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THE GENUS AGROSTIS L. IN EASTERN FENNOSCANDIA. TAXONOMY AND DISTRIBUTION

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To the memory of my father

Abstract

WIDÉN, KARL-GUSTAV (Dept. Botany, Univ. Helsinki): The genus *Agrostis* L. in eastern Fennoscandia. Taxonomy and distribution. — Flora Fennica 5:1—209. 1971.

The taxonomy, nomenclature and distribution of taxa of the genus *Agrostis* L. occurring in eastern Fennoscandia are treated. After a discussion of the typification of the genus, it is proposed that *A. canina* L. be conserved as the type species. A morphological description is given for each taxon, and the variation of some characters is illustrated with the aid of photographs and pictorialized scatter diagrams. The synonymy of the different taxa is discussed and numerous typifications of specific and infraspecific names are made. The literature on the cytology and its bearing on the taxonomy of the taxa treated are examined. Some new chromosome counts are reported. The distribution and immigration history of the taxa treated are discussed. Distribution maps are given. Ten interspecific hybrids are reported, two of which occur all over the region and are locally frequent and abundant. The taxa treated are: *A. canina* L., *A. stricta* J. F. Gmel. (= *A. coarctata* Ehrh. ex Hoffm., *A. canina* ssp. *montana* Hartm.), *A. mertensii* Trin. (= *A. borealis* Hartm.), *A. clavata* Trin., *A. scabra* Willd., *A. pourretii* Willd., *A. capillaris* L. (= *A. tenuis* Sibth.), *A. stolonifera* L., *A. gigantea* Roth var. *gigantea*, *A. gigantea* var. *repens* (Laest.) Widén, *A. gigantea* var. *glaucescens* Widén, *A. gigantea* var. *dispar* (Michx) Philipson, *A. mertensii* × *stricta*, *A.* × *bjoerkmanii* Widén (= *A. capillaris* × *gigantea*), *A.* × *murbeckii* Fouillade (= *A. capillaris* × *stolonifera*), *A. gigantea* × *stolonifera*, *A. canina* × *stolonifera*, *A. stolonifera* × *stricta*, *A. mertensii* × *stolonifera*, *A. gigantea* × *mertensii*, *A. capillaris* × *stricta* and *A. capillaris* × *clavata*.

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Contents

I. Previous investigations in Fennoscandia

Twelve *Agrostis* species were described by LINNAEUS in 1753. Of these five were treated in the second edition of his Flora Suecica (LINNAEUS 1755), namely *A. spica-venti*, *A. arundinacea*, *A. rubra*, *A. canina* and *A. stolonifera*, and were thus regarded as occurring in Sweden (which then included Finland; the omission of *A. capillaris* must have been a mistake as it was treated in the first edition of Flora Suecica [LINNAEUS 1745] and had not been united with any other species). *A. spica-venti* and *A. arundinacea* have subsequently usually been transferred to the genera *Apera* Adans. and *Calamagrostis* Adans. The characters used by LINNAEUS were mainly presence or absence of awn, form and colour of the panicle and growth direction of the culms and vegetative shoots; no account was taken of ligule and floret characters and the type of vegetative shoots. The characters used by LINNAEUS vary very much within the species, and consequently later authors have experienced great difficulties in identifying the Linnaean names and have used them in different senses. This is especially the case with *Agrostis alba* and *A. rubra*, names which in our days are rejected by most authors.

In the 18th and early 19th centuries *Agrostis mertensii* was united or confused with other species, as »*A. rubra*», or erroneously identified with the Central European species *A. alpina* Scop. or *A. rupestris* All. C. J. HARTMAN (1838) was the first who was able adequately to delimit and describe it, giving it the name *A. borealis* Hartm., which up to now has been used universally, while the older name *A. mertensii* Trin. (1836) has been wholly forgotten.

Very important contributions to the understanding of Fennoscandian *Agrostis* taxonomy were made by MURBECK (1898). He was the first to realize that hybridization between the species »played a not unimportant role in the genus» (original in Swedish). He emphasized that specimens that, judging from their morphology, could be interpreted as hybrids were regularly sterile in respect to pollen and seed production. He described four hybrids, three of which had not formerly been reported. MURBECK also described a new species (*A. bottnica*) previously unknown in Fennoscandia, but it was soon shown (H. LINDBERG 1906 a) to be identical with *A. clavata* Trin., a Eurasian species.

It was long before the next important contributions were made to the

Fennoscandian classification of *Agrostis*. In 1941 STERNER was able to show that, at least on the island Öland, *A. stolonifera*, as then delimited, could be readily divided into two species, viz. *A. stolonifera* s. str. and *A. gigantea* Roth. The latter species had been described by ROTH from Germany as early as in 1788, but had not been adequately characterized and delimited until PHILIPSON (1937) in Great Britain revised the distinguishing characters.

The distinction between the genus *Agrostis* and the closely related *Polypogon* Desf. was studied by HYLANDER (1945: 74). He demonstrated that *A. semiverticillata* (Forsk.) C. Christ., which occurs only adventitiously in Fennoscandia, should actually be transferred to *Polypogon*. Pedicels which break at their joint and fall together with the fruit and the glumes were the important distinguishing character mentioned by HYLANDER.

Very comprehensive and thorough investigations on the taxonomy and cytology of all the Fennoscandian and also numerous extra-Fennoscandian *Agrostis* species were performed by Sven O. Björkman. Only part of his results have been published, owing to his premature death in 1956. In 1951 BJÖRKMAN showed that the two varieties segregated by PHILIPSON within British *A. canina* differed in respect to their chromosome numbers, var. *fascicularis* (= var. *canina*) being diploid and var. *arida* tetraploid. The latter is treated by me as a species, *A. stricta* J. F. Gmel., and has several times been described in both Fennoscandian and other literature (see p. 36), though it was not adequately delimited until PHILIPSON and BJÖRKMAN pointed out the important distinguishing characters. Later BJÖRKMAN (1954a) showed that *A. gigantea* is always hexaploid (2n = 42), while *A. stolonifera* in Fennoscandia is mainly tetraploid (2n = 28), but also pentaploid (2n = 35) and hexaploid (2n = 42). The separation of the genus *Agrostis* from related genera was thoroughly studied and discussed by BJÖRKMAN (1960) on a world-wide basis, and several revisions were made as a result. As delimited by BJÖRKMAN, the genus comprises between 150 and 200 species, and is represented in all parts of the world. In Fennoscandia its delimitation does not present any difficulties. *Apera* has sometimes been included in *Agrostis*, but, as BJÖRKMAN (1960) showed, must have separated from it as early as at the diploid (2n = 14) level. The exclusion of *A. semiverticillata* was confirmed by BJÖRKMAN. He also discussed the subdivision of *Agrostis* in some detail. He showed that great importance attached to a character that had earlier been neglected and almost unknown, namely the development of a structure on the surface of the lemma, which he called a Trichodium net (see p. 19). Species having short paleas invariably have well-developed Trichodium nets, while species with long paleas either lack or have only rudimentary nets (exception: *A. capillaris*). The sections *Trichodium* (Michx) Trin. (containing the species with comparatively short paleas) and *Vilfa* (Adans.) Roem. & Schult. (containing species with long paleas) have usually been considered the two main groups of the temperate species of the genus *Agrostis* s. str. (see e.g. PHILIPSON 1937 and BJÖRKMAN 1960). If Agrostis is typified with *A. canina*, as proposed in this work, then sect. *Trichodium* becomes a synonym of *Agrostis* sect. *Agrostis*.

II. Aim, area and material of investigation

The principal aim of this study was to investigate the taxonomy, nomenclature and distribution of the taxa of the genus *Agrostis* occurring in eastern Fennoscandia. Attention has especially been paid to the separation of the various species and interspecific hybrids from one another. The differentiation of infraspecific taxa has also been studied, but, especially in the case of *Agrostis stolonifera*, it was found that a separate large-scale study covering a much wider region is needed.

The area of this investigation was at first East Fennoscandia, as defined by Nordic biologists (Fig. 60). Soon it became evident that a proper understanding of distributional and taxonomic problems, especially in the northern part, could be obtained only when the adjacent parts of N. Sweden and N. Norway (the regions comprised by Fig. 60) were included in the study. The enlarged investigation area belongs to Finland, Norway, Sweden and the U.S.S.R. The Soviet part has been divided by Soviet authors into the Murmansk Region, the Karelian A.S.S.R. and the Leningrad Region (see Fig. 60). The division into provinces used in this work is the one commonly used by Nordic florists (e.g. in map of HYLANDER 1953a). The vegetation zones and sections follow AHTI & al. (1968).

The material studied by me consists of herbarium material and living specimens studied in the field and after transplantation in the Botanical Garden of the University of Helsinki. All the material from the investigated area (and part of that from the western half of Fennoscandia) present in 1964 in the following herbaria has been studied (the abbreviations are according to Index herbariorum 1964):

BG	Botanical Museum, University of Bergen, Bergen, Norway.
H	Botanical Museum, University of Helsinki, Helsinki, Finland.
HEL	Institute of Propaedeutic Botany, University of Helsinki, Helsinki, Finland.
HFR	Forest Research Institute, Helsinki, Finland.
HSI	Department of Silviculture, University of Helsinki, Helsinki, Finland.
KUO	Department of Natural History, Kuopio Museum, Kuopio, Finland.
LD	Botanical Museum, University of Lund, Lund, Sweden.
LE	Herbarium of the Komarov Botanical Institute of the Academy of Sciences of the U.S.S.R., Leningrad, U.S.S.R. (material from the Soviet part of Fennoscandia and also types and selected sheets from other parts of the U.S.S.R. and from Alaska).
O	Botanical Museum, University of Oslo, Oslo, Norway.
OULU	Botanical Museum, University of Oulu, Oulu, Finland.
S	Botanical Department, Naturhistoriska Riksmuseet, Stockholm, Sweden.
TRH	Botanical Department, Museum of the Royal Norwegian Society for Science and Letters, Trondheim, Norway.
TROM	Botanical Department, Tromsö Museum, Tromsö, Norway.
TUR	Botanical Museum, University of Turku, Turku, Finland.
TURA	Biological Institute, Åbo Academy, Turku/Åbo, Finland.

UPS	Institute of Systematic Botany, University of Uppsala, Uppsala, Sweden.
UPSV	Institute of Plant Biology, University of Uppsala, Uppsala, Sweden.
VOA	Ostrobothnia australis, Vasa, Finland.

I also studied type material and some selected sheets of material collected outside Fennoscandia from the following herbaria:

ABS	Department of Botany, University College of Wales, Aberystwyth, Wales, Great Britain.
B	Botanical Museum, Berlin-Dahlem, Germany.
BM	British Museum (Natural History), London, Great Britain.
BR	Jardin Botanique de l'Etat, Brussels, Belgium.
BRNU	Botanical Institute and Herbarium of J. E. Purkyne University, Brno, Czechoslovakia.
G	Conservatoire et Jardin Botaniques, Geneva, Switzerland.
GB	Institute of Systematic Botany, University of Gothenburg, Gothenburg, Sweden.
GH	Gray Herbarium of Harvard University, Cambridge, Massachusetts, U.S.A.
GOET	Systematisch-Geobotanisches Institut, University of Göttingen, Göttingen, Germany (Bundesrepublik).
HAL	Institute of Systematic Botany and Plant Geography, Martin Luther University, Halle (Saale), Germany (D.D.R.).
KW	Botanical Institute of the Academy of Sciences of the Ukrainian S.S.R., Kiev, U.S.S.R.
L	Rijksherbarium, Leiden, Netherlands.
LCU	The Catholic University of America, Washington, D.C., U.S.A.
LINN	The Linnean Society of London, London, Great Britain.
M	Botanische Staatssammlung, Munich, Germany.
MW	Department of Botany, Lomonosov State University of Moscow, Moscow, U.S.S.R.
OXF	Department of Botany, University of Oxford, Oxford, Great Britain.
P, P-HA, P-LA	Laboratoire de Phanérogamie, Museum National d'Histoire Naturelle, Paris, France.
PRC	Institutum botanicum Universitatis Carolinae, Prague, Czechoslovakia.
TAA	Institute of Zoology and Botany, Academy of Sciences, Tartu, Estonian S.S.R., U.S.S.R.
TU	Department of Taxonomy and Geobotany, Tartu State University, Tartu, Estonian S.S.R., U.S.S.R.

The herbarium material studied amounts to about 10 000 sheets. It is, however, not evenly distributed over the area studied. ERKAMO (1956, 1957 in ULVINEN) and SUOMINEN (1967) give information about the extent of the floristic exploration of different parts of Finland. In particular, the herbarium material available from the Soviet part of Fennoscandia was much scantier than that of other parts of the area investigated. I myself collected herbarium material in N in Finland during the years 1955—1970. In 1965, 1966, 1967 and 1969 I travelled widely and collected material from most parts of the investigation area, except LL, PL, LyL and ÅsL in Sweden and Nrd in Norway and Soviet Fennoscandia (where only Lps and Lt were visited by me in 1967). About 300 clones from different parts of the investigation area were transplanted in a uniform environment in the Botanical Garden of the University of Helsinki. Observations of phenotypic variation were made on this material. It was also used for chromosome counts (see p. 23). In the morphological descriptions and distribution maps only material studied by me has been taken into consideration. The information on habitats is according to my own experience and the herbarium labels, unless otherwise stated.

III. The typification of the genus *Agrostis* L. 1753

A. The Linnaean diagnosis

LINNAEUS described the genus *Agrostis* as early as in 1737, in the first edition of Genera Plantarum (p. 19). However, according to the International Code of Botanical Nomenclature (abbreviated as »the Code» later in this work), the diagnosis in the fifth edition of Genera Plantarum (LINNAEUS 1754: 30) has priority, and is regarded as published simultaneously with the first edition of LINNAEUS's (1753) Species Plantarum, on 1 May 1753. The diagnosis in Genera Plantarum (1754) is as follows:

74. AGROSTIS.*

CAL. *Gluma* uniflora, bivalvis, acuminata.
COR. bivalvis, acuminata, vix longitudine calycis; altera majore ariſtata.
STAM. *Filamenta* tria, capillaria, corolla longiora. *Antheræ* furcatæ.
PIST. *Germen* ſubrotundum. *Styli* duo, reflexi, villoſi. *Stigmata* ſimilia.
PER. *Corolla* adnaſcitur ſemini, nec dehiſcit.
SEM. unicum, ſubrotundum, utrinque acuminatum.

This diagnosis is essentially the same as that given in 1737, the only difference being that the reference »vide Scheuch. 3:11.9.» (= SCHEUCHZER 1719 Tab. III Fig. 11,9) has been replaced by an asterisk. According to STEARN (1962: X), the asterisk means that the diagnosis was based on a study of living material. Only some of the species depicted in SCHEUCHZER's (1719) Tab. III Fig. 11,9 were cited in the first edition of Species Plantarum.

»*Gramen serotinum, arvense, panicula contracta, pyramidali*» (Tab. III Fig. 11:C) was referred to *Agrostis rubra*. This was evidently a mistake, and LINNAEUS (1762: 91) corrected it in the second edition of Species Plantarum, when he transferred the phrase-name in question to the new species *Milium lendigerum* (= *Gastridium ventricosum* [Gouan] Schinz. & Thell.).

»*Gramen paniculatum, supinum, ad infima culmorum genicula, foliorum capillarium fasciculis donatum*» (Tab. III Fig. 9:C) was quoted under *A. canina* in the first edition of Species Plantarum.

»*Gramen arundinaceum, panicula densa viridi-argentea splendente aristata*» (Tab. III Fig. 11:A, B) was described by LINNAEUS (1762) as *Agrostis Calamagrostis* (= *Achnatherum calamagrostis* [L.] PB.) in the second edition of Species Plantarum.

As far as I know, Linnaeus never cited SCHEUCHZER's three phrase-names »*Gramen parvum, paniculatum, alpinum, panicula spadicea, aristatum*», »*Gramen paniculatum, capillaceo folio, locustis parvis spadiceo-fuscis, aristatis*» (Tab. III Fig. 9:A, B depicted these two polynomials, the former of which is *A. alpina* Scop. and the latter *A. rupestris* All., according to TRINIUS 1822) and »*Gramen Caninum Vineale*» (Tab. III Fig. 9:D, E; the identity is uncertain).

It is thus evident that, despite the unaltered diagnosis, the genus *Agrostis* in the first edition of Species Plantarum and the fifth edition of Genera Plantarum was largely based on different elements from those in the 1737 edition of Genera Plantarum (only two of the six polynomials of SCHEUCHZER included in 1737 were cited in 1753). We must suppose that LINNAEUS had checked the fitness of the diagnosis on one or a few species treated in Species Plantarum (1753), and based it on them instead.

B. Previous typifications

LINNAEUS did not give any type species for the genus *Agrostis* in his original description (LINNAEUS 1754). All the twelve species described in Species Plantarum (1753) are thus syntypes according to the Code (Art. 7), and the first author to designate a lectotype among them must be followed; the choice may be superseded if it can be shown that his choice was based upon a misinterpretation of the protologue or was made arbitrarily (Art. 8 as modified in 1969; see MOORE & al. 1970: 44). Below I discuss the typifications known to me.

1 ADANSON (1763: 495) amended the genus *Agrostis* L. 1753, as in his additions and corrections he divided it into four genera. These are 1. *Mibora* Adans. (based on »*Gramen.* Mor. s. 8. t.2.f.10» and *Agrostis* 10. Lin. Spec. 63»), 2. *Vilfa* Adans. (based on »*Gramen canin. supin.* C. B. Theat. 12» and in the index »*Gramen canin. supin. minus.* C. B.» and »*Gram. palust. panicula speciosa.* C. B.»), 3. *Apera* Adans. (based on »*Gramen capillatum.* J. B. Hist. 3. p. 462» and in the index »*Agrostis* 1. *Spica venti.* Lin.») and 4. *Agrostis.* For *Agrostis* the elements »*Sifon*-Teofr.», »*Sifonion.* Graec.» and »Scheuz. 57» were cited in the index. The last-mentioned element has confused earlier authors very much. A. S. HITCHCOCK (1905: 17, 19) considered it to represent *Saccharum.* PHILIPSON (1937: 76) again considered it to belong to the »modern genus *Imperata*», and stated that it must be regarded as having been wrongly included by ADANSON in his genus *Agrostis*, being awnless, while *Agrostis* was included in the »section *Avenae*», a group of genera possessing a dorsal awn on the lemma. However, the origin of this element is explained by a comparison of the first edition of Species Plantarum (LINNAEUS 1753) with ADANSON's quotation. Under *Agrostis arundinacea* LINNAEUS (1953: 61) cited »*Gramen avenaceum montanum, panicula angusta e dilutissimo fusco albicante* & *papposa* Scheuch. gram. 57». However, this polynomial was treated by SCHEUCHZER (1719) on page 507, not 57. This error was corrected

by LINNAEUS (1762: 91) in the second edition of Species Plantarum. The assumption that ADANSON's »Scheuz. 57» originates from this citation in the first edition of LINNAEUS's Species Plantarum is supported by the fact that ADANSON adopted another error from that work in his citation of »*Gramen capillatum.* J. B. Hist. 3. p. 462». This polynomial is actually described on page 462 in the second volume of J. BAUHIN & J. CHERLERUS (1651), and not in the third volume, but the third volume was also quoted by LINNAEUS (1753).

It is thus obvious that no importance can be attached to ADANSON's quotation of »Scheuz. 57», as its origin had not been checked, and ADANSON clearly took it directly from Species Plantarum (1753). Accordingly, ADANSON's *Agrostis* should be typified by *A. arundinacea* L. 1753, the species under which »Scheuz. 57» was quoted. However, it is not clear whether ADANSON's (1763) amendment of the genus *Agrostis* L. 1753 can also be considered a typification. »Scheuz. 57» (= *A. arundinacea*) was the only element included by LINNAEUS in *Agrostis* which was cited by ADANSON, but it was probably only given as an example, and other Linnaean species may also have been included in ADANSON's *Agrostis*. It is thus questionable whether ADANSON can be considered to have made a typification. However, *A. arundinacea* fits the original Linnaean description of *Agrostis* in respect to every character, and *Adanson* cannot be said to have misinterpreted the original description (in the sense of Art. 8 of the Code) when he made his amendment of *Agrostis* L. 1753. Nowadays *Agrostis arundinacea* is always referred to the genus *Calamagrostis* Adans. 1763.

2. A. S. HITCHCOCK (1905: 20) was the first author who definitely stated that he selected a type species for the genus *Agrostis:* »Following the provisions of canon 15, section f, of the recent Code of Botanical Nomenclature (Bul. Torr. Bot. Club 31: 249), I have selected as the type species of the genus *Agrostis, A. alba* L.». This type selection has been accepted by at least BRITTON & BROWN (1913) and the staff of Index Nominum Genericorum. The type specimen of *Agrostis alba* L. is, however, *Poa nemoralis* L. (see p. 101), a species with many-flowered spikelets, which consequently does not at all fit the original generic description of *Agrostis*. On the other hand, the nomenclatural type of a genus is a species (Art. 10 in the Code) and not a name, and *Agrostis alba* L. should be considered in the sense of A. S. HITCHCOCK (1905). Fortunately HITCHCOCK (1905) typified *A. alba* L. in the same study, and although his type specimen cannot be considered the correct type of *A. alba* L. (see p. 100), it makes his interpretation of the species quite clear. The specimen belongs to *Agrostis gigantea* Roth. This species was not named by LINNAEUS (1753) in Species Plantarum, but, being a widely distributed plant in south Sweden (see HYLANDER 1953 a), it may well have been included in one of the Linnaean syntypes (e.g. *A. stolonifera* or *A. capillaris*). However, this is not certain as the only specimen in the Linnaean herbaria was evidently collected later than 1753 (see p. 100). Thus it is an open question whether *A. alba* L. sensu A. S. HITCHCOCK 1905 (= A. *gigantea* Roth) can be accepted as the type species of *Agrostis* L., especially as the species in which it was possibly included by LINNAEUS belong to ***Muticae* and therefore do not completely fit the original generic description.

3. In 1920 A. S. HITCHCOCK (p. 125—126) observed that his earlier (1905) lectotype designation for *Agrostis alba* L. was incorrect, and that the name possibly was synonymous with *Poa nemoralis* L. He therefore proposed a new type species for the genus *Agrostis*, namely *A. stolonifera* L., because this was an economic species. At the same time A. S. HITCHCOCK (1920: 125, 127) noted that only the species referred by Linnaeus (1753) to **Aristatae*, and possessing a palea, fit the original generic description, but he neglected this point in his choice of type species. The Code and the appended Guide (Rec. 7B, Art.

8, Guide for the determination of types Note 4e) do not seem to sanction this neglect. However, *A. stolonifera* L. has been treated as the type species of *Agrostis* L. 1753 in several later studies (e.g. A. S. HITCHCOCK 1923, A. S. HITCHCOCK & GREEN 1929, PHILLIPS 1951 and MANSFELD 1959). For the typification of *A. stolonifera*, see pp. 82—84.

4. PHILIPSON (1937: 75—76) stated that the »standard species» of *Agrostis* L. should be selected among the Linnaean (1753) species within **Aristatae*, since the description of the genus included reference to an awn. Being the only Linnaean (1753) aristate species of certain identity generally included in *Agrostis*, *A. canina* L. was proposed by PHILIPSON (1937) as the »standard species». Unfortunately this species lacks a palea visible without a mcroscope, and therefore does not fit the original description (the statement »corolla bivalvis» in the diagnosis of LINNAEUS [1754] refers to the lemma and palea). If it is wished to ignore the disagreement with the generic description, *A. canina* must be proposed for conservation before it can be chosen as type species, because *A. stolonifera*, which disagrees about as much with the description, was designated earlier.

C. Discussion

If the Code and the »Guide for the determination of types» (the latter does not belong to the Code but is obviously a most authoritative interpretation of it; MC VAUGH 1969: 477, 478) are strictly applied to the typification of the genus *Agrostis* L. 1753, the lectotype should evidently be chosen among the syntypes in Species Plantarum (1753) which completely fit the original generic description in Genera Plantarum (1754). There are twelve syntypes divided between **Aristatae* (Nos. 1—6) and ***Muticae* (Nos. 7—12): 1. *A. spica-venti* 2. *A. miliacea*, 3. *A. arundinacea*, 4. *A. rubra*, 5. *A. canina*, 6. *A. paradoxa*, 7. *A. stolonifera*, 8. *A. capillaris*, 9. *A. alba*, 10. *A. minima*, 11. *A. virginica* and 12. *A. indica*. Of these twelve syntypes only a minority seem to agree completely with the original generic description (this is generally the rule with the larger Linnaean genera, according to, e.g., PENNELL 1930: 10, STEARN 1962: XII and DAVIS & HEYWOOD 1963: 285, and is due to the descriptive method of LINNAEUS). The six species grouped in ***Muticae* must evidently be rejected, as the generic description referred to awned lemmas. Among the species grouped in **Aristatae*, the identity of *A. rubra* is dubious (see pp. 54—56), while *A. canina*, as mentioned, lacks paleas visible without a microscope and thus does not fit the description completely. *A. spica-venti*, *A. miliacea*, *A. arundinacea* and *A. paradoxa* have awned lemmas and paleas visible to the naked eye and thus tally with the original generic description (WIDÉN 1967). Unfortunately none of these four species are nowadays referred to the genus *Agrostis*. *A. spica-venti* is the nomenclatural type of *Apera* Adans. 1763 (A. S. HITCHCOCK 1920: 127). *A. arundinacea* is generally treated as belonging to *Calamagrostis* Adans. 1763 (type species *Arundo calamagrostis* L. = *Calamagrostis canescens* [Web.] Roth; see A. S. HITCHCOCK 1935: 313), while *A. mi-*

liacea and *A. paradoxa* are referred to *Oryzopsis* Michx 1803 (type by monotypy *O. asperifolia* Michx). Lectotypification with any of these four species would thus inevitably lead to very undesirable nomenclatural changes.

The earliest designated lectotype species, *Agrostis alba* L. sensu A. S. HITCHCOCK (1905) = *A. gigantea* Roth, is probably included in the Linnaean syntypes, but this seems impossible to prove. In addition it belongs to the ***Muticae* group, which does not wholly fit the original description, and has not won general acceptance as the type species of *Agrostis* L. 1753. *A. stolonifera,* which was designated as type in 1920, belongs to the syntypes but was included in ***Muticae,* and its possible acceptance as type species, despite the disagreement with the original description, depends on whether it can be shown that *A. alba* L. sensu A. S. HITCHCOCK (1905) was not included in any of the Linnaean syntypes. However, the selection of *A. stolonifera* seems inadvisable as it is against the principles laid down in the »Guide for the determination of types».

In view of these facts, it seems to me that nomenclatural stability would best be ensured by the procedure of conservation (see Art. 14 in the Code and RICKETT & STAFLEU 1959). In my opinion, *A. canina* L. 1753 is the species most suitable for conservation as the type species of the genus *Agrostis* L. It can be quite satisfactorily lectotypified (see p. 31), belongs to the species upon which LINNAEUS originally based the genus (see p. 9), and has only seldom, and never in recent times, been referred to other genera.

Proposal: It is proposed that *Agrostis canina* L. 1753 be conserved as the lectotype of the genus *Agrostis* L. 1753.

IV. The taxonomically important characters

A. Habit

All indigenous Fennoscandian *Agrostis* species are perennial, except *A. clavata.* The culms and vegetative shoots are more or less tufted or mat-forming. Species which develop abundant erect intravaginal vegetative shoots (*A. capillaris, A. clavata, A. mertensii*) may be densely tufted, while species with mainly extravaginal rhizomes (*A. gigantea*) are rather loosely tufted. Species which have abundant intravaginal stolons (*A. canina* and some types of *A. stolonifera*) are often mat-forming and not tufted. The growth habit, is, however, much modified by the habitat.

B. Vegetative shoots

The vegetative shoots can be divided into two main types, intravaginal and extravaginal. The latter penetrates its enveloping leaf sheath, while the former grows up within it. The occurrence or absence of extravaginal shoots is a character which has great taxonomic significance in the genus *Agrostis,* as was shown by PHILIPSON (1937).

The intravaginal vegetative shoots are always aerial and possess complete green foliage leaves with both sheath and lamina. Sometimes they may become covered by soil or mosses and are then pale, but still have leaves with well-developed laminae. In respect to growth direction, the intravaginal shoots may be erect, ascending or procumbent. The erect shoots are rather short with comparatively short internodes, while the procumbent shoots, usually known as stolons, frequently become much longer and have elongated internodes. The vegetative shoots grow also after flowering. In this work the length reported for vegetative shoots always refers to the time of flowering, and specimens in fruit may thus have much longer shoots than described. Erect intravaginal shoots occur in all species, while the occurrence of stolons can be important as a taxonomic character. It must be kept in mind that the formation of stolons is much restricted by dry habitats and favoured by damp habitats.

The extravaginal vegetative shoots are at first subterranean and pale, and furnished with scale-leaves without developed laminae. Later they change growth direction and form aerial shoots.

It should be noted whether the extravaginal shoots have three or fewer scale-leaves and ascend at once, or whether they have more than three scale-leaves and grow longer distances (about 5—20 cm) subterraneously before they ascend.

C. Culms

In respect to height, growth direction and thickness, the culms vary very much among the taxa studied. The height may be only about 5 cm in some clones of *A. mertensii,* while *A. gigantea* may become up to 1.5 m tall. Although genetically determined, the culm height is much modified by the environment, and, in addition, the amplitude of the intraspecific genotypic variation is very large (e.g. in *A. gigantea* the height varies from 20 cm to 1.5 m). The height character can therefore only be considered taxonomically significant in some instances.

More important than the height is the character of growth direction. Decumbent geniculately ascending culms which branch at their bases are restricted to certain taxa (*A. canina, A. gigantea* var. *gigantea* and some types of *A. stolonifera*). It must, however, be kept in mind that the culms of taxa which usually have erect culms may be bent down by some external agent and then become geniculate. The number of nodes and the attachment point of the culm leaves vary both in and between the different species. The culm leaves are in this work enumerated from the top of the culm downwards.

D. Foliage leaves

1. *Lamina*

In respect to length and width of leaf laminae the variation is rather great in all species, and the variation ranges of most species overlap one another. The widest laminae (up to 1.2 cm) are encountered in some types of *A. gigantea*, while *A. canina* and some types of *A. stolonifera* possess very narrow laminae (only about 0.5—1 mm wide). The surface of the blades may be scabrous, owing to the occurrence of microscopical hairs, or smooth. This character has importance in the infraspecific classification of at least *A. gigantea*. The colour of the laminae shows both interspecific and intraspecific variation. This character seems, however, to be important only in the delimitation of infraspecific taxa. Laminae with involute margins are typical of the erect vegetative shoots of *A. canina*, while in the other species the leaves are all flat or slightly folded. In drought the lamina margins of some taxa (*A. stricta*, sea-shore types of *A. stolonifera*) may soon become involute. There are differences between some species in respect to the number of leaf nerves, but owing to overlapping this character seems to be of minor importance.

The leaf anatomy has proved to be a very important character both in the subdivision of the grass family into subfamilies and tribes, and also in the classification at species level (summarized e.g. by METCALFE 1960). An anatomical study of the leaves (and also culms, stolons and rhizomes) of the British species of *Agrostis* was made by PHILIPSON (1937) with the aim of revealing taxonomically important characters. However, he concluded that »this means of investigation is totally inadequate as a means of taxonomic identification» (PHILIPSON 1937: 134). Later VOVK (1965a) studied the leaf anatomy of the Ukrainian *Agrostis* species, and was much more inclined to accord it taxonomic significance. The literature on the anatomy of *Agrostis* species has been listed by METCALFE (1960: 16; a later study of BURDUJA & TOMA 1964 may be added).

In this work I made a preliminary study of stoma length, a character whose variation is often correlated with different levels of polyploidy. The

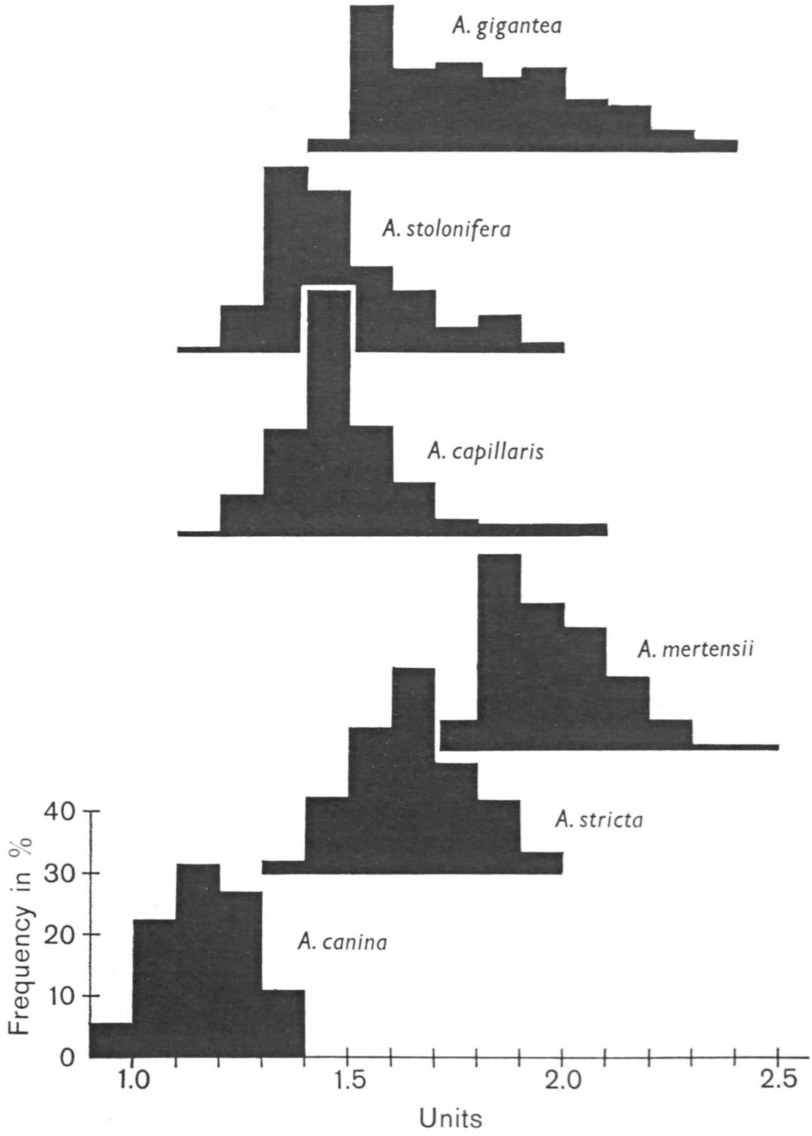

FIG. 1. Histogram illustrating the variation of stoma length in some *Agrostis* species. Material included marked with ** in the list of specimens studied. Ten stomata were measured in each individual studied. 1 unit = 25.7 μm. Cf. p. 17.

results are shown in Fig. 1. In the case of *A. canina* (2 ×), *A. stricta* (4 ×) and *A. mertensii* (8 ×) the overlapping in the stoma length of the different polyploidy levels is rather slight, while *A. gigantea* (6 ×) shows much more overlapping with the related species *A. capillaris* (4 ×) and *A. stolonifera* (4 ×). Earlier S. O. BJÖRKMAN (1960: 47) has shown that diploid and tetraploid cytotypes of *A. rupestris* All. differ in stoma length.

Stoma length was measured on both dry and fresh material. The piece of epidermis with stomata was always taken from the basal half of the under side of the lamina of the second leaf of the culm. Prior to examination dry leaves were boiled in a drop of water on a slide.

2. *Sheath*

The leaf sheaths provide rather few taxonomic characters. Within *A. gigantea* the colour and scabrousness of the leaf sheath are, however, important characters of infraspecific taxa.

3. *Ligule*

Especially at species level, the length and form of the ligules provide very important taxonomic characters, which were neglected by LINNAEUS, although already known in pre-Linnaean times (at least by SCHEUCHZER 1719). When studying the ligules, attention should be paid to: 1. the absolute length 2. the length/width ratio (manner of measurement in this work shown in Fig. 46 1) 3. the form of the apex. The variation encountered is shown in Figs. 46—47.

The length of the ligules on different leaves varies in the same individual, but always according to the same pattern. The uppermost culm leaf has the longest ligule, and the ligules gradually decrease in length down the culm. The ligules on the leaves of the vegetative shoots are about as long as on the lower culm leaves. Consequently, when the ligule length of different plants is compared, leaves in corresponding situations should always be chosen. The ligule apex is often split. Especially after flowering long ligules often become fragmented, a fact to which attention must be paid when measuring the ligule length and studying the apex.

E. Panicle

The panicles provide some characters in respect to form, size and branching. The largest panicles are met with in *A. gigantea* and may be 40 cm long, while the smallest panicles occurring in *A. stolonifera* are only about 2 cm long. Although there are differences in the average panicle size between the different taxa, it is evident that the great variation within the taxa prevents this character from being very useful in specific delimitation.

In respect to the form of the panicles, the variation ranges from narrowly lanceolate to ovate. Again the variation within the different species is considerable, and the character is evidently useful mainly at the infraspecific level, since the variation ranges of the different species partly cover one another. The panicle branches (branches of the first order), branchlets (branches of the second order) and pedicels (branches bearing spikelets) have some diagnostic characters. Attention should be paid to the point of branching (whether in the upper or lower half or in the middle), the length relation of different branches from the same node to one another, and the orientation of the branchlets and pedicels (whether projecting in one or several planes). The branches, branchlets and pedicels may be quite smooth or scabrous in various degrees. This character seems to be comparatively stable within most species, but varies much in *A. stolonifera* and *A. stricta*. It can be studied with a magnification of about 30 times. Fig. 48 shows the variation encountered: surface texture is here classified as smooth (Fig. 48 g, i), slightly scabrous (Fig. 48 c, m), intermediately scabrous (Fig. 48 a, e, o, q) or very scabrous (Fig. 48 f, k, s, v).

F. Spikelets

1. *Glumes*

The glumes provide practically no important characters among the taxa here treated. Differences exist between the species in respect to the average length and form of the apices, but considerable overlapping occurs between most species. Likewise the colour of the glumes seems to be of little importance as a taxonomic character. Greenish colour occurs in shade modifications. Yellowish colour is genetically determined but does not seem to be correlated with other characters.

2. *Floret scales (lemma and palea)*

In contrast to the glumes, the lemma and palea have been found to yield many very important characters, several of which seem to vary rather little within the species except in *A. stolonifera*, which is very heterogeneous taxonomically.

The floret scale characters are listed below:

a. Length ratio palea/lemma

A rough estimate may be made with a lens with a magnification of about 10 times. More exact measurements should be made on embedded material (e.g. in Euparal) under a microscope. The magnification can be about 30 times when taxa with relatively long paleas are studied. The measurement of minute paleas (in sect. *Agrostis*) requires a magnification of about 100 times. Figs. 8, 10, 12, 17, 19, 21, 23, 50—52 illustrate the variation in taxa with relatively long paleas.

b. Apex of lemma

The form of the apex of the lemma (whether acute, obtuse or truncate) is sometimes a useful character, perhaps especially at the infraspecific level. A magnification of about 30 times is suitable for the study of this character. Figs. 50—52 show the variation encountered.

c. Nerves of lemma

Attention should be paid to the number of nerves, the length of the nerves in relation to the length of the lemma, and the length of the nerves in relation to one another (Figs. 50—52). A magnification of about 30 times is sufficient. Embedded material is to be preferred.

d. Prickle-hairs

Some taxa have microscopical one-celled epidermal hairs with swollen bases and gradually narrowing apices projecting above the lemma surface. In the literature these hairs, which were observed long ago by LEERS (1775), have been called, e.g., asperities (PHILIPSON 1937) or scabrities (S. O. BJÖRKMAN 1960). In his thorough study of the anatomy of the grasses METCALFE (1960) used the term prickle-hair, subtype hook, and supposed that they are homologous with the so-called short-cells occurring in the epidermis of grasses. The study of lemma prickle-hairs is best made on embedded material with a magnification of about 500 times. Seen from above in optical transverse section the prickle-hairs are elliptic.

The species studied divide into two main groups in respect to the occurrence of lemma prickle-hairs: *A. canina*, *A. mertensii*, *A. pourretii* and *A. stricta* invariably have lemmas with comparatively dense prickle-hairs (Fig. 53 a), while in *A. capillaris*, *A. clavata*, *A. gigantea* and *A. stolonifera* the prickle-hairs are scattered or absent (Fig. 53 d; *A. stolonifera* again shows more variation than the other species in this group, Fig. 53 c). The hybrids are mostly intermediate in respect to this character.

e. Structure of epidermal cell walls of lemma

The epidermal cells of the lemmas are long and rather narrow (see e.g. Fig. 56 d). In some species the outer walls of the cells bear distinct thicker reinforcement ribbons on their inner surfaces. When studied under the microscope, the lemma surface gives the impression of bearing a fine-meshed network (see Fig. 54 a). The first to pay attention to this network was probably the Swede T. Vestergren who in the twenties revised the *Agrostis* material of the Botanical Dept. of Naturhistoriska Riksmuseet in Stockholm (S; cf. S. O. BJÖRKMAN 1960: 28). The herbarium sheets contain annotations and drawings illustrating the character, and the denomination »Trichodium nät» was used for the network, but the observations were never published. The name »Trichodium nät» suggests that Vestergren had noticed that the species with minute paleas usually referred to the section *Trichodium* (Michx) Trin. always had such a network. Later the occurrence of a lemma network in some Spanish *Agrostis* species was noted by PAUNERO (1953: 335—336), but did not lead to any major taxonomic conclusions.

S. O. BJÖRKMAN (1960: 28—37) performed thorough studies on the anatomical structure and taxonomic significance of the lemma network, for which he adopted Vestergren's name Trichodium net. After a study of almost all the *Agrostis* species in the world, S. O. BJÖRKMAN (1960) showed that the occurrence or absence of a Trichodium net seemed to be a most important character in the sectional subdivision of *Agrostis*. The species with short paleas generally referred to sect. *Trichodium* (Michx) Trin. invariably had well-developed Trichodium nets, while the species usually referred to sect. *Vilfa* (Adans.) Roem. & Schult., with paleas measuring 1/3 the length of the lemmas or more, lacked or had fragmentary Trichodium nets (*A. capillaris* being, however, an exception in respect to this character). S. O. BJÖRKMAN'S (1960: 98—103) Tab. 1 gives information about the surface structure of the lemmas of almost all the *Agrostis* species.

In his study of the surface structure of the lemmas S. O. BJÖRKMAN (1960) used a technique which included staining by boiling in lactic acid containing 0.05 % methyl green and 0.1 % acid fuchsine. I have obtained quite sufficient clearness by simply immersing the floret scales for a few seconds in absolute alcohol and then mounting them in Euparal. In this way large amounts of permanent slides could be rapidly obtained for routine analysis. To study them a magnification of at least 500 times is required. According to S. O. BJÖRKMAN (1960: 30), the ventral (inner) epidermis of the lemmas does not provide any distinguishing features at specific level. This is, however, an error as I have invariably found the same type of Trichodium net in the ventral epidermis as in the dorsal epidermis.

The type of lemma surface structure is a character that varies little within most species (*A. stolonifera* is, however, again an exception). S.O. BJÖRKMAN (1960: 32) divided the species investigated by him into four main groups as regards the development of the Trichodium net: »(1) network fully developed over the whole surface, (2) network only fragmentarily developed, (3) without developed network but with a tendency towards it (lateral flaps occur), and (4) entirely without network or tendency towards any.» In my study I found the lemma surface structure a most useful character. I divided the different surface structures into 7 main types (on the basis of the epidermis of the basal half of the lemma):

I Trichodium net fully developed with thickened transverse ribbons about as wide as, or wider than, the unthickened parts of the outer epidermis cell wall (Fig. 54 a—d).
II Trichodium net fully developed but with transverse ribbons about 2/3—1/2 the width of the unthickened wall portions (Figs. 55 c, 59 c, d).
III Trichodium net fully developed with transverse ribbons about 1/2—1/5 the width of the unthickened wall portions (Figs. 55 b, 57 d, 59 a, b).
IV Trichodium net fragmentary with some complete transverse ribbons, and some ribbons not extending across the whole cell (Fig. 57 c, 58 a).
V Trichodium net very fragmentary. Most transverse ribbons are discernible near the lateral cell walls, but disappear or become very faint towards the middle of the upper cell walls (Figs. 56 a, c, 57 b).
VI Trichodium net not developed but tendency towards a net revealed by initials of transverse ribbons occurring near the lateral cell walls (Fig. 55 d, 57 a, 58 b).
VII Trichodium net not developed. Even fragmentary transverse ribbons wholly absent (Fig. 56 d).

Type I is very distinct and nets transitional between it and type II seldom occur. The other types are not as distinct, but the division into types is useful in describing differences between the taxa. Figs. 2, 21 and 23 show the frequency of the different types of lemma surface structure in the species and interspecific hybrids.

f. Awn

The occurrence or absence of a dorsal awn on the lemma is a character which has received much attention. It is true that some species are normally awned (*A. canina, A. mertensii; A. stricta* belongs to this group but unawned clones are frequent), while other

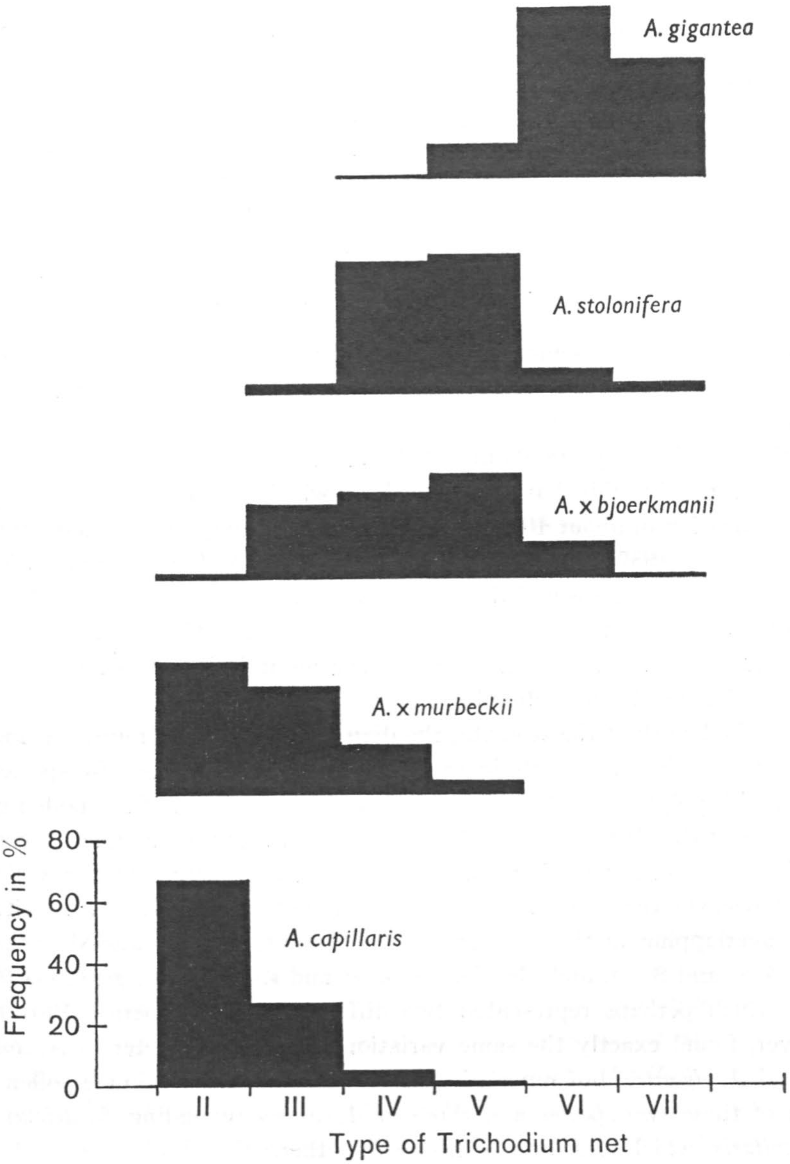

FIG. 2. Histogram illustrating the frequency of the different types of lemma surface structure in some *Agrostis* species and hybrids. Material included marked with ″ in the list of specimens studied. Cf. pp. 19—20.

species are usually unawned (*A. capillaris, A. clavata, A. gigantea, A. stolonifera*). However, clones which deviate in respect to the occurrence or absence of awns occur in most species, and have evidently arisen several times independently, as they are not restricted to any special area, and the difference is not correlated with other characters. Accordingly, the occurrence or absence of awns seems to be of only minor taxonomic significance. A character which seems to be more important is the insertion point of the awns. In some species the awn, when present, has its insertion point in the lower half of the lemma (*A. canina, A. capillaris, A. mertensii, A. stricta*), while in other species (*A. gigantea, A. stolonifera*) the point always lies in the upper half. There are differences in the average awn length between the different species, but intraspecific variation is great.

3. *Anthers, time of anthesis, pollen*

The relation of the length of the anthers to the length of the lemma is a character which is stable within the species. *A. clavata, A. mertensii* and *A. scabra* have anthers measuring only 1/4—1/3 the length of the lemma, while in the other species they are about 2/3 the length of the lemma.

Male-sterile hybrids have thin anthers which do not dehisce (Fig. 49). A magnification of about 10 times suffices for the study of this character.

PHILIPSON (1937: 146), DAVIES (1953) and VOVK (1966) found different diurnal times of anthesis in different British and Ukrainian species of *Agrostis*. According to VOVK (1966) in mesophilous species the time of anthesis is in the morning while in more xerophilous species it is in the afternoon. This character has not been studied by me.

Like the length of the stomata, the diameter of the pollen grains is known frequently to increase with increasing chromosome number in species or genera with polyploidy. Measurements have been reported of the pollen grain diameters of the British species (PHILIPSON 1937: 148; the diameters given are certainly ten times too short) and some species occurring in the U.S.S.R. (SOKOLOVSKAJA 1955, 1962). SOKOLOVSKAJA found different diameters, without much overlapping in the variation, for *A. canina, A. trinii* and *A. mertensii* (2 ×, 4 × and 8 ×), and also for »*A. alba*» and »*A. alba var. gigantea*» (4 ×, 6 ×), which perhaps represented two different polyploid series. PHILIPSON however, found exactly the same variation in pollen diameter in *A. stolonifera* and *A. gigantea*, but reported differences between the average pollen diameter of these two species and those of *A. canina* (including *A. stricta*) and *A. capillaris*, which also differed from each other.

4. *Abnormal spikelets*

Normally all *Agrostis* species have one-flowered spikelets. Two-flowered spikelets can, however, sometimes be observed in any of the species, and seem to have no taxonomic significance. Specimens which are infected by the smut fungus *Tilletia sphaerococca* (Wallr.) Fisch. v. Waldh. (synonym *T. decipiens* [Pers.] Körn.) have a very dwarfed habit, and small compact panicles. The parasite occurs at least in *A. capillaris*, and infected specimens received the name *A. pumila* LINNAEUS (1767: 31; see LINDEBERG 1959: 74—75). Like all other names based on monstrosities, this must be rejected in accordance with the Code (Art. 71).

Agrostis spikelets may also be infected by the nematode *Anguillina agrostis* (Steinbuch). According to PHILIPSON (1935), spikelets which have elongated glumes and lemmas and whose ovaries are transformed into galls are infected by this nematode. *A. sylvatica* HUDSON (1762) was, according to PHILIPSON (1937: 99), based upon specimens of *A. stolonifera* infected by *Anguillina agrostis*, and must therefore be rejected.

Sometimes »viviparous» spikelets are met with especially in *A. capillaris*. The glumes are normal but the lemma becomes elongated and resembles small foliage leaves. In some grass genera (e.g. *Deschampsia*, *Poa*) this character has taxonomic significance, but this is evidently not the case in *Agrostis*, where it is rare and does not appear to be restricted to any special area. *A. sylvatica* POLLICH (1776) was based on »viviparous» specimens of *A. capillaris*. The Code does not define the word »monstrosity», and hence it is an open question whether »viviparous» *Agrostis* specimens are to be treated as monstrosities or not.

All the four kinds of abnormal spikelets described above occur in the material studied by me, but are rare (a note about viviparous *Agrostis* specimens in Sweden and Norway has been given by ÅBERG 1940).

G. Cytology

The chromosome numbers found within the genus *Agrostis* constitute a polyploid series ranging from diploid (2n = 14) to decaploid (2n = 70) with x = 7 (BJÖRKMAN 1960: 10, LÖVE & LÖVE 1961, BOLHOVSKIH & al. 1969). As a rule, only euploid numbers occur in somatic cells and aneuploid numbers are rare. The cytology of most European species has been thoroughly studied by S. O. BJÖRKMAN (1951, 1954a, 1960). The material of Fennoscandian species studied by him was very extensive, but unfortunately the final results were published only for two species (*A. clavata* and *A. mertensii*); for the others preliminary accounts were given in earlier publications. However, JONES (1956a,b,c) made a thorough cytological analysis of British species and their hybrids (all the Fennoscandian species except *A. clavata* and *A. mertensii* occur in Great Britain).

Some chromosome counts were made in this work, mainly with the aim

TABLE 1. Chromosome counts (the voucher specimens are marked with * in the list of specimens studied).

	2n	Locality		2n	Locality
A. stricta	28	Ab Nagu	*A.* × *bjoerkmanii*	35	Lk Savukoski
	28	Le Enontekiö		35	Lk Sodankylä
	28	Lps Pechenga		35	Lk Sodankylä
	35	Trs Kvaenangen		35	Lk Kittilä
A. mertensii	56	Ob Rovaniemi		35	Le Enontekiö
A. capillaris	28	Ob Rovaniemi			
A. stolonifera	28	N Borgå	*A. mertensii* × *stricta*	42	Trs Kvaenangen
	35	N Borgå			
	35	Ok Sotkamo	*A. gigantea* × *stolonifera*	35	Li Inari
	28	Lps Pechenga			
			A. stolonifera × *stricta*	28	Ks Kuusamo
A. gigantea var. *repens*	42	Sb Kuopio			
	42	Ks Kuusamo	*A. mertensii* × *stolonifera*	42	Le Enontekiö
				42	TL Karesuando
A. gigantea var. *glaucescens*	42	N Borgå			
	42	Om Larsmo	*A. gigantea* × *mertensii*	49	Lps Pechenga
A. gigantea var. *dispar*	42	Ok Sotkamo	*A. capillaris* × *stricta*	28	Lk Sodankylä
	42	Li Inari		28	Le Enontekiö
A. × *bjoerkmanii*	35	Sb Maaninka		28	Li Inari
	35	Om Larsmo		28	Lps Pechenga

of checking critical determinations, especially of hybrids. The results are listed in Table 1. In all cases root tip mitoses were studied. The root tips were cut off and kept for 1—2 hours in 0.2—0.4 % colchicine solution. Thereafter they were heated to 60°C for a few minutes in acetic orcein containing a few drops of 1 N HCl, after which an acetic orcein squash was made in the usual manner (see e.g. DARLINGTON & LA COUR 1960).

H. Reproduction

Most individuals of all the Fennoscandian *Agrostis* species set abundant seed. DAVIES (1953) found the British species to be highly self-sterile when isolated experimentally. However, some authors (SPLECHTNER 1923, 1925, KNOLL 1929, TROLL 1931), though they also found a high degree of self-sterility in most individuals of some of the species here treated, reported a few individuals to be quite self-fertile. This self-fertility of some few specimens of mainly self-sterile species seems to be a widespread phenomenon in grasses (HERTZSH 1959). The interspecific hybrids are mostly completely sterile in respect to both pollen and seed production, and the formation of F_2 and backcross hybrids must thus generally be of no or minor importance (*A.* × *bjoerkmanii* is probably an exception, see pp. 114—115). All the perennial species and hybrids are capable of vegetative reproduction by stolons or rhizomes. In most cases vegetative spreading is certainly only local, but it is clear that separated vegetative parts may travel fairly long distances down rivers (see e.g. *A.* × *bjoerkmanii* in N. Finland), and perhaps also to some extent along coasts and lakes. In most native species vegetative reproduction can be assumed to be locally as important as, or perhaps more important than, reproduction by seed. In the annual *A. clavata* reproduction naturally occurs solely by seed. *A. mertensii* is a perennial but lacks both stolons and rhizomes and has only erect vegetative shoots. It is thus obvious that its vegetative expansion must be very slow (except along rivers and lakes where the tufts may easily become fragmented and be transported by water) and that in this species reproduction by seed is much more important even for local spreading.

I. Flowering time

The flowering time of the different taxa of *Agrostis* in the area of this investigation is a character that cannot be attributed very much diagnostic value. On the other hand it may certainly be of great importance in evolution, as different flowering times can reduce the formation of hybrids between different species, and the gene flow between different populations of the same species. However, it must be kept in mind that even a slight overlap in flowering time may suffice to produce some hybrid clones, which may then reproduce vegetatively and become abundant if favoured by natural selection.

Vovk (1966) has reported on the differences in flowering time between Ukrainian *Agrostis* species, and Davies (1953) has studied the flowering times of the British species under experimental conditions.

I have observed the flowering time of the different taxa described in this work both in the field and in specimens cultivated side by side in the Botanical Garden. In the garden species collected from both the north and south of eastern Fennoscandia showed a clinal variation in respect to flowering time. When cultivated in the south, the northern populations flower earlier than the southern populations. The taxa occurring in southern Finland may be arranged in the following sequence in respect to flowering time: 1. *A. canina*, 2. *A. stricta, A. capillaris, A. stolonifera* (the flowering times of the three last-mentioned species all begin within about one week and about one to two weeks later than in *A. canina*), 3. *A. gigantea* var. *dispar* (flowering begins about one week later than in the three preceding species), 4. *A. gigantea* var. *repens* and *A. gigantea* var. *glaucescens* (in these two taxa flowering begins about one week later than in *A. gigantea* var. *dispar*). *A. canina* usually begins flowering in the latter half of June, while *A. gigantea* var. *repens* and var.

glaucescens begin in the latter half of July. In shady habitats flowering may be delayed by as much as two weeks or even more in comparison with sunny habitats. The flowering of an individual lasts about three days to one week, and in the same locality the flowering of the majority of the individuals of a species is accomplished within two weeks. It is thus evident that there are important differences in flowering time between some taxa, but, owing to the delay of flowering in shady habitats, there are no absolute discontinuities in flowering time and hence no definite barriers to crossing. The taxonomic heterogeneity of *A. stolonifera* is also reflected in the slightly different flowering times of its different types.

In the northern parts of Fennoscandia the whole period of flowering of *Agrostis* taxa is shorter and occurs later than in S. Finland. The overlap in flowering time of the different taxa is also still more pronounced than in S. Finland. *A. mertensii* is the earliest species (flowering begins about one week earlier than in the northern population of *A. stricta*) and the other taxa can be arranged in the same sequence as in S. Finland. In northernmost Norway the flowering of *A. mertensii* generally begins in the last days of July, while *A. capillaris* begins to flower in the middle of August at sea level. Increasing altitude delays the beginning of flowering (*A. capillaris* begins to flower in the last days of August or the beginning of September in oroarctic habitats in N. Norway, or does not flower at all in unfavourable years).

V. Key to species and interspecific hybrids

- A. Palea $<1/5$ the length of the lemma; Trichodium net of type I
    - B. Extravaginal rhizomes present
        - C. Anthers $<2/5$ the length of the lemma, about 0.5—0.9 mm long, dehiscent; rhizomes very rare .... *A. mertensii*
        - CC. Anthers $>2/5$ the length of the lemma; rhizomes regularly present
            - D. Anthers about 2/3 the length of the lemma, 1.0—1.5 mm long, dehiscent .... *A. stricta*
            - DD. Anthers about 1/2 the length of the lemma, about 1 mm long, non-dehiscent .... *A. mertensii* × *stricta*
    - BB. Extravaginal rhizomes absent
        - C. Anthers $>1/2$ the length of the lemma
            - D. Perennial, often stoloniferous; lemma about 2/3 the length of the glumes .... *A. canina*
            - DD. Annual, stolons absent; lemma $<1/2$ the length of the glumes .... *A. pourretii*
        - CC. Anthers $<1/2$ the length of the lemma
            - D. Perennial; panicle up to about 10 cm long with smooth or slightly scabrous branchlets and pedicels; anthers 0.5—0.9 mm long .... *A. mertensii*

DD. Annual or biennial; panicle usually >8 cm long, with intermediately — very scabrous branchlets and pedicels; anthers 0.3—0.5 mm long

E. Panicle branchlets and pedicels usually intermediately scabrous; lemma about 2/3 the length of the glumes, smooth or with very few prickle-hairs .... *A. clavata*

EE. Panicle branchlets and pedicels usually very scabrous; lemma 1/2—2/3 the length of the glumes, with dense—intermediately dense prickle-hairs .... *A. scabra*

AA. Palea $>1/5$ the length of the lemma; Trichodium net of types (I—) II—VII

B. Palea 1/5—2/5 the length of the lemma; Trichodium net of types I—II; anthers non-dehiscent

C. Prickle-hairs intermediately dense—dense on lemma, which has five strong nerves .... *A. capillaris × stricta*

CC. Lemma smooth or nearly smooth, furnished with three longer and stronger and two shorter and weaker nerves .... *A. capillaris × clavata*

BB. Palea $>2/5$ the length of the lemma; Trichodium net of types II—VII

C. Palea $<3/5$ the length of the lemma; Trichodium net usually of types II—V

D. Extravaginal rhizomes with more than three scale-leaves present

E. Ligule on second culm leaf usually <1.3 mm long and 0.3—1.0 times as long as broad, truncate—broadly obtuse; panicle branchlets and pedicels smooth — slightly scabrous; lemma usually 3-, rarely 5-nerved, usually smooth or with scattered, rarely intermediately dense, prickle-hairs; anthers dehiscent .. .. *A. capillaris*

EE. Ligule on second culm leaf usually >1.3 mm long and about 0.7—2 times as long as broad, obtuse; panicle branchlets and pedicels intermediately or very scabrous, rarely slightly scabrous or smooth; lemma 3—5-nerved, smooth or with intermediately dense prickle-hairs; anthers usually non-dehiscent

F. Lemma usually furnished with five strong equal nerves, rarely with three stronger and longer and two shorter and weaker nerves, usually with intermediately dense prickle-hairs; Trichodium net of types II—III (—IV) ....
A. mertensii × gigantea, A. mertensii × stolonifera, A. stolonifera × stricta

FF. Lemma furnished with three or four nerves, or three stronger and longer and two shorter and weaker nerves, or rarely with five equal but usually not strong nerves, smooth or with scattered prickle-hairs; Trichodium net of types II—VI

G. Culms and aerial vegetative shoots usually erect; panicle ovate; lemma usually with three equal nerves; Trichodium net of types (III—) IV—V (—VII) .... *A. × bjoerkmanii*

GG. Culms and aerial vegetative shoots often geniculately ascending at base; panicle lanceolate—ovate; lemma often with three stronger and longer and two weaker and shorter nerves, or 4-nerved, or rarely with three or five equal nerves; Trichodium net of types II—IV (—V) .... *A. × murbeckii*

DD. Extravaginal rhizomes with more than three scale-leaves absent

E. Lemma nerves usually end before edge; prickle-hairs absent — intermediately dense on lemma; awn if present attached to upper half of lemma; anthers dehiscent .... *A. stolonifera*

EE. Lemma nerves strong and ending at edge of lemma; prickle-hairs usually intermediately dense on lemma; awn usually present and attached at about middle of lemma; anthers non-dehiscent .... *A. canina* × *stolonifera*

CC. Palea >3/5 the length of the lemma; Trichodium net of types II—VII

D. Extravaginal rhizomes with more than three scale-leaves absent .. .. *A. stolonifera*

DD. Extravaginal rhizomes with more than three scale-leaves present

E. Ligule on second culm leaf about (1.5—) 2—5 mm long, and about 0.75—2 times as long as broad; panicle branchlets and pedicels usually very scabrous; Trichodium net usually of types VI—VII

F. Culms and vegetative shoots usually erect; panicle usually ovate; lemma mostly 3- rarely 5-nerved; anthers dehiscent .... *A. gigantea*

FF. Culms and aerial vegetative shoots usually at least partly decumbent; panicle lanceolate — ovate; lemma with three stronger and longer and two shorter and weaker nerves, or 3-nerved; anthers non-dehiscent .... *A. gigantea* × *stolonifera*

EE. Ligule on second culm leaf usually about 0.3—3 mm long and about 0.3—1.2 times as long as broad; panicle branchlets and pedicels smooth — intermediately scabrous; Trichodium net of types II—V (—VII)

F. Ligule on second culm leaf usually 0.3—1.3 mm long and about 0.3—1.0 times as long as broad, truncate — broadly obtuse; panicle branches smooth — slightly scabrous; Trichodium net of types II—III (—V); anthers dehiscent .... *A. capillaris*

FF. Ligule on second culm leaf usually 1.0—3.0 mm long and about 0.5—1.2 times as long as broad, obtuse; panicle branches very scabrous—smooth; Trichodium net of types II—VI; anthers usually non-dehiscent

G. Culms and vegetative shoots usually erect; panicle ovate; lemma usually with three equal nerves; Trichodium net of types (III—) IV—V (—VII) .... *A.* × *bjoerkmanii*

GG. Culms and vegetative shoots often geniculately ascending at base; panicle lanceolate—ovate; lemma often with three stronger and longer and two shorter and weaker nerves, or with four or five equal nerves, or rarely with three equal nerves; Trichodium net of types II—IV (—V) .... *A.* × *murbeckii*

VI. Taxa

A. Sectio *Agrostis*

Cornucopiae WALTER 1788: 73 (»*Cornucopiae?*»).

Trichodium MICHAUX 1803: 41. — *Agrostis* subg. III. *Trichodium* (Michx) ROUY 1913: 65. — *Agrostis* [sect.][1] b) *Trichodium* (Michx) TRINIUS 1820: 112. — Lectotypus: *Trichodium laxiflorum* Michx (A. S. HITCHCOCK 1920: 127).

Agraulus PALISOT DE BEAUVOIS 1812: 5. — *Agrostis* [sect.] c) *Agraulus* (PB.) TRINIUS 1820: 112. — Lectotypus: *Agrostis canina* L. (A. S. HITCHCOCK 1920: 127).

Agrostis [sect.] I. b. *Agrostiotypus* ASCHERSON & GRAEBNER 1899: 171 (p.p.).

Agrostis [sect.] II. b. *Aperopsis* ASCHERSON & GRAEBNER 1899: 194. — Holotypus: *Agrostis pallida* DC.

Palea minute, less than 1/5 the length of the lemma. Trichodium net on lemma well developed, type I.

Agrostis canina L.

A. canina LINNAEUS 1753: 62. — *Trichodium caninum* (L.) SCHRADER 1806: 198. — *Agraulus caninus* (L.) PALISOT DE BEAUVOIS 1812: 5. — Lectotypus: Germania (D.D.R.), Lipsia (Leipzig), specimen I:3, sub nom. *Gramen caninum supinum folio varians* Bauh. in Hortus Siccus Burseri (UPS)![2]), Ic .25, vide infra p. 31.

A. tenuifolia CURTIS 1787: 4 (nom. nov. pro *A. canina* α HUDSON 1778: 31). — Non *A. tenuifolia* M. BIEB. 1808 (vide p. 36).

A. violaceo-purpurea GILIBERT 1792: 525 (nom. inval., vide infra p. 32).

A. pallida WITHERING 1796: 128. — *Agraulus pallidus* (With.) S. F. GRAY 1821: 149. — Non *A. pallida* DC. 1815 (vide p. 65).

A. hybrida GAUDIN 1811: 66. — *Vilfa hybrida* (Gaud.) PALISOT DE BEAUVOIS 1812: 16, 147. — *Trichodium hybridum* (Gaud.) ROEMER & SCHULTES 1817: 282. — *A. canina* [var.] δ *hybrida* (Gaud.) GAUDIN 1828: 182. — Lectotypus: in G (HACKEL & BRIQUET 1907: 40). — Non *A. hybrida* sensu HOLUB 1963 (pro syn, vide p. 37).

A. fascicularis CURTIS 1798: 46 (nom. superfl. pro *A. tenuifolia* Curt. 1787, vide supra). — *A. canina* ssp. *fascicularis* HYLANDER 1953b: 356 (pro *A. fasciculari* »Curtis ex Sinclair 1816»). — *A. canina* [var.] *fascicularis* SINCLAIR 1824: 278 (pro *A. fasciculari* Curt.).

A. nivea SINCLAIR 1816: 152.

A. canina, var. *mutica* SINCLAIR 1816: 226. — Typus vide p. 32.

A. canina [var.], *alba* DESVAUX 1818: 50.

A. canina α *violacea* C. J. HARTMAN 1820: 44 (nom. illeg. pro *A. canina* α *canina*).

A. canina β *flava* C. J. HARTMAN 1820: 44; HYLANDER 1941: 12 ut f.

A. canina [var.] α *sylvatica* SCHLECHTENDAL 1823: 45 (nom. illeg. pro *A. canina* var. *canina*).

A. canina [var.] γ *mutica* GAUDIN 1828: 182 non Sincl. 1816. — *A. canina* [ssp.] β. *mutica* ARCANGELI 1882: 769 non Sincl. 1816 (pro *A. canina* γ *mutica* Gaud. 1828). — *A. canina* f. *mutica* MELA & CAJANDER 1906: 68 non Sincl. 1816 (pro *A. canina* γ *mutica* Gaud. 1828).

A. canina [var.] β. *submutica* M. & K. ex SCHÜBLER & MARTENS 1834: 63.

A. canina [var.] β. *stolonifera* BLYTT 1847: 151.

A. canina var. pallida REICHENBACH 1834: 12, pl. 33 f. 1425.

A. canina — *pallida* ANDERSSON 1852: 105 non Reich. 1834. — *A. canina* f. *pallida* MELA & CAJANDER 1906: 68 non Reich. 1834 (pro *A. canina* —*pallida* Ands. 1852).

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[1]) The ranks of the names are placed in square brackets when not indicated by their authors as part of the names, but found elsewhere in the work.

[2]) The sign ! after a herbarium abbreviation means that I have seen the specimen cited. When not otherwise stated the type selections are made in this work.

Description

Loosely tufted, sometimes mat-forming, perennial. *Vegetative shoots* always intravaginal, partly short erect aerial shoots, partly long slender, branching trailing stolons rooting at the nodes; the stolons are formed at the time of flowering, or later, and are often furnished with tufts of very short erect shoots at the nodes. *Culms* erect, or decumbent and branching at base, and then ascending geniculately (with 1—3 joints) often with short vegetative shoots at the nodes, (10—) 20—60 cm tall, 2—6-noded, smooth, slender but stiff. *Leaf* laminae on erect short vegetative shoots soft, filiform, about 0.5—2.0 mm wide, usually with involute margins, 1—3 cm long at the nodes of stolons and bases of culms, 2—8 cm long elsewhere; on culm leaves flat, the uppermost often very short, only about 1—4 cm long, widest near the base and then gradually tapering, the others longer, but all rather narrow, finely pointed, about (0.75—) 1.0—2.5 (—4) mm wide; on stolons flat, finely pointed, 1.0—2.5 (—4) mm broad, up to 13 cm long; all laminae scabrous—nearly smooth, bright green, 5—12-nerved; sheaths green or sometimes tinged with purple, smooth or slightly scabrous; stomata about 23—33 μm long. *Ligule* rather long and narrow, acute—acuminate, very rarely with blunt apex; on uppermost culm leaf about (1.5—) 2—4 (—4.5) mm and on second culm leaf about (1.3—) 1.5—3.9 (—4.2) mm long and about 1.5—2.2 times as long as wide; apex often split. *Panicle* rather rich in flowers, about 3—11 cm long, ovate—lanceolate, brown or brownish purple, rarely yellowish or greenish; branches fine, scabrous in various degrees, especially in the apical half, like branchlets and pedicels; after flowering the pedicels and branchlets usually approach the branches, which may be raised. *Spikelets* about 1.6—2.5 mm long; glumes lanceolate, acute, scabrous on the keel of the upper half. *Lemma* about 1.5—1.8 mm long, ovate, truncate — obtuse, 5-nerved with slightly excurrent lateral nerves; the median nerve usually enters an awn below the middle of the lemma; awn mostly 1—2 times the length of the lemma, exserted and geniculate, seldom short and straight or rarely totally absent; prickle-hairs occur densely everywhere on the lemma, except at the apex; Trichodium net well developed, type I. *Palea* very short or absent, extremely seldom measuring the length of the ovary. *Anthers* purplish, rarely yellow, about 0.9—1.5 mm long (about 2/3 the length of the lemma).

Figs. 1, 25, 33a,b, 41a,b, 46a, 48a, 53a, 54a.

Cytology

S. O. BJÖRKMAN (1951: 465) gave the chromosome number 2 n = 14 for 80 clones of »*A. canina* var. *fascicularis*» from N.W., W. and Central Europe (Denmark, Finland [see p. 135], Sweden [see p. 136], Great Britain, Germany and Switzerland). One specimen that BJÖRKMAN (1951) considered a tall »*A. canina* var. *fascicularis*» had the number 2n = 28. He reported triploid clones, too, from natural populations, and 25 clones with B chromosomes. Later he (BJÖRKMAN 1954a: 254) reported hexaploid (2n = 42) and octoploid (2n = 56) clones from Portugal, the taxonomic status of which he rightly considered uncertain. The number 2 n = 14 has been reported also by SOKOLOVSKAJA (1937a: 473, 1938: 454, 1955: 851, 1962: 81; material from different parts of the U.S.S.R.), Jones (1952: 159, 1953: 316, 1956a: 371; material from Great Britain), Jörgensen & al. (1958: 14; Danish material), Bowden (1960: 542; Canadian material) and Vovk (1968: 17, 1970: 740; Ukrainian material). Wulff's (1937: 267) plants with 2n = 28 are probably *A. stricta*. *A. canina* var. *formosana* Hack. from Taiwan, for which Chen & Hsu (1962: 301) report n = 21, may well be a different species. Heitz (1967) has given the number n = 8.

Normally there are 7 bivalents in the meiosis of *A. canina* (Jones 1952: 159, 1953: 316, 1956a: 371). Only a few univalents were seen by Jones (1956a: 371), and no multivalents at all.

Nomenclature

Almost all authors have agreed about the identity of *A. canina* L. 1753, C. J. Hartman (1840: 83) being, however, an exception as he stated that Linnaeus meant »*A. vulgaris*» (= *A. capillaris*) with his *A. canina*. In my opinion the cited polynomials and the habitat given by Linnaeus (1753: 62) exclude even *A. stricta*.

Philipson (1937: 81) typified *A. canina* L. 1753 with »*Agrostis* sheet No. 12 in the Linnaean Herbarium» in London. According to H. Lindberg (1958: 16), this sheet contains »five typical tops of *A. canina*, as long as the sheet» (original in Swedish). As the basal parts of the specimens are lacking, the shoot morphology is not known and *A. stricta* cannot with certainty be eliminated. Probably it would, however, be possible to decide whether the specimens are diploid or tetraploid by measuring the stomata. The number of *A. canina* is not underlined in Linnaeus's own copy of Species Plantarum, which indicates that sheet No. 12 was not included in the Linnaean Herbarium prior to 1753 (Jackson 1912). Sheet No. 12 is thus to be considered a neotype, and, according to the Code (Art. 7,8), has no significance if original material is known to exist. The Linnaean collections in London (Jackson 1912: 30) and Stockholm (Lindman 1908: 37) evidently lack original material of *A. canina*, but Burser's »Hortus siccus» in Uppsala in Sweden contains one specimen, which Linnaeus, in a manuscript later published by Savage (1937), determined as *A. canina*. The determinations in Linnaeus's manuscript have been dated by Savage (1936, 1937) to the years 1746—1748, thus making lectotype selections among Burser's specimens possible for Linnaean names in the first edition of Species Plantarum (Savage 1936, 1937, Stearn 1957). Burser's specimen I:3 (Fig. 25) is sterile but has well-developed stolons. In my opinion there can be no doubt that it really is *A. canina* (Juel 1923: 1, 1936: 9 considered specimen I:3 »ein steriles Gras, das wohl kaum bestimmbar ist»). Specimen I:3 (Fig. 25) in Hortus siccus Burseri (in UPS) is thus designated as the lectotype of *A. canina* L. 1753.

The name *A. violaceo-purpurea* Gilib. is invalid because GILIBERT did not consistently use binary nomenclature in his Exercitia phytologica (HYLANDER 1945: 16, STAFLEU 1967). *A. fascicularis* Curt. is illegitimate according to Arts. 62 and 63 of the Code, because CURTIS (1798: 46) changed the name *tenuifolia* »for the more expressive one of *fascicularis*, the stalks in autumn producing leaves in bundles».

Remarks on taxonomy

After the removal of *A. stricta* from *A. canina*, the latter seems at least cytologically uniform. Several infraspecific taxa described in Fennoscandian literature represent *A. stricta* (see pp. 36—37). The rest of the infraspecific epithets are mostly based on either clones with pale yellow or greenish panicles, or clones with short or totally absent awns. The former have usually been called forma or varietas *pallida* Ands. (based on yellowish-flowered specimens). That name cannot, however, be used as it is antedated by *A. canina* var. *pallida* Reich. *A. canina* var. *alba* Desv. is probably the oldest infraspecific name for yellowish-flowered *A. canina*. Specific names are *A. pallida* With. (based on greenish-flowered plants), and *A. nivea* Sincl. (yellowish panicles). The oldest name based on awnless clones is probably *A. canina* var. *mutica* Sincl. (with a holotype specimen in SINCLAIR's 1816 own copy of the work, according to CHASE & NILES 1962, which is preserved at Woburn Abbey fide PHILIPSON 1937: 81). If one wishes to name short-awned variants, the oldest name is probably *A. canina β submutica* M. & K. ex Schübl. & Mart. With the exception of the greenish-panicled specimens, which are only shade modifications, the abovementioned deviations are hereditary. But they do not exhibit any special geographical or ecological trends or correlation with other characters. The deviating clones simply occur here and there among otherwise quite normal *A. canina*, as has been noted by PHILIPSON (1937: 83—84) for British material, too, and there seems to be little justification for distinguishing taxa of this kind (cf. e.g. DU RIETZ 1930: 344).

Submersed clones, which occur rather commonly in fresh water, are modifications without any taxonomic value. The length and width of the laminae as well as the length and amount of erect vegetative shoots and stolons are characters which are easily modified by the environment. I have not been able to detect eastern Fennoscandian infraspecific taxa worth varietal or subspecific rank. Superficially *A. canina* resembles most *A. stricta* and *A. mertensii*, but differs clearly from the former in the occurrence of intravaginal stolons and absence of extravaginal rhizomes, and is distinguished most surely from the latter by its longer anthers. Submersed sterile specimens of *A. canina* and *A. stolonifera* may resemble one another very much. Narrow leaves and acute narrow ligules are indicative of *A. canina,* as is an oligotrophic habitat.

Habitats

A. canina is amphiclinous and is native in a wide variety of more or less moist, usually not very shaded habitats. These include especially some minerotrophic mire types. These can all be classified as fens, with or without scattered trees and bushes. The species occurs in both poor and rich fens, often together with sedges (e.g. *Carex canescens, C. echinata, C. nigra, C. dioeca* and *C. panicea*), and may be abundant. At least the richest occurrence of the species is found in habitats adjacent to mineral ground. The fens with *A. canina* may be situated in the laggs of raised bogs, at the margins of other mire complexes, and along rivers and lakes. The species is absent from typical bog communities, but occurs in bogs where springs produce fen soaks. The habitats of the species include also small paludified patches in forests, and ponds on mountains.

On lake and river shores *A. canina* occurs also on moist mineral ground, even pure sand, and on mineral ground overlain by a very thin moss cover, in open places or among shore trees or bushes. The species occurs frequently at springs and rooted in mosses on stones in rapids, where it may be quite submersed, as on freshwater shores. On shores along brackish water the species grows rather high up in places submersed only by extremely high water, mainly on ± peaty soil.

A. canina occurs in hemerobic habitats both as an apophyte and as a hemerochore. Man-made habitats in which it is found include ditches, roadsides, paths, meadows and fields especially on peaty ground, and also rather dry places such as railway yards and embankments and waste places. According to HUBBARD (1968), *A. canina* is used as a lawn grass in Great Britain. PIPER (1918: 11) stated that the turf formed by it is of excellent quality. According to some importers (Hankkija Ltd. and Kesko Ltd.), the species has been used only occasionally as a lawn grass in Finland.

Distribution

General distribution

The total distribution of *A. canina* s. str. is not very well known owing to the occurrence of several similar related taxa (e.g. *A. stricta, A. planifolia,* *A. tenuifolia* M. Bieb., *A. syreistschikowii*, *A. trinii* and *A. anadyrensis;* in my opinion the last-mentioned is more closely related to *A. scabra*). *A. canina* s. lat. is listed by HULTÉN (1950) in the group »25 West-European-North-Siberian plants» reaching Lake Baikal. The total distribution of *A. canina* s. lat. has been mapped by HULTÉN (1962: 208—209) and MEUSEL & al. (1965: 413), and is here outlined according to these authors. The species occurs in the whole of Europe except the northernmost (arctic Soviet Union) and southernmost parts (southern Iberian peninsula, southernmost Italy, southern Balkan peninsula and southernmost and S.E. Ukraine). HULTÉN gives the distribution as extending from the Urals through Central Siberia to the Yenisey River in the east. According to CVELEV (1964: 48), *A. canina* s. str. does not occur in Siberia but is replaced by *A. syreistschikowii* and *A. trinii* (see p. 48). Taxa considered to be *A. canina* s. lat. occur in the Himalayas and in China, on Taiwan (var. *formosana* Hack.), and on Borneo (var. *borneensis* Stapf). *A. canina* is introduced in southern India and Japan.

The occurrences in Greenland and Iceland mentioned by HULTÉN (1962) presumably belong to *A. stricta* (BÖCHER & al. 1968 and LÖVE & LÖVE 1956 mention only *A. stricta*, not *A. canina*).

On the North American continent *A. canina* is known to be introduced in some places, most of them on the eastern coast. FERNALD (1926: 50, 56, 81, 85) reported the species from natural habitats on Newfoundland. HULTÉN (1962) thought that these finds represented *A. stricta* (=*A. canina* ssp. *montana*) but authentic material (kept in GH) seen by me from the localities described by FERNALD was *A. canina* s. str.

A. canina has furthermore been introduced into southern Chile, the Falkland Islands and North Island in New Zealand.

In the Nordic area *A. canina* s. str. is common in nearly the whole of Denmark and the southern half of Sweden (except the mountain regions), and in Norway seems fairly common along the coast up to the polar circle, though lacking or rare in the interior (HYLANDER 1953a: 323; map 156 of HULTÉN [1950] shows the combined distribution of *A. canina* and *A. stricta*).

Distribution in the investigation area

In East Fennoscandia and N. Sweden (Fig. 3) *A. canina* has been collected from numerous localities in the hemiboreal, southern boreal and middle boreal zones. In Finland the species is evidently common up to Ok[3] and the coastal areas of Ob. Along the coasts it is known from all the archipelago zones, even from some of the outermost islets high enough not to be submersed by the sea. The distribution gaps in the southern half of Finland in Fig. 3 are not real but the result of infrequent collection of herbarium

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[3]) For explanation of provinces and abbreviations of their names, see Fig. 60.

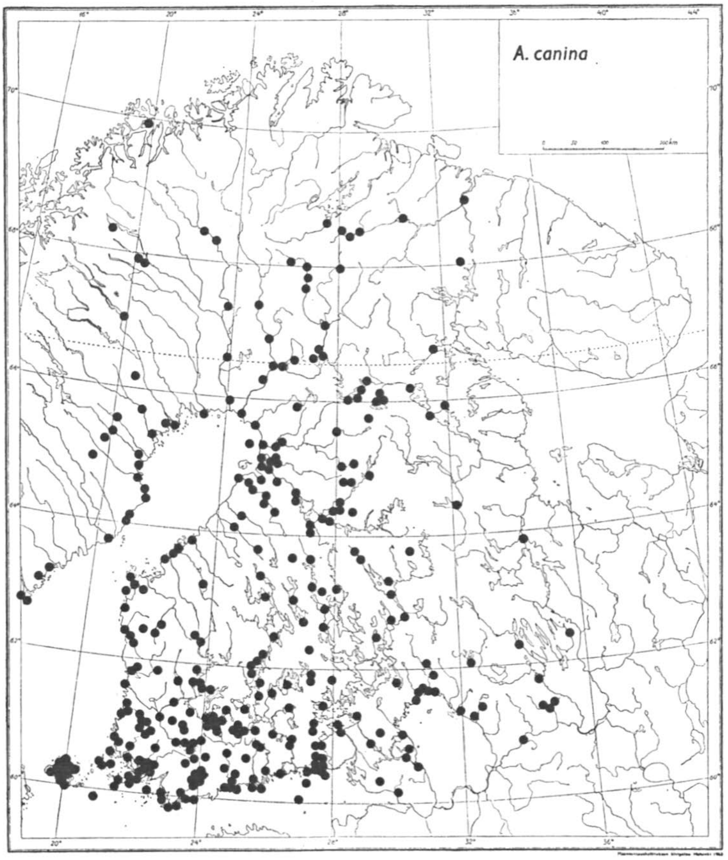


FIG. 3. The distribution of *A. canina* in the eastern half of Fennoscandia according to the specimens examined.

material. Fig. 3 shows a great similarity with Erkamo's (1956: 154, 1957 in Ulvinen: 62) maps of the floristic exploration of Finland. In northeastern and northern Ob, as in Ks, Lk, Le and Li, nearly all the collections of *A. canina* are of very recent date (from the 1940s onward; see p. 136) and the species is obviously spreading there rapidly. The habitats there include roadsides, ditches and railway yards, but also river shores. The occurrences in seemingly natural habitats (such as river shores) seem to comprise only a few individuals (my observations and information from labels) and seem to me to represent secondary migration from man-made habitats. Owing to this migration, the northern limit of indigenous *A. canina* is very hard to determine, but may lie in northern Ob and Ok or southern Ks. Some localities in Le and Li have been discovered very recently (p. 136), but earlier records (Hjelt 1895: 363, Hultén

1950, 1971, Hylander 1953a: 323, 1966: 434 and Jalas 1958: 482) from those provinces have evidently been based on either *A. stricta* or misidentified *A. mertensii*.

The herbarium material of *A. canina* from Soviet Fennoscandia seen by me is very scanty. Up to 65° N. lat. the species is considered common (Hultén 1950 map 156, Ramenskaja 1960). For the Murmansk Region a distribution map has been published by Kuzeneva (1953 map 61). There too the species is obviously spreading rapidly along roadsides: e.g. it was frequent along the Lotta—Murmansk road in 1967 (my observation). In northern Sweden *A. canina* has been collected mainly in the coastal region, and may be rather common there, as indicated by Hultén (1950, 1971). In the inland of northern Sweden *A. canina* is rare and mainly hemerochorous. Hultén's (1950, 1971) localities in Swedish Lapland mostly represent *A. stricta*.

The only herbarium specimen from northern Norway seen by me is from Karlsöy in Trs. It seems very probable that the species is introduced there, although this is not evident from the collector's label. *A. canina* of Norman (1895, 1900) and Dahl (1934) is *A. stricta*. Benum (1958: 124) lists one locality of *A. canina* s. str. from Trs, but in my opinion the cited specimen is *A. stricta*.

Agrostis stricta J. F. Gmel.

A. stricta J. F. Gmelin 1791: 170. — Lectotypus: sub nom. »*Gramen miliaceum angustifolium glumis perexiguis* Dill.» in Herbarium Haller (P-HA)!, vide infra p. 39. — Non *A. stricta* Willd. 1797 (vide p. 66), nec Curt. 1798 (vide infra).

? *A. rubra* Linnaeus 1753: 62 (p.p., nom. dub. et ambig., vide pp. 54—56).

? *A. dubia* Leers 1775: 20 (nom. dub., vide p. 40); G. F. W. Meyer 1836: 658 (pro syn.) — Non sensu K. Richt. 1890, nec Duby 1828 (vide p. 65).

A. canina [var.] β *minor* Retzius 1779: 14. — Lectotypus: Tab. 161 in Flora Danica III (Oeder 1764; vide infra p. 40).

A. alpina Leysser 1783: 16 non Scop. 1772; Roth 1788: 31.

? *A. compressa* Willdenow 1790: 39 (nom. superfl. pro *A. dubia* Leers 1775, vide supra).

? *A. varians* Thuillier 1799: 35.

? *A. violacea* Thuillier 1799: 35.

A. coarctata Ehrhart ex Hoffmann 1800: 37. — *A. stolonifera* [var.] β *? coarctata* (Hoffm.) Persoon 1805: 35 (quoad basion.). — *A. canina* Spielart a. *coarctata* (Hoffm.) G. F. W. Meyer 1836: 657. — Lectotypus: Germania (Bundesrepublik), »Hannoverae». Specimen N:o 133 in exsiccato Fr. Ehrharti: Calamariae Gramina et Tripetaloideae Linneae (in Herbarium G. F. W. Meyer in GOET, Scholz 1969: 480; Isotypus in UPS!). — Non *A. coarctata* sensu Schrad. 1806 (pro syn., vide p. 78).

A. stricta Curtis 1798: 46 (»*Stricta*») non J. F. Gmel. 1791 (nom. superfl. pro »*A. rubra*»); Löve & Löve 1961: 69.

? *A. tenuifolia* Marshall a Bieberstein 1808: 56 non Curt. 1787 (vide p. 29). — *A. canina* var. *tenuifolia* (M. Bieb.) Boissier 1884: 516. — Lectotypus: »Ex Caucasi monte Beshtau». Leg. M. a. Bieberstein (LE; Šiškin 1934: 177)!

A. pusilla Dumortier 1823: 129. — *Trichodium pusillum* (Dum.) van Hall 1825: 56. — *A. canina* A. I. a. 2. b. *pusilla* (Dum.) Ascherson & Graebner 1899: 185. — Lectotypus: »Hab. in arenosis umbrosis Beckhuizen». Leg. van Hall (BR)!

A. canina [var.] *β. arida* SCHLECHTENDAL 1823: 45. — Lectotypus: Germania, Berlin (?). 1821 Leg. D. F. D. L. v. Schlechtendal (HAL)!

A. canina [var.] *β montana* C. J. HARTMAN 1832: 19 (nom. nov. pro »*A. setacea* Sm.» sensu J. C. Hartman 1820: 44). — *A. canina* [ssp.]* *montana* (Hartm.) C. J. HARTMAN 1846: 13. — *A. canina* f. *montana* (Hartm.) LINDMAN 1918: 75.

A. canina [var.] *γ mutica* C. J. HARTMAN 1838: 17 non Sincl. 1816 (vide p. 29.). — Lectotypus: Suecia, TL Karesuando. Leg. L. L. Laestadius (S)!

A. borealis [ssp.]* *elatior* C. J. HARTMAN 1846: 13. — *A. canina* [ssp.]* *elatior* (Hartm.) C. J. HARTMAN 1849: 303. — *A. canina* var. *elatior* (Hartm.) MURBECK 1898: 8. — *A. canina* f. *elatior* (Hartm.) LINDMAN 1918: 75.

? *A. planifolia* C. KOCH 1848: 380. — Lectotypus: »Auf dem Südabhange des unteren Kaukasus, auf Trachyt, 5000' hoch». Leg. C. Koch (B; ŠIŠKIN 1934: 175, BOR 1970: 300).

A. rubra stolonifera ANDERSSON 1852: 105.

A. hyperborea LAESTADIUS 1856: 82. — *A. borealis* [ssp.]* *hyperborea* (Laest.) C. HARTMAN 1864: 260. — *A. coarctata* ssp. *hyperborea* (Laest.) SCHOLZ 1969: 482. — Lectotypus: Fennia, Le »Enontekis, supra Gunnarin Korva». Leg. L. L. Laestadius (S)!

A. alpestris LAESTADIUS 1856: 81. — Lectotypus: Suecia, TL Karesuando. Leg. L. L. Laestadius (S)! — Non *A. alpestris* sensu MURBECK 1898 (pro syn., vide p. 53).

? *A. Trinii* TURCZANINOW 1856: 18 (nom. nov. pro *A. rubra* TRINIUS 1824). — *A. canina* ssp. *trinii* (Turcz.) HULTÉN 1962: 208. — *A. coarctata* ssp. *trinii* (Turcz.) SCHOLZ 1969: 484.

A. borealis var. *elongata* NORMAN 1893: 55. — Lectotypus: Norvegia, Karasjok, »Tana elven Seylnes», J. M. Norman (O)!

? *A. Castriferrei* WAISBECK 1905: 68 fide HOLUB 1963. — Non sensu HYLANDER 1968 (vide p. 126).

? *A. Wildtii* PODPERA 1926: 628 (pro hybr.). — Holotypus: Moravia, in colle Zluty kopec apud urbem Brno. VI. 1915 leg. A. Wildt (BRNU)!

? *A. Syreistschikowii* SMIRNOV 1938: 248. — *A. coarctata* ssp. *syreistschikowii* (P. Smirn.) SCHOLZ 1969: 484. — Holotypus: Rossia, »Summitas centrorossica, Steppum pratosum Streletzkaja prope urbem Kursk». 11.VI.1932 leg. P. A. Smirnov (MW)!

A. alpina auct. non Scop. 1772, nec Willd. 1797: WAHLENBERG 1812: 22 (p.p.).

A. setacea auct. non Curt. 1787, nec Sm. 1790: C. J. HARTMAN 1820: 44.

A. rupestris auct. non All. 1785: C. J. HARTMAN 1838: 16 (p.p.).

A. vinealis auct. non Schreb. 1771: LAWALREE 1956: 53 (pro syn.), et al. (vide p. 40).

A. hybrida auct. non Gaud. 1811: HOLUB 1963: 136 (pro syn., vide p. 29).

Description

Perennial, loosely—densely tufted. *Vegetative shoots* either intra- or extravaginal; intravaginal erect, 1/4—3/4 the length of the culms; extravaginal subterranean scaly rhizomes up to 10 cm long; intravaginal stolons absent. *Culms* 2—4 (—5) -noded, erect or bent at base, rarely geniculate, stout — slender, stiff, 10—70 cm tall, usually smooth, very rarely rough. *Leaf* laminae flat or slightly folded, tightly folded or with involute margins in drought, rather stiff, about (0.50—) 1—3 (—4) mm wide, scabrous or subscabrous on both sides; uppermost lamina on the culm 1—10 (—15) cm long; sheaths scabrous or smooth; laminae and sheaths bright, dark or greyish green; basal sheaths rarely slightly purplish; stomata about 31—51 μm long. *Ligule* acute—obtuse, on second culm leaf about 1.3—4.0 mm long and 1.3—3.0 mm broad. *Panicle* ovate—lanceolate, about 3—10 (—13) cm long, much branched and dense to sparsely branched and diffuse, purplish or greyish, brownish or greenish purplish, rarely greenish or yellowish, after flowering wholly contracted, or with branches spreading in various degrees, and branchlets and pedicels approaching branches; branches, branchlets and pedicels very scabrous — quite smooth. *Spikelets* about 2.0—3.2 (—3.5) mm long; glumes lanceolate and scabrous on the upper half of their keels, or smooth. *Lemma* 1.2—2.2 mm long, ovate, obtuse—truncate—emarginate, distinctly 5-nerved with shortly excurrent lateral nerves, densely covered with prickle-hairs, awned from the lower half, or unawned; awn up to twice the length of the lemma and geniculate, or short and straight; Trichodium net of type I. *Palea* about 0.19—0.47 mm long. *Anthers* about 1.0—1.8 mm long, about 2/3 the length of the lemma, purplish or yellowish.

Figs. 1, 4, 33 c, d, 41 c, d, e, 46 b, c, 48 b, c, 50 c-h, 54 b.

Cytology

S. O. Björkman (1951: 466, 1954a: 254) was the first to show that *A. stricta* deviates from *A. canina* s. str. in having the chromosome number 2 n=28 instead of 2 n=14. His material included clones from N. W. Europe (Denmark, Finland, Iceland, Norway [see p. 138] and Sweden [see p. 138]), Germany and Great Britain. Four different clones from northern Sweden had the pentaploid number 2 n=35. The number 2 n=28 has also been reported for *A. stricta* by Jones (1952: 159, 1953: 314, 1956a: 370; material from Great Britain), Löve & Löve (1956: 120; material from Iceland), Jörgensen & al. (1958: 14; material from Greenland) and Knaben & Engelskjön (1967: 13; material from southern Norway). Wulff's (1937: 267) »*A. canina*» from Kiel in Germany with 2 n=28 was presumably *A. stricta*. I have made 4 chromosome counts for this species, three of which gave 2 n=28, one 2 n=35 (p. 24).

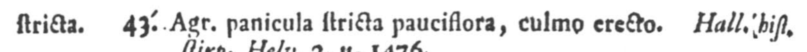
At meiotic metaphase quadrivalents can regularly be observed; according to Jones (1956a: 371, 372), the maximum number per P.M.C. is 7 and the mean 2.66 (see also Jones 1952: 159, 1953: 316; S. O. Björkman 1951: 467). Thus the species behaves as an autotetraploid during meiosis. In experimentally synthesized triploid hybrids of *A. stricta* with *A. canina* Jones (1956a: 373) found that the maximum number of trivalents per P.M.C. was 7, and the mean 3.82 (see also Jones 1952: 159, 1953: 216). S. O. Björkman (1951) and Jones (1952, 1953, 1956a) concluded from the above-mentioned facts that *A. stricta* is an autotetraploid that has arisen by chromosome doubling from *A. canina* or other more primitive related diploid taxa.

There are also chromosome number determinations for most of the eastern European and Asiatic taxa which, on morphological grounds, must be considered related to *A. stricta* (cf. p. 48). *A. planifolia* is hexaploid (2 n=42), according to Sokolovskaja (1937a: 462, 1938: 456) and Sokolovskaja & Strelkova (1948: 201). Evidently no chromosome numbers have been reported for the other Caucasian taxon (see p. 48), *A. tenuifolia* M. Bieb. Two counts were recently reported for *A. syreistschikowii*, one of which (Galenkovskaja in Bolhovskih 1969) revealed a diploid (2 n=14), the other (Vovk 1968: 17, 1970: 740) a tetraploid chromosome number. According to Sokolovskaja (1937a: 459, 1938: 454—455, 1955: 851, 1962: 81), *A. trinii* contains both diploid (2 n=14) and tetraploid (2 n=28) cytotypes. 2 n=28 was later reported by Zukova (1967: 984) for the same taxon.

Nomenclature

The specific name of this species has been changed four times during the last two decades. *A. hyperborea* Laest. 1856, *A. pusilla* Dum. 1823, *A. stricta* Curt. 1798 and *A. coarctata* Ehrh. ex Hoffm. 1800 have been used by different authors.

The oldest name which I have been able to identify and typify is *A. stricta* J. F. Gmel. 1971, which thus antedates *A. coarctata* Ehrh. ex Hoffm. 1800, to which attention has recently been drawn by Neumann (in OBERDORFER 1962: 151), EHRENDORFER (1967), HANSEN (1968) and SCHOLZ (1969). The protologue given by J. F. GMELIN (1791: 170) for *A. stricta* under »***Muticae*» is very short:



ſtricta. 43. Agr. panicula ſtricta pauciflora, culmo erecto. *Hall. hiſt. ſtirp. Helv.* 2. *n.* 1476.

As nothing is known about any herbarium of J. F. Gmelin (STAFLEU 1967), *A. stricta* must be interpreted wholly with the aid of the cited polynomial No. 1476 in HALLER (1768: 226), of which it is an avowed substitute. The protologue of HALLER's No. 1476 does not give very much help, but there is one corresponding specimen in Herbarium Haller (P-HA) vol. 42 in Paris, named »*Gramen miliaceum angustifolium glumis perexiguis* Dill». The same polynomial is cited as »*Gramen miliaceum angustifolium, calyce levi, glumis perexiguis* Dillen. Syn. III. p. 404» in HALLER's (1768: 226) Historia. As the polynomial in RAY's (1724: 404) third edition of Synopsis (which was edited by Dillenius; see e.g. S. O. LINDBERG 1883: 7) is exactly the same as in Herbarium Haller the addition of the words »calyce levi» in HALLER's Historia must be an error. Therefore there can be little doubt that the specimen mentioned in Herbarium Haller really corresponds to polynomial No. 1476 in HALLER's Historia, especially as no other specimen with any connection with that polynomial could be found. I have examined the specimen in Paris, and considered that it belongs to the same species as the Fennoscandian populations described here. »*Gramen miliaceum angustifolium glumis perexiguis*» in vol. 42 in Herbarium Haller (P-HA) is now designated as the lectotype of *A. stricta* J. F. Gmel. 1791. The type specimen consists of a tuft with two erect culms (about 15 and 20 cm tall) and erect vegetative shoots. All the leaf blades are flat, about 1 mm broad. The panicles are narrow, about 3 cm long, greenish with smooth branches, branchlets, pedicels and glumes. Probably the type specimen belongs to a mountain type, being so dwarf. About the type locality, HALLER (1768: 226) says: »In Germania reperi», but no locality is mentioned on the herbarium sheet.

There are some specific names older than *A. stricta* which may have included also this species. *A. rubra* L. 1753 is the oldest name but cannot be used, as the only original specimen cannot be quite certainly identified (see p. 55). *A. vinealis* Schreb. 1771 has by some authors been considered possibly synonymous with *A. pusilla* Dum. (e.g. LAWALREE 1956 and HOLUB 1963), and thus deserves a detailed examination. The protologue describes a grass with ascending culms, coloured glumes, and lemmas with dorsal awns nearly as long as the glumes. As habitats were mentioned »In siccioribus ad Schoenfeld, templum S. Theclae», and, for a variant with longer awns, »in pineto ad Lindenthal». The awns and the dry habitats have apparently caused some authors to suspect *A. vinealis* to be synonymous with *A. stricta*. One sheet from Herbarium Schreber in Munich (M) collected in 1765 from »Lipsiae prope Lindenthal» is *A. canina*. The sheet was originally labelled as »*Agrostis vinealis*», which later had been changed to *A. canina* (evidently by Schreber), and contains the note »*var. aristis longioribus*». Although collected as far back as in 1765 the sheet is probably less suitable as type because the variant with longer awns was segregated as early as in the original description of *A. vinealis*. Two other sheets marked *A. vinealis* contain only several awned specimens referable to *A. stolonifera*. The sheets bear no dates, but none of the localities they give are cited by SCHREBER in Spicilegium Florae Lipsicae (1771): they are cited in a later work (SCHREBER 1810: 40). These specimens thus obviously cannot be considered to constitute original material. On the other hand, Spicilegium Florae Lipsicae lacks any other name that could be regarded as synonymous with *A. stolonifera*, and it is therefore very probable that *A. vinealis* is a synonym of *A. stolonifera*. This is also suggested by the polynomials of HALLER (1768: 228, No. 1481) and SCHEUCHZER (1719: 143; »Haller n. 1481» was cited), cited in SCHREBER's description of *A. vinealis;* the polynomial of SCHEUCHZER was considered to belong to *A. decumbens* Hall. fil. ex Gaud. (=*A. stolonifera*) by GAUDIN (1811: 87).

Another old name which is very hard to interpret is *A. dubia* LEERS 1775. No herbarium of Leers is known to exist (STAFLEU 1967). Most of the description fits *A. stricta* very well, but the palea is said to measure 1/2 the length of the lemma, while *A. canina* is said to have no or a very minute (»minutissima») palea. »*Poa.* Hall 1476?» (the polynomial cited for *A. stricta*, too, see above p. 39) is cited but has apparently no significance in this case because of the question-mark. As long as no original material of *A. dubia* is known, it must apparently be considered a dubious name.

If *A. stricta* is considered only a variety of *A. canina*, then *A. canina* var. *minor* Retz. 1779 (and not var. *arida* Schlecht. 1823) is the oldest name. As Herbarium Retzius (in LD) lacks material of var. *minor*, the cited plate (tab. 161) of Flora Danica must be taken as lectotype (Herbarium Oeder in C lacks material corresponding to this plate). In this plate the anthers are very small (1/3 the length of the lemma, a character which fits *A. mertensii*). But as plate 1443 of *A. canina* from Denmark in Flora Danica XXV (HORNEMANN 1813) also has anthers less than 1/3 the length of the lemma, and *A. flava* in plate 751 of Flora Danica XIII (MÜLLER 1778) has anthers longer than the lemma (which actually never occurs in the *A. stolonifera* group), the character of anther length was apparently then unknown and therefore erroneously depicted. Otherwise plate 161 in Flora Danica greatly resembles the northern type of *A. stricta* in Fennoscandia (see p. 42).

The oldest subspecific name of *A. stricta* is *A. canina* ssp. *montana* (Hartm.) Hartm. 1846. *A. alpestris* Laest. 1856 has earlier been considered a synonym of *A. borealis* (MURBECK 1898). LAESTADIUS's original material consists of both *A. stricta* and *A. mertensii*, but in my opinion the protologue fits *A. stricta* much better (e.g. »Panicula semper oblonga, contracta» and »floret multo post *A. rubram*»; *A. rubra* in *Laestadius* 1856 is *A. mertensii*). For the taxonomic status of *A. planifolia*, *A. syreistschikowii* and *A. tenuifolia* M. Bieb., see p. 48. On geographical grounds *A. wildtii* and *A. castriferrei* might be referred to, or approach, *A. syreistschikowii* (at least as delimited by SCHOLZ 1969).

Remarks on taxonomy

Recent authors do not seem to have reached agreement on the question whether *A. stricta* deserves varietal or subspecific recognition within *A. canina*, or if it is a species, although PHILIPSON pointed out its distinguishing characters as early as 1937. In newer works (1937 or later) *A. stricta* has been considered a variety (*A. canina* var. *arida*) by, e.g., PHILIPSON (1937), HYLANDER (1941), JANSEN (1951), S. O. BJÖRKMAN (1951, 1954a, 1960) and JONES (1952, 1953), though JONES expressed strong doubts about its varietal status (1953: 316): »However, whatever the origin of var. *arida*, it is clear that the sterility of the triploid hybrid between it and var. *fascicularis* ensures genetic isolation between the two varieties. Bearing in mind their ecological preferences and morphological differences, as well as this isolation, we must consider whether *A. canina* encompasses two varieties or two species».

A. stricta has been considered a subspecies of *A. canina* by, e.g., HYLANDER (1953a), HUBBARD (1954, 1968), CLAPHAM & al. (1962), WEIMARCK (1963), LID (1963) and ROTHMALER (1963).

A. stricta has been accorded specific rank by, e.g., LÖVE & LÖVE (1956, 1961), LAWALREE (1956), JALAS (1958), HESS & al. (1967) and SCHOLZ (1969).

Experimentally produced triploid hybrids between *A. canina* and *A. stricta* of Welsh origin have proved to have completely sterile pollen and seeds (DAVIES 1953, JONES 1953, 1956 a). Hybrids have not been found by me in natural populations in Finland, although especially sought for by rock-pools, where the two taxa occur together in S.W. Finland. There can be no doubt about the fact that the two taxa are reproductively isolated.

In discussions about specific versus infraspecific rank rather great significance has usually been attached to reproductive isolation (e.g. by DU RIETZ 1930, STEBBINS 1950, MAYR 1958, VALENTINE & LÖVE 1958 and RUNEMARK 1961). In my opinion, the fact that reproductive isolation is combined with different chromosome numbers, some morphological differences (shoot morphology) and quite different ecology and distribution indicates that *A. canina* and *A. stricta* are different species, at least in the eastern half of Fennoscandia.

Within the area of this study *A. stricta* has a totally discontinuous distribution (see Fig. 5). Parallel with this geographical discontinuity morphological differentiation occurs. The main differences between the two population groups may be summarized as follows (cf. Figs. 4, 33 c, d, 41 c-e, 46 b, c, 48 b, c, 50 c-h):

	Northern populations	*Southern populations*
Habit:	Loosely tufted — scattered culms and vegetative shoots.	Loosely — rather densely tufted culms and vegetative shoots.
Culms:	About 10—30 (—50) cm tall, 2—3 (—4)-noded, smooth, rather slender.	About (15—)30—50(—70) cm tall, (2—) 3—4(—5)-noded, smooth or rarely scabrous, usually rather stout, sometimes slender.
Leaves:	Lamina (0.5—)1.0—2.0(—3.0) mm wide; uppermost culm leaf 1—5 (—9) cm long; lamina and sheath bright — dark green; sheath smooth.	Lamina (1.0—)1.5—3.0(—4.0) mm wide; uppermost culm leaf (2—)3—10(—15) cm long; lamina and sheath usually greyish green; sheath smooth or scabrous.
Ligule:	On second culm leaf about 1.3—2.7 (—4.0) mm long and 1.3—1.8 mm wide, obtuse — acute.	On second culm leaf about 2.2—4.0 mm long and 1.3—3.0 mm wide, acute — obtuse.
Panicle:	About 3—7(—10) cm long, usually lanceolate, rarely ovate, rather sparsely branched and not very dense; branchlets and pedicels scabrous — quite smooth.	About 3—10 (—13) cm long, ovate — lanceolate, much branched and often dense; branchlets and pedicels very scabrous — nearly smooth.

Spikelets:	
About 2.5—3.2 (—3.5) mm long.	About 2.0—2.7 (—3.0) mm long.
Lemma:	
About (1.5—) 1.7—2.0 mm long, truncate — obtuse.	About 1.2—1.7 mm long, obtuse — truncate — emarginate.
Palea:	
About 0.23—0.47 mm long.	About 0.19—0.30 mm long.

Concerning differences in habitat ecology, see pp. 46—47. A different hybridization pattern of the two population groups is discussed on pp. 130—132. The immigration into Fennoscandia of the different population groups is discussed on pp. 44—52.

As can be seen from the comparison above, there are on the average many differences between the two population groups. However, every character studied shows some degree of overlapping (the least overlapping apparently occurs in the length of the lemma). When representatives of the populations were cultivated side by side in the Botanical Garden, the differences remained largely unchanged. When attention is restricted to these populations in the area studied, recognition at the varietal or even subspecific level would seem justified. On the other hand, the distribution of *A. stricta* is quite continuous in Fennoscandia as a whole, as the two different areas in eastern Fennoscandia are linked together by a continuous distribution in Norway and southern Sweden, extending to Uppland in Sweden and southern Finland (see pp. 48—49). Thus the population groups studied here are likely to constitute extremes within a (continuous?) clinal variation series. Until its possible continuity or discontinuity has been studied in detail in the western half of Fennoscandia, I prefer not to decide the rank or form any new names or combinations for the different taxa here encountered.

Names based on specimens from the northern population are *A. canina β mutica* Hartm. 1838, *A. rubra stolonifera* Ands. 1852, *A. hyperborea* Laest. 1856, *A. alpestris* Laest. 1856 and *A. borealis* var. *elongata* Norm. 1893, and probably also *A. canina β minor* Retz. 1779 (as judged from the morphology of the type, for which only Norway is given as locality) and *A. borealis *elatior* Hartm. 1846 (as judged from the large spikelets described; the type locality is in Buskerud in southern Norway).

A name given to specimens of the southern type is *A. canina β montana* Hartm. 1832 (type locality Stockholm).

Recently Scholz (1969) made a revision of the entities within *A. stricta* (sub nom. *A. coarctata*) on a worldwide basis. In Fennoscandia three different subspecies were distinguished, but very few specimens were cited. Scholz drew attention especially to the length of the palea and the form of the lemma apex as delimiting characters. *A. coarctata* ssp. *hyperborea* (*A. borealis* ssp. *elatior* is evidently an older subspecific name) was stated to occur in eastern Canada, Greenland, Iceland and arctic Europe, but specimens were cited only from Greenland and Iceland. The variation of the palea and lemma characters of the northern Fennoscandian populations seem to fit the description given by SCHOLZ for his ssp. *hyberborea*, being, however, somewhat wider in the case of the lemma. *A. coarctata* was reported by SCHOLZ from »West- und Nordeuropa» and one specimen from Nordfjord in Norway was cited. The palea length of *A. stricta* in southern Finland (see above p. 43) seems to match that given (±0.2 mm) for ssp. *coarctata* rather well, or is perhaps somewhat greater, while the lemma apex ranges from obtuse to truncate and emarginate (see Fig. 50) and thus partly falls outside the variation given for ssp. *coarctata* by SCHOLZ. Finally, *A. coarctata* ssp. *syreistschikowii* was described as having obtuse lemmas and short (0.1—0.2 mm) paleas, and a distribution ranging from western Siberia to southern and eastern Central Europe. One specimen was cited from Helsinki (in fact: Espoo), Tapiola (I have studied it and found that morphologically it agrees with S. Finnish *A. stricta*). The southern Finnish population of *A. stricta* partly falls within the range of variation given for ssp. *syreistschikowii* in respect to the above-mentioned characters by SCHOLZ. But *A. syreistschikowii* in the Ukraine was described as having short, obtuse—nearly truncate ligules. A ligule length of 0.7—1.0 mm was reported for the uppermost culm leaves and only 0.3—0.5 mm for the other leaves (SMIRNOV 1938; cf. also LAVRENKO 1940). Short obtuse—nearly truncate ligules were reported by HOLUB (1963) also for Czechoslovakian »*A. pusilla*», and were found by me in some Soviet specimens of *A. syreistschikowii* (see Fig. 4). The population of *A. stricta* in S. Finland differs quite clearly from *A. syreistschikowii* in this character. Rather long and obtuse—acute ligules were found also in some specimens from S. Sweden studied (see Fig. 4), and were reported for British *A. stricta* by HUBBARD (1968). In the U.S.S.R. *A. syreistschikowii* was reported to occur in the south, extending only up to the Moscow Region (SMIRNOV 1938, LAVRENKO 1940). However, according to specimens seen by me (see p. 139) the distribution seems to cover most of the European part of the U.S.S.R. up to the Leningrad Region in the north. These specimens were in respect to ligule length typical *A. syreistschikowii*. Recently VILJASOO (1966) reported occurrence in Estonia. Some Estonian specimens studied (see p. 139) had ligules ranging from short and truncate to rather long and pointed (see Fig. 4), thus approaching south Finnish *A. stricta*. Apparently at least the Ukrainian *A. syreistschikowii* must be considered different from the south Finnish *A. stricta*, but the latter taxon may well be the same as *A. stricta* in S. Sweden and W. and N. Central Europe. This conclusion is supported

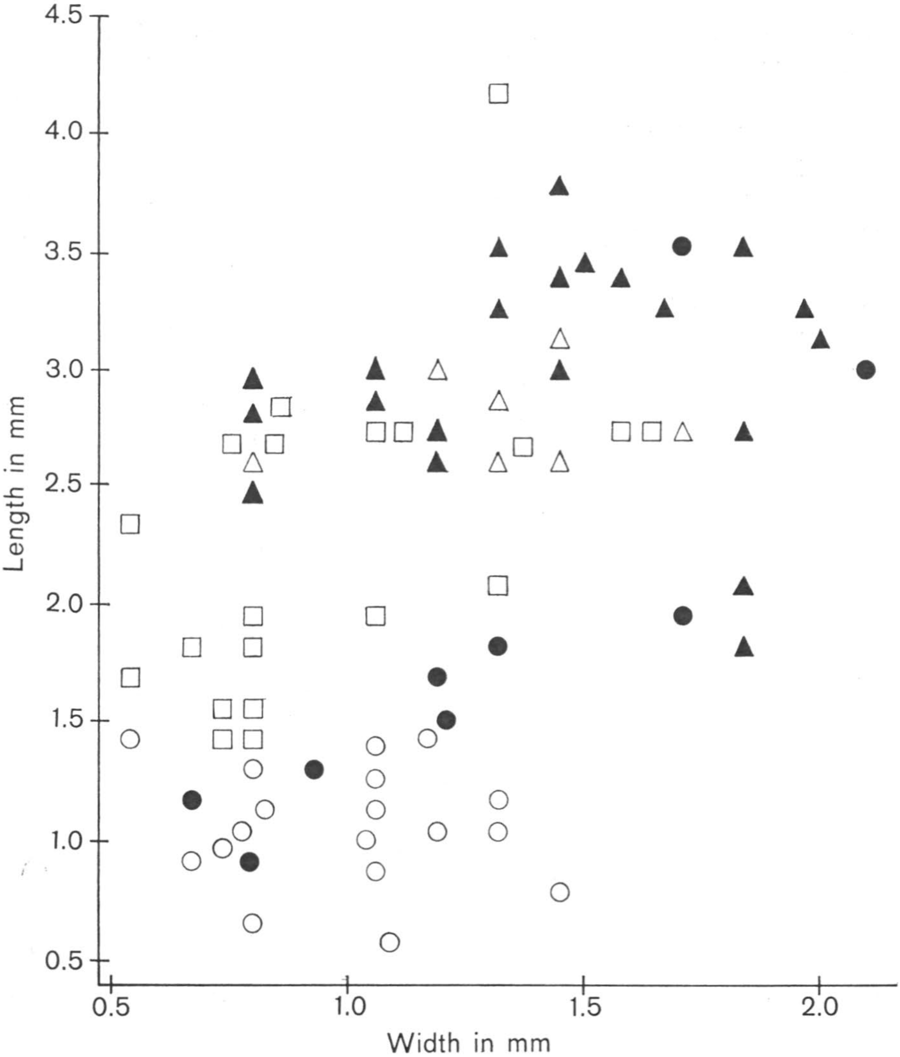


FIG. 4. Scatter diagram illustrating ligule length and width (on second culm leaf) in some different populations of *A. stricta* and *A. syreistschikowii*. Specimens included marked with ° or °° in the list of specimens studied (see p. 135).

▲ south Finnish *A. stricta*
☐ north Fennoscandian *A. stricta*
△ Danish and south Swedish *A. stricta*
○ *A. syreistschikowii* from the U.S.S.R. (except the Estonian S.S.R.)
● material from the Estonian S.S.R.

by the ecology of these plants. *A. syreistschikowii* was described as a steppe and alluvial shore plant by SMIRNOV (1938), and in Fennoscandia such plants regularly require basic or neutral ground, often growing on calcareous soils (cf. SJÖRS 1956: 13, 130—137), while the plants that favour acid heaths or acid rocks with heath-like vegetation usually are ± suboceanic with a western or southern distribution in Europe (cf. SJÖRS 1956: 103—111; concerning the habitats of *A. stricta* in S. Finland see below). The intermediate variation pattern in respect to ligule length of the Estonian specimens studied seems to support the treatment of *A. stricta* and *A. syreistschikowii* as subspecies within the same species, as was done by SCHOLZ. Obtuse lemma margins, which are found rather often in southern Finnish *A. stricta*, do not seem to occur in Scandinavian or western European populations, and so might have been derived by introgression from *A. syreistschikowii.*

Minor variants without any very great taxonomic significance are rare yellowish-panicled clones. In *A. stricta* awnless and especially short-awned clones are frequent; in the north awnless clones are locally even more frequent than awned clones. *A. canina β mutica* Hartm. is a name given to unawned clones of the northern population of *A. stricta.*

The specific delimitation of *A. stricta* in the area studied does not provide any difficulties. The occurrence of extravaginal rhizomes and absence of intravaginal stolons separates the species from *A. canina. A. mertensii* may resemble the northern population of *A. stricta* rather much, but is sharply distinguished by its much shorter anthers. *A. stricta* may sometimes resemble *A. capillaris* rather closely but differs in its short paleas.

Habitats

The southern population group of *A. stricta* in eastern Fennoscandia grows almost exclusively on open sunny rocks with scattered pines. The chief occurrence is in the so-called *Rhacomitrium lanuginosum — Cladina — Gyrophora* vegetation analysed and described by JALAS (1961). The vascular plant species are rather few in this vegetation type; *Deschampsia flexuosa, Rumex acetosella* and *Spergula vernalis* may be mentioned. The most abundant cryptogams are *Rhacomitrium lanuginosum* and reindeer lichens (*Cladina*). *A. stricta* can be found also (usually sparsely) on rocks where the mosses are less abundant and reindeer lichens dominate. Here the vascular plants include *Silene rupestris* and *Calluna vulgaris.* The rocks are usually of granite and gneiss and very acid. The species occurs in S. Finland also on rocks with a richer vascular flora comprising *Sedum telephium, Viola tricolor* and *Viscaria vulgaris* (the *Woodsia — Viscaria* vegetation described by JALAS 1961) and has even been collected from calcareous rocks being thus apparently amphiclinous. The habitats are usually very dry but in Ab Korpo I saw the species growing also in periodically wet crevices with *Drepanocladus* mosses. These clones were at first suspected to be hybrids with *A. canina*, but when plants were grown in the Botanical Garden their shoot morphology was typical of *A. stricta*, and a tetraploid chromosome number was found (see p. 24). A few collections have been made from sites other than rocks, e.g. from a lawn and from a juniper heath on till. *A. stricta* seems to be a hemeradiaphore in southern Finland. Hubbard (1968: 299) mentions the species as a drought-resistant lawn grass but it has evidently not been used as such in Finland, except perhaps in very rare cases.

The northern population group of *A. stricta* in the eastern half of Fennoscandia grows in two kinds of habitats. One is sandy or gravelly margins of lakes, rivers and brooks, with or without a thin humus layer. The size of the waters ranges from very small brooks to large rivers and lakes. I have seen the species growing in pure fine sand and forming the riverward margin of the shore vegetation along the Tana River in Norway and Finland. *A. stricta* occurs in treeless shore communities with a more or less open plant cover, too, where the humus layer is often thin and there is often a layer of moss. Here it also occurs among the bushes closest to the water's edge. The habitats in northern Finland and Sweden are evidently mainly of this kind (see p. 138; cf. G. Björkman 1939: 12 sub nom. *A. canina*, and Wistrand & Lundqvist 1964: 56).

In northern Norway the species occurs in similar waterside localities, but also in lower oroarctic habitats other than shores. For instance, Benum (1958) lists as habitats of »*A. canina*» (=*A. stricta*) in Trs »heathery or grassy hills, rock ledges and stony slopes». Such oroarctic occurrences extend to northwest Le in Finland and westernmost TL and LL in Sweden (see p. 138). Just outside the region here studied *A. stricta* has been found on serpentine ground in Jmt in Sweden (Rune 1953).

Two cases of apophytic occurrence in N. Finland are known to me. In one case a roadside had been invaded in Lk Muonio (see p. 138), in the other case a field beside the Tana River in Li Utsjoki (see p. 138).

Common properties of the habitats of the two different *A. stricta* population groups are a not quite closed plant cover, and a good light supply.

Distribution

General distribution

The total distribution of *A. stricta* is very hard to define. This is partly due to the fact that until very recently the species was not consistently separated from *A. canina*. Moreover the distinction of *A. stricta* from related taxa other than *A. canina* s. str. is not clear. Taxa that, like *A. stricta*, differ from *A. canina* in the possession of rhizomes are *A. syreistschikowii*, *A. planifolia*, *A. tenuifolia* M. Bieb. and *A. trinii*. *A. planifolia* was described from Caucasia and is reported as an endemic there by ŠIŠKIN (1934: 175) and SOKOLOVSKAJA (1938: 456). *A. tenuifolia* was described from Caucasia, too, but its area is very little known (SMIRNOV 1938). The type of *A. syreistschikowii* is from the middle of the European part of the U.S.S.R. and the species is reported to occur from western Siberia to Austria in Central Europe (SMIRNOV 1938, CVELEV 1964: 48, SCHOLZ 1969: 484—485). *A. trinii* was described from the Baikal area and occurs in Siberia with one disjunct locality at the mouth of the Yenisey River, extending from the southern course of the Yenisey River eastwards through Siberia to the coast of the Bering Sea, and also into Mongolia, N.E. China, Korea, and Alaska on the North American Continent (CVELEV 1964: 48, HULTÉN 1968: 98). *A. trinii* and *A. syreistschikowii* were included in *A. coarctata* as subspecies by SCHOLZ (1969) in a recent revision, while *A. planifolia* and *A. tenuifolia* were excluded. The distribution of *A. stricta* (when *A. syreistschikowii* is excluded) covers most of N.W. (including Iceland and the Faeroes), W. and Central Europe, while the taxonomic status of types in the Balkan and Iberian peninsulas is unclear (SCHOLZ 1969). For the subdivision of European *A. stricta* made by SCHOLZ (1969), and the distribution areas of the different subspecies, see p. 44.

The distribution of *A. stricta* in Greenland is well known (JÖRGENSEN & al. 1958: 14). *A. stricta* has repeatedly been stated to occur in North America (outside Greenland). Thus HULTÉN (1962: 208) reported that *A. canina* ssp. *montana* occurs in N.E. North America down to Maine in the south, and stated that the presumably native *A. canina* found by FERNALD (1926: 50, 56, 81, 85) on Newfoundland belonged to that taxon. Although the habitats described by FERNALD do in fact strongly indicate *A. stricta*, all the authentic material in Gray Herbarium (GH) from the localities mentioned seems to me to belong quite clearly to *A. canina* s. str. Recently S. J. SMITH (1965: 6) reported some occurrences from New York State. SCHOLZ (1969) reported *A. coarctata* ssp. *hyperborea* as growing in »Östliches Kanada» and ssp. *coarctata* as occurring in North America as an escaped lawn grass, without, however, quoting any specimens or records relating to North American occurrences of either subspecies.

The distribution and frequency of *A. stricta* in the western half of Fennoscandia are not known in any detail. The species probably occurs throughout Denmark, and in Norway and Sweden it is common at least along the coasts, but rarer inland (HYLANDER 1953a: 323). Very interesting information on the distribution of *A. stricta* in Uppland in Sweden is given by E. ALMQUIST (1929: 237; »*A. canina* på klippor och hällar» must, judging from the habitat, be *A. stricta*): »*Agrostis canina* — *Cladina* heath (tab. 53). Almost exclusively on rocks and cliffs; common in southern Uppland, especially along the coast

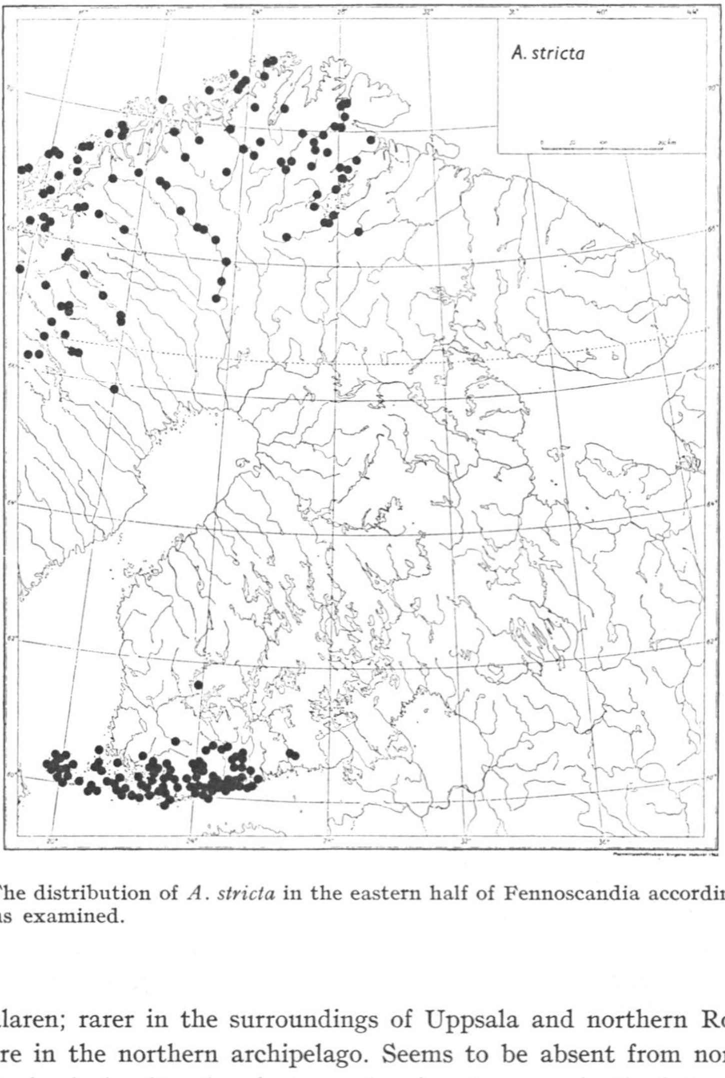


FIG. 5. The distribution of *A. stricta* in the eastern half of Fennoscandia according to the specimens examined.

and Mälaren; rarer in the surroundings of Uppsala and northern Roslagen, very rare in the northern archipelago. Seems to be absent from north and west Uppland, despite abundant supply of rocky areas in the latter region. This is remarkable, because the constituents of the type are common throughout the county. North- and westwards *A. canina* is restricted to fens etc.; the factor preventing its occurrence on rocks is unknown, but presumably climatic» (original in Swedish). It is interesting to compare these observations with the distribution of *A. stricta* in S.W. Finland.

Distribution in the investigation area

The discontinuous distribution of *A. stricta* (Fig. 5) in the eastern half of Fennoscandia is very interesting: the species occurs in S.W. Finland and appears again in N. Fennoscandia after a vast distribution gap.

In S. Finland *A. stricta* is common in Al, southern Ab and in the archipelagoes and coastal regions of western N on suitable sunny rocks. Its northern limit in Ab coincides rather well with the southern border of the rapakivi region of northwest Ab and south St described by KALLIO (1954). In this rapakivi region the rocks are mostly covered by rapakivi gravel and tree-clad (cf. KALLIO 1954). Absence or scarcity of suitable habitats may thus at least partly explain the northwest distribution limit in Ab. The eastern limit of continuous distribution seems to lie around Borgå, since *A. stricta* occurs in the southwest of the Borgå archipelago, but suddenly disappears in the southeast. East of Borgå there is a large rapakivi region (see e.g. Atlas of Finland 1925 map 8). However, the continuous area of *A. stricta* does not seem to reach the western border of this region.

In connection with a line survey of the distribution of forest plant species on the coast and inland near Helsinki, HINTIKKA (1964: 227, 228) noted a decrease in the frequency of *A. stricta* on passing inland. This decreasing frequency was then compared with the frequency of rocky sample plots, and a positive correlation was noted. The gradually decreasing frequency of open sunny rocks towards the inland certainly at least partly accounts for the decreasing frequency of *A. stricta*, but cannot wholly explain its eastern, northeastern and northern distribution limits, as there are rocks with only scattered trees almost all over Finland. Probably a change of the rock vegetation is partly responsible.

The so-called *Rhacomitrium lanuginosum* — *Cladina* — *Gyrophora* vegetation, in which *A. stricta* has its chief occurrence in S. Finland, is distributed very near the coast, but extends farther inland (up to 50 km) when the rock outcrops have exposures receiving the full influence of moist winds from the sea (JALAS 1955, 1961: 40). The distribution of the S. Finnish *A. stricta* thus seems to coincide rather closely with this vegetation type, which, however, is reported to occur farther towards the east along the northern coast of the Gulf of Finland than *A. stricta*, and also on the northern coast of Lake Ladoga (JALAS 1955, 1961). However, *A. stricta* is not entirely confined to this vegetation type in S. Finland, but occurs also in the *Woodsia—Viscaria* vegetation, which occurs south of 62° N. lat., extending to the northern coast of Lake Ladoga in the east (JALAS 1961: 44), and also in open rock vegetation dominated by reindeer lichen cushions, which occurs in many places in Lake Finland (the map of KUKKONEN 1964: 111 gives information on the distribution of *Silene rupestris*, a species which *A. stricta* often accompanies in reindeer lichen vegetation on open rocks in S. W. Finland). Thus the absence of habitats with suitable vegetation evidently does not wholly explain the distribution limits of *A. stricta* in S. Finland.

In northern Fennoscandia *A. stricta* has been collected from scattered localities in Norway, Sweden and Finland, ranging from the outer Norwegian islands to southern LL, northernmost Nb and southernmost Li. One locality has newly been found by me in the extreme west of the Murmansk Region. In Norway and westernmost LL and TL and in northwest Le the species occurs in various oroarctic habitats other than shores (see p. 138). The factor that limits the distribution in oroarctic habitats of this kind is very likely the humidity of the oceanic climate, as the species can maintain itself on moist shores in much more continental parts of northern Fennoscandia. The frequency of the northern population is not very well known. Owing to its only rarely abundant occurrence, dwarf habit and similarity to the frequent *A. mertensii*, *A. stricta* has certainly been very much overlooked, especially in oroarctic habitats, where it flowers very late. My experience suggests that it may prove ± common within many regions of its northern Fennoscandian distribution area. The occurrence of *A. stricta* hybrids in Lk and even Ks in Finland must indicate that it at least formerly had a wider distribution in Finnish Lapland. It would not be surprising if more localities were discovered in the Murmansk Region. The species ascends to at least 700 m in northwest Le in Finland (see p. 138), 950 m in Nrd in Norway (see p. 138), and has been collected at 1000 m in Jmt just west of the area of this study (specimens collected by S. Kilander in H).

The taxonomic heterogeneity of *A. stricta* is revealed also by an examination of its total distribution area in eastern Fennoscandia. There is evidently no other vascular plant species with an identical area. Some species classified by KALELA (1961b: 450) as maritime-southern suboceanic (e.g. *Sedum annuum*, KALELA 1961 map 31, *Alchemilla filicaulis* var. *filicaulis*, mapped by K. Saarisalo in JALAS 1965, and *Silene rupestris*, KUKKONEN 1964: 111) have rather similar areas, but, unlike *A. stricta*, occur only in the mountains in W. and Central Europe. Thus, the distribution of the northern and southern Fennoscandian populations must apparently be considered apart from one another. The northern populations (which morphologically resemble the populations occurring in Iceland and Greenland, see SCHOLZ 1969 and p. 44) have a distribution in Fennoscandia resembling that of some non-centric oceanic arctic-montane species occurring in Fennoscandia and in some mountains of Central and W. Europe and also the Caucasus, and in Iceland, Greenland and N. E. America (being thus amphi-Atlantic). Among such species are *Gentiana nivalis* (HULTÉN 1971 map 1423, 1958 map 97), *Saxifraga stellaris* (HULTÉN 1971 map 970, 1958 map 91) and *Gnaphalium supinum* (HULTÉN 1971 map 1692, 1958 map 99). All 3 species have some localities in the Murmansk Region (in the north of the U.S.S.R. *Gnaphalium supinum* extends eastwards to the Ural Mts) but, as already noted, in view of its distribution in the adjacent parts of Finland and Norway, *A. stricta* may well occur there, too. It is interesting that PHILIPSON (1937: 109) found clearly larger spikelets in »*A. canina*» (containing *A. stricta*) in Scotland than in S.E. England. The three northern species just mentioned (and many others, too) occur in Scotland.

Considering the variation, distribution, frequency, and habitats of *A. stricta* in S. Finland and S. Sweden, immigration from the west seems probable (cf. p. 44). The southern populations seem to belong to a group of plants listed by KALELA (1961b: 445—446) as suboceanic and southern with their main distribution in Europe: e.g. *Carex pilulifera* (KALELA 1961 map 25), *Sedum telephium* ssp. *maximum* (its distribution outlined in JALAS 1954), *Saxifraga granulata* (HULTÉN 1971 map 962), *Sieglingia decumbens* (HULTÉN 1971 map 195) and *Senecio silvaticus* (HULTÉN 1971 map 1743). Some of these have somewhat narrower areas than *A. stricta* in S. Finland, others again have wider distributions. The most favourable migration time for this group of species was, according to KALELA (1961b: 444), the Atlantic period. In S.W. Finland *A. stricta* has been able to colonize recently emerged coastal rocks, but this is not the case on the south coast east of Borgå. (The report of ULVINEN 1959: 122 of *A. stricta* from Ka Kotka, Mussalo, was based on misidentified *A. capillaris*). The easternmost localities in the interior of Ka can probably be interpreted as relics of a wider distribution existing during more favourable times. The northernmost localities were certainly invaded long ago when the coast line was nearby and are also to be regarded as relics. The recently found isolated locality in Ta Teisko suggests that the species should be looked for on suitable rocks elsewhere in central Ta.

Agrostis mertensii Trin.

A. Mertensii TRINIUS 1836: 302. — *A. laxiflora* [var.] β. *Mertensii* (Trin.) GRISEBACH 1853: 442. — *A. canina* [var.] E. *Mertensii* (Trin.) KUNTZE 1898: 338. — Lectotypus: America septentrionalis, Alaska, insula Unalaska. 1829 leg. K. H. Mertens (LE; A. S. HITCHCOCK 1905: 53, Pl.XXXV:1)! Ic. 26.

? *A. rubra* LINNAEUS 1753: 62 (p.p., nom. dub. et ambig., vide pp. 54—56); WAHLENBERG 1812: 23 (p.p.), 1824: 41 (p.p.), non 1820, nec KALM 1765; BLYTT 1847: 152, 1861: 79, ANDERSSON 1852: 102, GRISEBACH 1853: 440, LÖNNROT 1860: 114, LÖNNROT & SAELAN 1866: 144, MELA 1895: 432, 1899: 423. — *Vilfa rubra* (L.) PALISOT DE BEAUVOIS 1812: 48. — *Trichodium rubrum* (L.) ROEMER & SCHULTES 1817: 281.

A. rupestris [var.] β *uliginosa* C. J. HARTMAN 1832: 19. — Lectotypus: Suecia, TL, between »Kengis bruk och Pajala kyrka». 18.VIII.1800 leg. G. Wahlenberg (UPS, sub nom. *A. rubra*)!

A. borealis C. J. Hartman 1838: 17 (nom. nov. pro *A. rupestri* β *uliginosa*). — Typus: vide sub nom. *A. rupestris* β *uliginosa*.

A. borealis [var.] β *minor* C. J. HARTMAN 1846: 13. — *A. rubra* var. *minor* (Hartm.) MELA 1895: 433. — Lectotypus: Suecia, »Torne Lpm, 1834 Laestad.» (L. L. Laestadius [UPS], sub nom. *A. rupestris* Koch)!

A. rubra [var.] ? *β angustata* BLYTT 1847: 152. — Lectotypus: Suecia, Jmt, Snasahögen. Leg. C. Lagerheim. In E. Fries: Herbarium normale 11: 86 (GB)!

A. alpina auct. non Scop. 1772, nec Leyss. 1783 (vide p. 36), nec Willd. 1797: WAHLENBERG 1812: 22 (p.p.), 1824: 40 (p.p.), C. J. HARTMAN 1820: 44, GRISEBACH 1853: 439, et al.
A. rupestris auct. non All. 1785: C. J. HARTMAN 1832: 16, GRISEBACH 1853: 439, et al.
A. alpestris auct. non Laest. 1856 (vide p. 37): MURBECK 1898: 11 (pro syn.).

Description

Loosely—densely tufted, perennial. *Vegetative shoots* intravaginal, erect and rather short, about 1/5—1/3 (—1/2) the length of the culms; intravaginal stolons absent; extravaginal rhizomes very rare. *Culms* about (5—) 10—30 (—50) cm tall, stiff, erect, or geniculate (only one joint) right at the base, smooth, with the uppermost leaf blade during and after flowering attached at about 1/3—1/2 the height of the culm, and the other 1—3 blades crowded at the base. *Leaf* laminae on culms green, flat, about 1—3 (—5) mm wide, scabrous — smooth on the upper side, smooth or subscabrous on the under side; on vegetative shoots narrower, about 0.75—2.0 (—3.0) mm broad, flat or folded, smooth or slightly scabrous; sheaths smooth, green or rarely purplish; stomata about 46—55 μm long. *Ligule* on uppermost culm leaf about 1.2—3.0 (—4.0) mm long, on second culm leaf about 1.0—2.5 mm long with a width/length ratio of about 1/2—1/1, with obtuse—truncate apex. *Panicle* mostly pyramidal, semi-contracted or open during flowering, and open after flowering, rarely strongly contracted during and after flowering, about (2—) 3—10 cm long and about 1/5—1/3 the length of the culm, rather sparsely branched; branches smooth, dividing above 1/2 their length, with rather few spikelets and smooth or slightly scabrous pedicels and branchlets; the lowest branches are the longest. *Spikelets* dark brown or brownish purple, rarely greenish, about 2.5—3.5 mm long; glumes subequal, narrowly ovately lanceolate, acute—acuminate, smooth. *Lemma* about 1.7—2.6 mm long, obtuse—truncate, 5-nerved with slightly excurrent lateral nerves and the median nerve entering a geniculate awn at about 1/3—1/2 of the way up the lemma, which has dense prickle-hairs; Trichodium net well developed, type I. *Palea* very minute or absent, always much shorter than the ovary. *Anthers* about 0.5—0.9 mm long, measuring about 1/3 the length of the corresponding lemma, yellowish or very rarely purplish.

Figs. 1, 26, 34 a, 41 f, g, 46 d, 48 d, 50 b, 54 c.

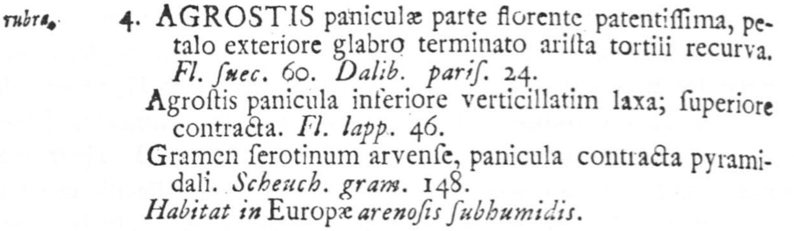
Cytology

The chromosome counts (all sub nom. *A. borealis*) have with only one exception (see below) given the octoploid number 2 n = 56. SOKOLOVSKAJA (1937a: 461, 1938: 455, 1955: 851, 1962: 81, 1963: 49) and SOKOLOVSKAJA & STRELKOVA (1939: 51, 1962: 86) studied both wild and cultivated material from several different parts of the U.S.S.R. North American plants were investigated by BOWDEN (1960: 542), LÖVE & LÖVE (1966: 17; three different infraspecific taxa), HEDBERG (1967: 312) and TAYLOR & MULLIGAN (1968: 22). The last-mentioned authors found the number 2 n = 42. Their material (5 clones) was from the Queen Charlotte Islands on the Pacific coast of Canada, and it would be desirable to ascertain whether it really is conspecific with the octoploid *A. mertensii*. Chromosomes of Greenlandic plants were counted by BÖCHER & LARSEN (1950: 5) and JÖRGENSEN & al. (1958: 15). S. O. BJÖRKMAN's (1951: 467, 1954a: 255, b: 57, 1960: 39—40) material orginated from Sweden (see p. 140), Finland (see p. 140), Norway and Canada. I have found the octoploid number in one plant from Ob Rovaniemi. S. O. BJÖRKMAN (1960: 40) has given the following data on the meiotic chromosomes: normally there were 28 bivalents, rarely 27 bivalents and two univalents, or 26 bivalents and 4 univalents, very rarely 25 bivalents and 6 univalents. Multivalents did not occur.

Nomenclature

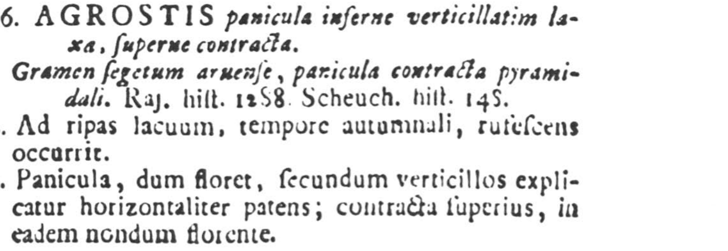
The species in question has mostly been called *A. borealis* Hartm., while the name *A. mertensii* Trin. has been forgotten for a very long time. The lectotype specimen of the latter name was collected in 1829 in Unalaska by K. H. Mertens and was then named *A. Mertensii* in schedis by TRINIUS, but this name was not published until 1836 in a list of plants collected in South America by E. Poeppig. The short description fits our species, and the following information was given about the distribution: »In And. Chil. austr. (Eandem legit b. Mertens in Unalaschka)». As TRINIUS cited the specimen of Mertens and named it after him, and as »Herb. Acad. Petrop.» was cited after the name, the lectotype selection of A. S. HITCHCOCK (1905: 53) must be considered correct, although it is very doubtful whether the Chilean specimens belong to the same species. A. S. HITCHCOCK did not know that the name *A. mertensii* had been published in 1836, being aware only of a later (1841) diagnosis, and therefore did not use it instead of *A. borealis* Hartm. 1838. Recently, however, C. L. HITCHCOCK & al. (1969: 467) drew attention to the name *A. mertensii* as a possible synonym of *A. borealis*, knowing the right date of publication, but apparently being unaware of A. S. HITCHCOCK's typification.

Especially formerly the name *A. rubra* L. 1753 has also been used for the species (see p. 52). The identity of this name has been much disputed. The protologue in LINNAEUS's Species Plantarum (1753: 62) is as follows:



rubra. 4. AGROSTIS paniculæ parte florente patentiſſima, petalo exteriore glabro terminato ariſta tortili recurva. *Fl. ſuec.* 60. *Dalib. pariſ.* 24.
Agroſtis panicula inferiore verticillatim laxa; ſuperiore contracta. *Fl. lapp.* 46.
Gramen ſerotinum arvenſe, panicula contracta pyramidali. *Scheuch. gram.* 148.
Habitat in Europæ *arenoſis ſubhumidis.*

The trivial name in the protologue apparently refers to the reddish colour of the panicle. The phrase-name was taken unchanged from LINNAEUS's Flora Suecica (1745: 22), from which it had meanwhile been adopted by DALIBARD (1749: 24, the reference to his work is thus unimportant). The statement about the form of the panicle has little importance. The description of the awn and its attachment has probably been taken from the cited description of SCHEUCHZER (1719: 148), which concerned a plant with a terminal awn, as C. J. HARTMAN (1840: 82) has already pointed out. Of the cited polynomials, those in LINNAEUS's own Flora Suecica (1745: 22) and Flora Lapponica (1737 b: 27) must be considered important, while the polynomials of RAY (1688: 1288), SCHEUCHZER (1719: 148) and VAILLANT (1723: 88), which were cited by LINNAEUS in all or some of the works mentioned above, must be considered to have been misidentified by LINNAEUS. They all represent *Gastridium ventricosum* (Gouan) Schinz. & Thell., a grass which later has been found only occurring adventitiously in the regions cited in Flora Suecica. Later LINNAEUS observed his mistake, as in Species Plantarum ed. 2 (1762: 91) he based his new species *Milium lendigerum* upon RAY's and SCHEUCHZER's polynomials. In Flora Lapponica the protologue runs:



46. AGROSTIS *panicula inferne verticillatim laxa, ſuperne contracta.*
Gramen ſegetum arvenſe, panicula contracta pyramidali. Raj. hiſt. 1288. Scheuch. hiſt. 148.
α. Ad ripas lacuum, tempore autumnali, rufeſcens occurrit.
β. Panicula, dum floret, ſecundum verticillos explicatur horizontaliter patens; contracta ſuperius, in eadem nondum florente.

The description of the panicle fits very well the corresponding panicle in LINNAEUS's Lapland herbarium, which is kept at Institute de France in Paris. I have studied it in Paris and can definitely state that it cannot be *A. mertensii*, but is an unawned specimen belonging to the *A. canina* group, as already reported by TH. M. FRIES (1861: 260). Probably it is *A. stricta*, but as the specimen consists merely of the panicle its identity cannot be decided with complete certainty. However, considering the distribution and frequency of the different *Agrostis* spp. in Lapland, it seems very probable that *A. mertensii* was referred to the same polynomial, if the other *Agrostis* in Flora Lapponica is thought to be *A. capillaris* (see p. 70). In Flora Suecica (1745: 22) the phrase-name was changed to that later adopted in Species Plantarum. As regards distribution and habitat, Flora Suecica gave the following information: »Habitat ad ripas lacuum & in pratis depressis ubique». Consequently the name must have included other taxa besides the northern *A. mertensii,* probably awned taxa like *A. canina* and *A. stricta,* although the former was also described separately in the same work (p. 392).

As far as I know, *A. rubra* L. 1753 has never been typified. In the Linnaean herbarium in London there is one sheet (No. 10 according to SAVAGE 1945: 14) marked *A. rubra* in the handwriting of LINNAEUS. According to A. S. HITCHCOCK (1904: 141), the specimen is *Sporobolus junceus.* Doubtless A. S. HITCHCOCK was right, when he stated that the sheet has no bearing on the typification of *A. rubra,* as it agrees neither with the description nor with the cited polynomials. Still it can be added that *A. rubra*'s number was not underlined in LINNAEUS's own copy of Species Plantarum, which, according to JACKSON (1912), means that the sheet was placed in the herbarium after 1753, and, according to the Code (Art. 7), cannot be made a lectotype but only a neotype. The only material known by me as determined by LINNAEUS prior to 1753 is the panicle (see above p. 55) in the Lapland herbarium. Being original material, however, it prevents the designation of a neotype (Art. 7, Note 3 and Guide for the determination of types Note 5 in the Code) and this makes it impossible to use *A. rubra* as a correct older synonym of *A. mertensii* or *A. borealis.* On the other hand, I consider it inadvisable to select the specimen in the Lapland herbarium as a lectotype, because it probably cannot be identified with complete certainty, and such a selection would make *A. rubra* still more ambiguous. Thus I prefer to list *A. rubra* L. 1753 as a nomen dubium. The discovery of a satisfactory type specimen among original material might naturally change the status of this name. According to Art. 69 in the Code, it might also be considered a nomen ambiguum, and rejected as such, as it has been applied to both *A. mertensii* (see p. 52) and *A. capillaris* (see p. 66).

The younger synonym *A. borealis* Hartm. 1838 has been very extensively used, but has not yet been typified. The protologue cited »Sv. B. 668» (WAHLENBERG 1826 tab. 668) and »H.N.f. 3 N:o 87» (E. FRIES, Herbarium normale Fasc. 3 N:o 87). Both probably represent *A. mertensii* as here understood, but, according to the protologue, *A. borealis* was published as an avowed substitute (nomen novum) for *A. rupestris β uliginosa* Hartm. 1832, and must be typified by the type of that name (Art. 7 Note 4, MC VAUGH & al. 1968: 8; however, the question whether a name is to be considered a nomen novum or not is not very precisely defined in the Code; see ISOVIITA 1966: 211). As »*A. rubra* Wg Fl. L.» (Wahlenberg 1812: 23) was cited in the protologue of *A. rupestris β uliginosa,* it must also be considered a nomen novum. *A. rubra* Wg 1812, again, is a nomenclatural synonym of *A. rubra* L. 1753, as »Linn. spec. plant.» was cited, but C. J. HARTMAN evidently cited WAHLENBERG and not LINNAEUS because he considered LINNAEUS's name of uncertain identity (a question that he discussed later: C. J. HARTMAN 1840). Accordingly the type specimen must be selected among specimens referred to *A. rubra* by WAHLENBERG prior to 1812. One such specimen in UPS (see p. 52) is now designated as the lectotype of *A. rupestris β uliginosa* Hartm. 1832, and it consequently typifies *A. borealis* Hartm. 1838, too.

Remarks on taxonomy

Although the Fennoscandian *A. mertensii* is assumed to consist of populations of different origin (see p. 59), the species seems to me rather uniform. The specimens with greenish panicles must be classified as shade modifications. The plant height varies rather much. Dwarf specimens with small rather narrow panicles have been named *A. borealis β minor* Hartm. Such specimens occur especially in oroarctic habitats, while specimens from lower regions are often taller and more luxuriant with larger and broader panicles. However, intermediate types are frequent, and the extremes do not seem worthy of taxonomic recognition. The density of the tufts is easily modified by the habitat. Specimens growing among mosses develop only loose tufts while specimens on bare soil often develop dense tufts. Some very conspicuous clones have the panicles fully contracted during and after flowering (Fig. 41 g), a property maintained in cultivation. These have been seen by me growing among normal clones in Le Enontekiö and Lk Pelkosenniemi. They evidently do not constitute a geographically or ecologically differentiated taxon. Such clones have been given the name *A. rubra* ? *β angustata* Bl. Some infraspecific epithets used within *A. borealis* in Nordic literature belong to *A. stricta* (see p. 37).

The delimitation of *A. mertensii* in Fennoscandia does not present any difficulties, as its short anthers sharply differentiate it from the morphologically somewhat similar *A. stricta* and *A. canina*. The occurrence of hybrids with *A. stricta* must, however, be kept in mind. These are very similar to *A. mertensii* but differ in having longer (about 1 mm long) thin non-dehiscent anthers, and the regular production of extravaginal shoots. The other known *A. mertensii* hybrids do not resemble it very much. The hybrid with *A. canina* has not yet been found in nature but should be looked for, as it has been produced experimentally (S. O. BJÖRKMAN 1954a).

Habitats

In relation to many ecological factors *A. mertensii* has a remarkably wide amplitude. E.g. it may grow submersed in springs and also on rather dry heaths and roadsides. The soil may be acid or rich in lime, but the species does not grow in bogs very poor in electrolytes. The habitats are mostly rather open, but may sometimes be quite shady. The plant cover is usually not quite closed, and the plants in the field layer are either not very tall, or not very dense. In the mountains the oroarctic habitats of the species include both meadow and heath communities and also moving soil, rock-crevices, snow-beds, small fens, pond and brook margins and brooklets. In the mountain birch forests and coniferous forests of the northern boreal zone *A. mertensii* grows mainly along rivers and brooks and on lake shores of different kinds (sandy, gravelly, peaty or meadow shores). Other habitats are fens and springs.

A. mertensii is clearly apophytic and rapidly colonizes places with a disturbed plant cover. According to SELANDER (1950: 34), it quickly spreads to reindeer tracks. It is frequent and often abundant in such man-made habitats, as ditches, paths, roadsides, railway embankments, fields and other suitable places. In its southernmost localities the species is hemerochorous and obviously adventitious. In the southern part of its distribution it may to some extent have invaded natural localities from man-made sites.

Distribution

General distribution

HULTÉN (1950) lists *A. mertensii* (sub nom. *A. borealis*) in his distribution group 9: »Circumpolar arctic-montane plants present in the mountains of Central Europe, but with large gaps in Siberia». As S. O. BJÖRKMAN (1954a: 255, b, 1960: 38) has shown that the data on the occurrence of *A. mertensii* (»*A. rubra*») in the mountains of Central Europe are based on misidentified material, the species should be placed in HULTÉN's (1950) group 7: »Circumpolar, arctic-montane plants lacking in the mountains of Central Europe and with large gaps in Siberia».

The total area of *A. mertensii* has been mapped by HULTÉN (1958: 198, map 179; further literature cited there; the map supplemented in 1968: 98), and MEUSEL & al. (1965: 413, map 47 d). The species occurs in the north and the mountains of Fennoscandia (but is lacking in Iceland and Spitzbergen) and extends through the extreme north of the European part of the Soviet Union (N. of 65° N. lat.) to the Ural Mountains (there it occurs down to 60° N. lat.). There is one isolated locality in the Kadikovsk District, southeast of Lake Onega. HULTÉN's (1968) map shows disjunct localities by the mouth of the Yenisey River (doubted by CVELEV 1964) and near Lake Baikal in Siberia. After a vast distribution gap in Siberia, the species occurs in Kamchatka, near the Amur River, on the Kurile Islands, Sakhalin and Japan. (assumed by CVELEV 1964 to be of American origin in this part of its range).

In Greenland *A. mertensii* occurs along the coasts of the southern half, while its area in North America is nearly continuous between the polar circle and 55° N. lat., from Baffin Island, Newfoundland and Labrador in the east to Alaska and the Aleutian Islands in the west. In the western and eastern mountain ranges localities are known far south, in the Rocky Mountains down to 40° N. lat. The separation of the species from related taxa in North America is critical and it has evidently not yet been clearly delimited. In addition *A. mertensii* seems to comprise infraspecific taxa with different distributions. (A. S. HITCHCOCK 1905: 51—55, FERNALD 1933, HULTÉN 1958: 198, CALDER & MULLIGAN 1968: 184). Considered as a whole, the distribution shows the species to be slightly oceanic (HAVAS 1958, KALELA 1961: 329).

HULTÉN (1971 map 155) gives the distribution of the species in Fennoscandia: outside the area of this investigation *A. mertensii* is common in the Norwegian and Swedish mountains, but in southern Norway it is lacking in the vicinity of the coast. The southernmost localities in Sweden are in Dlr, Hls and Mpd (HULTÉN 1971, HYLANDER 1953a: 324).

Distribution in the investigation area

Fig. 6 depicts the distribution of *A. mertensii* in East Fennoscandia and adjacent regions. The main distribution clearly lies in the northern boreal and orohemiarctic zones (as it does in Scandinavia, too), and the middle boreal zone of northern Norway. The species has only scattered localities in the middle boreal zone in Finland and Sweden. Vertically the distribution extends from sea level in northern Norway (but not in southern Norway) to the lower and sometimes even to the middle oroarctic zones (1 240 m. in Trs Balsfjord, Rismålstind has been reported by DEVOLD 1939: 5).

As regards its immigration history, the species has been referred by KALELA (1961a: 328—329) to a group of oceanic boreal-subarctic species assumed to have migrated to the area partly from glacial refugia in Fennoscandia, partly from the northeast. The different populations are now wholly merged. According to KALELA the main migration periods of the group were the late Youngest Dryas period (this name according to HIITONEN 1970) and the early Pre-Boreal period. Migration was interrupted by the warmer periods which followed, but in the Sub-Atlantic period conditions have again favoured the spreading of the group. The rarity of *A. mertensii* along the northern coast of the Gulf of Bothnia and the western coast of the White Sea (see Fig. 6) may indicate that the later migration period has not been as important for *A. mertensii* as for many other species of the group.

Numerous herbarium specimens have been collected from all parts of northern Norway, where the species is considered one of the commonest vascular plants (DAHL 1934: 245, BENUM 1958: 123). It has been claimed to be rare in the northernmost Norwegian islands and peninsulas (NORMAN

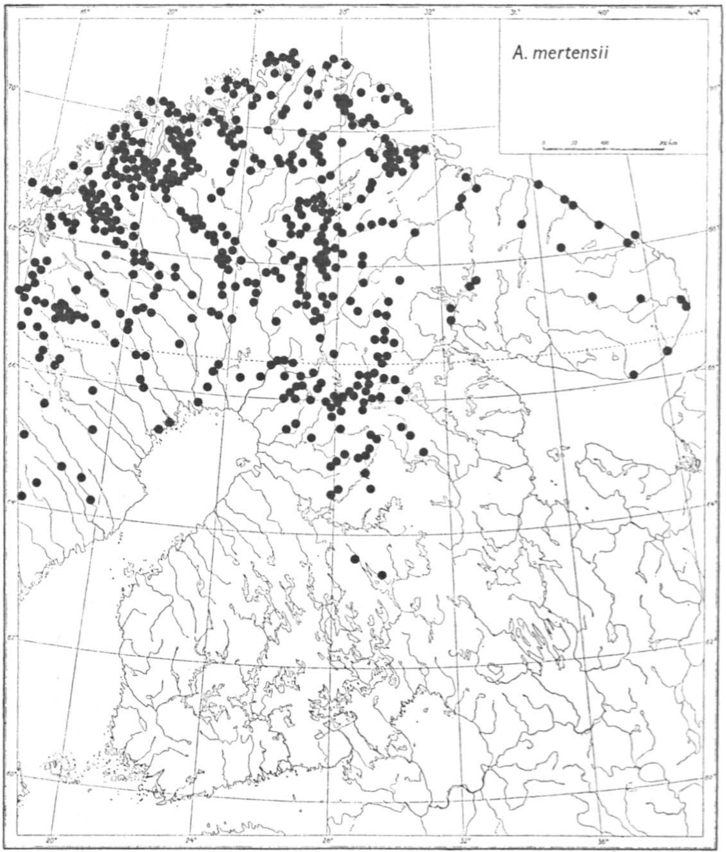


FIG. 6. The distribution of *A. mertensii* in the eastern half of Fennoscandia according to the specimens examined.

1895: 595, Dahl 1934: 245) but the herbarium material from there seems as rich as from the inland. The material from coastal areas in northernmost Nrd is scarce. Apparently the species occurs there mainly in the mountains.

From the inner parts of northern Sweden (ÅsL—TL) and Finland (Le, Li, Lk, Ks and N.E. Ob) there is rather rich material. The species generally seems to be frequent (e.g. in Swedish Lapland it is reported as frequent — rather frequent by G. Björkman 1939, Arwidsson 1943, Selander 1950, and Wistrand 1962), but the southern limits of its frequent as well as indigenous occurrence are hard to determine. The southernmost localities in Finland are in Kb Nurmes and Valtimo in railway yards, but there the species is doubtless hemerochorous and adventitious, as it very probably is in Sweden in the localities in Nb Luleå, Nederkalix and Nederluleå. The dot in Hultén's (1971) map 155 in Om Ylivieska is based on a herbarium specimen whose locality may be erroneous. The species is fairly clearly absent, at least as a native, from the coastal areas of the Gulf of Bothnia in both Sweden and Finland. Localities, which, judged by the herbarium labels, may represent indigenous occurrences lie on the southwest border of the area of the species in Finland in Ok Puolanka and Hyrynsalmi, and Ob Pudasjärvi and Ranua. Similarly the southern Swedish localities in Ång Anundsjö and Vb Degerfors can be considered natural, while information on the nature of the other marginal localities has not been given.

Rather few herbarium specimens have been seen from the Murmansk Region, but, according to the literature (Hultén 1971 map 155, Kuzeneva 1953 map 60, Cvelev 1964: 50), the species is common there.

In the Karelian A.S.S.R. the species has been collected from a very few localities in Kpoc, Ks and Kk. More southern localities are not mentioned by Ramenskaja (1960: 102). All the localities lie within the northern boreal zone.

Agrostis clavata Trin.

A. clavata Trinius in Sprengel 1821: 5. — *Trichodium clavatum* (Trin.) Schultes & Schultes 1827: 556. — Typus incognitus (vide p. 62).

A. Michauxii Trinius 1824: 206 quoad b) β) (nom. superfluum pro *Trochodio laxifloro* Michx 1803).

A. bottnica Murbeck 1898: 13.

A. laxiflora auct. non Poir. in Lam. 1810: Grisebach 1853: 441.

A. perennans auct. non (Walt.) Tuck. 1843: H. Lindberg 1898: 187, 1900: 110.

A. scabra auct. non Willd. 1797 (vide p. 63): S. Almquist 1898: 281.

A. hiemalis auct. non (Walt.) Britt., Sterns & Pogg. 1888: Neuman 1901: 775.

Description

Usually annual, very rarely perennial, loosely or densely tufted. *Vegetative shoots* erect, intravaginal, rather short (up to 1/2 the length of the culms), very rarely decumbent stolons. *Culms* erect or geniculately ascending, slender — rather stout, flexible — rather stiff, 2—3-noded, smooth, about 30—70 cm tall. *Leaf* laminae on culms and vegetative shoots flat, soft, the former about 2—7 the latter about 1—2 mm wide, with about 10—20 rather distant nerves, rather long, bright — dark green, scabrous on both sides. *Ligule* about 1.5—3.0 mm long on uppermost culm leaf, on second culm leaf about 1.3—2.5 mm long, and 1.4—0.75 times as long as wide, obtuse—acute. *Panicle* rather large, about 8—25 cm long, measuring about (1/2—) 1/3—1/4 (—1/5) the length of the culm, ovate (— elliptic), diffuse, few-flowered, with branches dividing above the middle, lightly purplish or green in shady habitats, branches patent but often somewhat raised after flowering, when branchlets and pedicels approach the branches; branchlets and pedicels intermediately scabrous, pedicels somewhat clavate. *Spikelets* about 1.6—2.8 mm long, with lanceolate, dorsally slightly scabrous glumes. *Lemma* about 1.3—1.9 mm long, about 2/3 the length of the glumes, obtuse, with five thin nerves ending at the edge, smooth or with very few prickle-hairs, unawned; Trichodium net of type I. *Palea* minute, only about 1/7—1/10 the length of the lemma, or absent. *Anthers* about 0.3—0.5 mm long, about 1/4 the length of the lemma, yellowish or purplish.

Figs. 34 b, c, 41 h, 46 e, 48 e, 50 i, 54 d.

Cytology

A hexaploid chromosome number (2 n = 42) has been obtained from Swedish material by EHRENBERG (1945: 435) and S. O. BJÖRKMAN (1951: 467,- 1960: 68). The same number was found by SOKOLOVSKAJA (1937a: 468, 1938: 458, 1960: 43, 1963: 51, 1966: 93) in material from different parts of the U.S.S.R. CHEN & HSU (1962: 301) reported n = 21 for *A. clavata* var. *nukabo* from Taiwan. *A. clavata* behaves as a diploid species in meiosis. Normally there are 21 bivalents, only very rarely 20 bivalents and two univalents (BJÖRKMAN 1960: 69).

Nomenclature

Various names were used for the species in Fennoscandian literature until H. LINDBERG (1906a: 110) showed that *A. clavata* is the oldest name.

The type locality mentioned by Trinius (in SPRENGEL 1821: 55) is Kamchatka. ŠIŠKIN (1934: 179) mentioned a type specimen in Leningrad (LE), which was requested by me but could not be found.

Remarks on taxonomy

Within Fennoscandia *A. clavata* appears to be taxonomically uniform. The forms described within the species (f. *aprica* H. LINDBERG 1906 b:16 and f. *umbrosa* H. LINDBERG 1906b: 16) are only habitat modifications.

Within Fennoscandia the habit of *A. clavata* most resembles shade modifications of *A. capillaris*, which species, however, is readily separated by its longer anthers, longer paleas and shorter ligules. The characters differentiating *A. clavata* from *A. scabra* are listed on pp. 63—64. Shade modifications of other Fennoscandian species with short paleas differ in having lemmas with dense prickle-hairs.

Habitats

As a native *A. clavata* is known to occur in moist rather eutrophic spruce forests. Being annual the species is a weak competitor, and grows in places with more or less open vegetation, e.g. often around brooks and springs. It is strongly apophytic and has in many places spread from natural habitats to paths and ditches. The occurrence recently found in Sb Pieksämäki in a railway yard must be interpreted as the result of hemerochorous dispersal.

Distribution

HULTÉN (1950: 63) lists *A. clavata* in his group »Northern-Eurasiatic plants lacking in Central Europe». The total area of the species has newly been depicted by HULTÉN (1968: 101): the area extends, mainly between 55 and 65°N. lat., from northern Sweden through Finland and the European part of the U.S.S.R. (evidently with gaps there) to northern Asia, where the distribution is continuous between 50° and 65° N. lat. from the easternmost part of the Ob River to the eastern coast and then extends to Sakhalin, Japan and Kamchatka. Two more northern areas, viz. around Penzina and around the Chaunian Gulf, are known in easternmost Siberia. Recently two new localities on the North American continent, in Alaska and the Yukon, were reported by S. O. BJÖRKMAN (1960: 68).

The distribution of *A. clavata* in the eastern half of Fennoscandia is shown by Fig. 7. The occurrences are mainly in the middle boreal zone with scattered localities in the southern part of the northern boreal and the northern part of the southern boreal zones. The species seems clearly to be absent from recently emerged coastal regions. KALELA (1961b: 325—326) has analysed the distribution and migration history of the species in Fennoscandia. He grouped it among »taiga species» which do not show a marked avoidance of maritime climates. He considers migration to Fennoscandia to have occurred in the Alleröd, late Pre-Boreal and early Boreal periods. Evidently almost no migration took place after the post-glacial warm period. Immigration into eastern Fennoscandia presumably took place from the southeast across the isthmus between the White Sea and Lake Ladoga. Migration to the Swedish localities was supposed by KALELA (1961b) to have taken place through the regions north of the Gulf of Bothnia before the post-glacial warm period.

Outside the area of Fig. 7, the species occurs in Fennoscandia in scattered localities in Dlr, Hls, Hrj, Jmt, Mpd and ÅsL (HULTÉN 1971 map 157, HYLANDER 1953a: 324).

Agrostis scabra Willd.

A. scabra WILLDENOW 1797: 370. — *Trichodium scabrum* (Willd.) MUEHLENBERG 1813: 10. — *A. capillaris* var. *scabra* (Willd.) LINDMAN 1926: 78 quoad basion. — Typus: in B (A. S. HITCHCOCK 1904: 42).

A. hiemalis auct. non (Walt.) Britt., Sterns & Pogg. 1888: HOLMBERG 1922: 146, HIITONEN 1947: 159.

A. scabra resembles *A. clavata* rather much. It is an annual or biennial caespitose species with short erect intravaginal vegetative shoots. The leaves are narrow. The panicles are diffuse and very large compared with the culms (about 1/3 the length of the

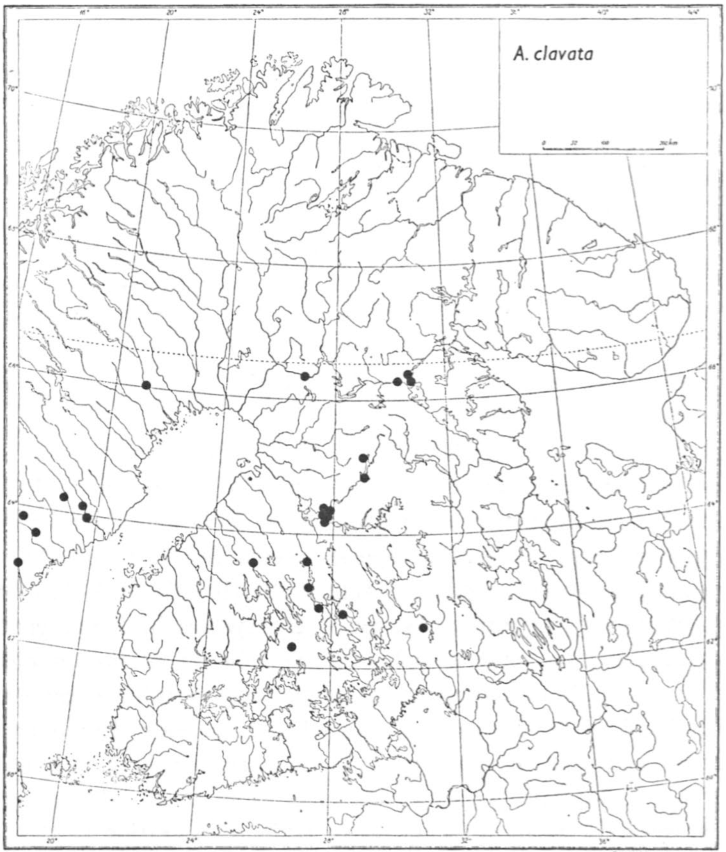


FIG. 7. The distribution of *A. clavata* in the eastern half of Fennoscandia according to the specimens examined.

culms). The species differs from *A. clavata* in having intermediately — very scabrous branchlets and pedicels, lemmas measuring less than 2/3 the length of the longer glume, and intermediately dense — dense prickle-hairs on the lemma. A more detailed description is found in, e.g., A. S. HITCHCOCK (1951: 49).

A. scabra is hexaploid (2 n = 42; SOKOLOVSKAJA 1937a: 468, 1938: 459 sub nom. *A. hiemalis*, 1968: 104; S. O. BJÖRKMAN 1951: 467 sub nom. *A. hiemalis*, 1960: 75; BOWDEN 1960: 543; Holmen in FREDSKILD 1964: 45 sub nom. *A. scabra* var. *septentrionalis;* Carlbom in LÖVE 1967: 342 sub nom. *A. scabra* var. *scabra* and *A. scabra* var. *geminata*).

A scabra has three times been collected from railway yards in Finland (see p. 141), but evidently soon disappeared again. It is also reported (ERVI 1956: 113) to have been introduced with American cranberries into St Köyliö in Finland. The species is native in Greenland (FREDSKILD 1964), North America (e.g. A. S. HITCHCOCK 1951) and N.E. Asia (CVELEV 1964). Several instances are known of adventitious introduction into Denmark, S. Norway and S. Sweden (HYLANDER 1953a: 324, LID 1963: 93).

Figr. 48 f, 55 a.

Agrostis pourretii Willd.

A. Pourretii WILLDENOW 1808: 290. — Typus: in B (S. O. BJÖRKMAN 1960: 77).
A. pallida DE CANDOLLE 1815: 251 non With. 1796 (vide p. 29).
A. salmantica (Lag.) KUNTH 1833: 229. — *Trichodium salmanticum* LAGASCA 1816: 3.

A. pourretii has only once been found in the eastern half of Fennoscandia, namely in 1940. It had been adventitiously introduced into N Helsinki in cork imported from Morocco and Spain (see p. 141; PETTERSSON 1952). The species is native in the western Mediterranean region (ASCHERSON & GRAEBNER 1899: 194). One adventitious occurrence has also been found in Gothenburg in S. Sweden (H. FRIES 1945: 142).

A. pourretii is a rather small, tufted annual species with intravaginal vegetative shoots, but without stolons. The culms are rather low, usually about 20—40 cm tall. The leaves are narrow, usually less than 1.5 mm wide, scabrous, with long (up to 4 mm) pointed ligules. The panicles are contracted, dense, greenish or lightly purplish with intermediately scabrous branches. The lemmas measure less than 1/2 the length of the glumes, and are truncate, 5-nerved with long excurrent lateral nerves, and furnished with a long geniculate awn attached slightly above the middle. The lemma has dense prickle-hairs. The Trichodium net is of type I. The anthers are comparatively long in relation to the lemma (about 4:5). More detailed descriptions of *A. pourretii* are given by ASCHERSON & GRAEBNER (1899: 194) and PAUNERO (1947: 568).

A. pourretii is a diploid (2 n = 14) species (LITARDIERE 1950: 80, S. O. BJÖRKMAN 1951: 467, 1960: 78).

Fig. 50 j.

B. Sectio *Vilfa* (Adans.) Roem. & Schult.

Vilfa ADANSON 1763: 495. — *Agrostis* subg. II. *Vilfa* (Adans.) ROUY 1913: 60. — *Agrostis* [sect.] a. *Vilfa* (Adans.) ROEMER & SCHULTES 1817: 343 (»*Vilfae.*»). — Lectotypus: *Gramen caninum supinum minus* C. BAUHIN 1658: 13 (= *Agrostis stolonifera*).
Decandolia BASTARD 1809:28.
Agrostis sect. *Euagrostis* GRISEBACH 1853: 463 (nom. illeg.).
Agrostis [sect.] I. b. *Agrostiotypus* ASCHERSON & GRAEBNER 1899:171 (p.p.).
Palea longer than 1/3 the length of the lemma. Trichodium net on lemma of types II—VII.

Agrostis capillaris L.

A. capillaris LINNAEUS 1753: 62. — *A. polymorpha* [var.] α *capillaris* (L.) HUDSON 1778: 31. — Lectotypus: in Herb. Royen (in L) ! sub nom. »*Agrostis panicula compressa, calycibus subulatis aequalibus hispidiusculis coloratis*», Ic. 27. — Non *Vilfa capillaris* PALISOT DE BEAUVOIS 1812: 147 (pro *A. capillari* J. E. SMITH 1791: 54), nec *A. capillaris* sensu KUNTH 1833, nec WILLKOMM & LANGE 1861, nec ASCHERSON & GRAEBNER 1899 (vide p. 70).
A. pumila LINNAEUS 1767: 31 (nom. rejic. monstr., vide p. 71).
? *A. dubia* LEERS 1775: 20 (nom. dub., vide p. 36). — *A. alba* [ssp.] b) *dubia* (Leers) K. RICHTER 1890: 43. — *A. vulgaris* var. γ. *dubia* (Leers) DUBY 1828: 503. — Non *A. dubia* sensu G. F. W. Mey. 1836 (pro syn., vide p. 36).
A. sylvatica POLLICH 1776: 73 non Huds. 1762 (vide p. 23).

A. polymorpha HUDSON 1778: 31 (nom. superfl. pro *A. capillari*). — Typus: vide sub nom. *A. capillaris.*

A. tenuis SIBTHORP 1794: 36. — *A. alba* var. ε *tenuis* (Sibth.) FIORI 1923: 97. — Lectotypus: in OXF (PHILIPSON 1937: 86). — Non *A. stolonifera γ) tenuis* Heuff. 1858 (vide p. 78).

A. vulgaris WITHERING 1796: 132. — *Decandolia vulgaris* (With.) *Bastard* 1809: 28. — *Vilfa vulgaris* (With.) S. F. GRAY 1821: 146. — *A. stolonifera* [ssp.] a) *vulgaris* (With.) ČELAKOVSKY 1881: 710 non *A. stolonifera α) vulgaris* Heuff. 1858, vide; p. 78. — *A. alba* ssp. II. *vulgaris* (With.) ROUY 1913: 63 non *A. alba* var. 1. *vulgaris* G. F. W. Mey. 1823 (quae est nom. illeg. pro *A. alba* var. *alba*). — *A. alba* var. *vulgaris* (With.) COSSON & DURIEU 1854: 63 non G. F. W. Mey. 1823.

A. stricta WILLDENOW 1797: 366 non J. F. Gmel. 1791, (vide p. 36). — *Trichodium strictum* ROEMER & SCHULTES 1817: 281 (pro *A. stricta* Willd. 1797). — *A. alba* [var.] *β. stricta* WOOD 1861: 774 (pro *A. stricta* Willd. 1797).

A. hispida WILLDENOW 1797: 370. — *A. vulgaris* var. 2. *hispida* (Willd.) G. F. W. MEYER 1823: 140. — *A. tenuis* var. *hispida* (Willd.) PHILIPSON 1937: 86.

A. tenella HOFFMAN 1800: 36. — *A. vulgaris* [ssp.] c) *tenella* (Hoffm.) K. RICHTER 1890: 44. — *A. vulgaris* [var.] *β tenella* (Hoffm.) GAUDIN 1811: 84 (»*Tenella*»).

A. vulgaris var. 1. *capillaris* G. F. W. MEYER 1823: 139 (nom. illeg. pro *A. vulgari* var. *vulgari*).

A. vulgaris var. 1. *capillaris aristata* G. F. W. MEYER 1823: 139.

A. vulgaris [var.] *canina* SINCLAIR 1824: 271.

A. vulgaris [var.] *β. aristata* W. J. HOOKER 1831: 38 (nom. nov. pro »*A. canina* With.») non G. F. W. Mey. 1823.

A. vulgaris Spielart a. *stolonifera* G. F. W. MEYER 1836: 657; W. D. J. Koch 1837: 78 ut [var.] *β.* — *A. capillaris* [var.] g. *stolonifera* (G. F. W. Mey.) DRUCE 1928: 126. — Typus: vide p. 72.

A. vulgaris — — aristata PARNELL 1842: 34 non G. F. W. Mey. 1823 (vide supra). — *A. tenuis* [var.] e. *aristata* DRUCE 1908: 79 (pro *A. vulgari — — aristata* Parn. 1842). — *A. capillaris* var. *aristata* DRUCE 1927: 474 (pro *A. vulgari — — aristata* Parn. 1842) non Lindm. 1926 (vide infra). — *A. tenuis* f. *aristata* WIEGAND 1924: 2 (pro *A. vulgari — — aristata* Parn. 1842).

A. stolonifera [ssp.] a) *diffusa* ČELAKOVSKY 1867: 35 (nom. nov. pro *A. vulgari* With. 1796, vide supra).

A. vulgaris var. *setulosa* MURBECK 1898: 7. — *A. tenuis* var. *setulosa* (Murb.) LINDMAN 1918: 75. — *A. capillaris* f. *setulosa* (Murb.) LINDMAN 1926: 78. — Lectotypus: Dania, Jylland, Rödding. Leg. Poulsson (UPS)!

A. capillaris f. *aristata* LINDMAN 1926: 78.

A. stolonifera auct. non L. 1753, 1755 (vide p. 77): LEERS 1775: 20, G. F. W. MEYER 1836: 657 (pro syn.), C. J. HARTMAN 1849: 303 (pro syn.), ANDERSSON 1852: 101 (pro syn.), LÖNNROT 1860: 114 (pro syn.), FARWELL 1920: 350, et al.

A. rubra auct. non L. 1753, nec Wg 1812 (vide p. 52): KALM 1765: 3, WAHLENBERG 1820: 25, 1824: 40 saltem quoad *β mutica*, et. al.

Description

Loosely—densely tufted, perennial. Intravaginal *vegetative shoots* usually erect and rather short (about 1/4—1/2 the length of the culms at flowering time), sometimes decumbent or procumbent stolons up to 50 cm long; extravaginal subterranean, furnished with pale scale-leaves, up to 10 cm long, comparatively thin. *Culms* 2—5-noded, usually erect, sometimes decumbent and geniculately ascending, about (10—) 25—100 cm tall, stiff, smooth. *Leaf* laminae flat, about (1.5—) 2—6 mm wide, up to 20 cm long, bright—dark green, sometimes purplish (especially in the north), scabrous especially on the upper side, about 10—25-nerved; sheaths smooth, green or sometimes tinged with purple; stomata about (28—) 30—44 (—49) μm long. *Ligule* comparatively short, at shoot and lower and middle culm leaves about 0.3—1.3 mm long, and about 3—1 times as wide as long, at uppermost culm leaf usually less than 2 mm long, truncate or broadly obtuse. *Panicle* about 4—12 (—20) cm long, ovate — elliptic, much branched, rather loose and rich in spikelets, brownish or greyish or purplish brown, greenish (in shady habitats) or rarely yellowish; branches dividing at or above the middle, with branchlets and pedicels projecting in all directions, and branch verticils thus confluent; branches, branchlets and pedicels thin, hair-like, smooth or slightly scabrous; branches patent after flowering, and branchlets and pedicels mostly patent, too, or approaching branches to greater or lesser degree. *Spikelets* about 1.5—3.5 mm long; glumes lanceolate, acute, dorsally slightly scabrous. *Lemma* about 1.4—2.5 mm long, ovately lanceolate, acute—obtuse, smooth, or with scattered prickle-hairs, usually awnless and distinctly 3-nerved with shortly excurrent lateral nerves, rarely 5-nerved and then usually furnished with a geniculate awn from the lower half of the lemma which sometimes may be straight and short, too; Trichodium net of types II—III (—V). *Palea* about 1/2 (—2/3) the length of the lemma. *Anthers* slightly shorter than the lemma, greyish yellow or sometimes purplish.

Figs. 1, 2, 8, 27, 34 d, 35 a, 42 a, 46 f, g, 48 g, h, 51 a, b, 55 b, c.

Cytology

One chromosome count made on Finnish material is reported in the literature (Sorsa 1962: 9). This gave the number 2 n = ±28 (tetraploid number). S. O. Björkman (1954a: 256) reported a tetraploid number, too, for 90 % of as many as 300 specimens (mainly from Sweden; for part of the material see pp. 142, 144). The rest of the specimens were either trisomic, or had B chromosomes. The number 2 n = 28 was found also by Avdulov (1928: 66, 1931: 45; origin of material not reported), Sokolovskaja (1937a: 473, 1938: 456; material from the U.S.S.R.), Delay (1948: 110), Löve & Löve (1948: 24, origin of material not reported, 1956: 151, Icelandic material), Jones (1953: 316, 1956b: 379, 1958 in Bradshaw 1958: 75; material from Great Britain), Hedberg & Hedberg 1964: 126; Swedish material), Heitz (1967: 22), Gadella & Kliphuis (1968: 172; material from the Netherlands) and Vovk 1970: 470; Ukrainian material). Stuckey & Banfield (1946: 181) have reported the numbers 2 n = 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 39 and 42 for specimens grown from seeds of »*A. tenuis*» from old pastures in Rhode Island and adjacent parts of the U.S.A. On the basis of their morphology some of these specimens were identified as »*A. tenuis*» other as »*A. alba*» (presumably = *A. gigantea*), while some were considered intermediate. As S. O. Björkman (1954a: 256) and Jones (1956a: 371) have stated, it is probable that the material consisted of progeny of the hybrid *A. capillaris* × *gigantea*. In addition to tetraploid specimens, Bowden (1960: 544, Canadian material) found some specimens with aneuploid numbers (2 n = 32, 34). I obtained the number 2 n = 28 for one clone from Ob Rovaniemi. Morphologically the clone proved interesting, when cultivated in the Botanical Garden, since it differed from the common type of *A. capillaris* in possessing decumbent and geniculately ascending culms and procumbent stolons.

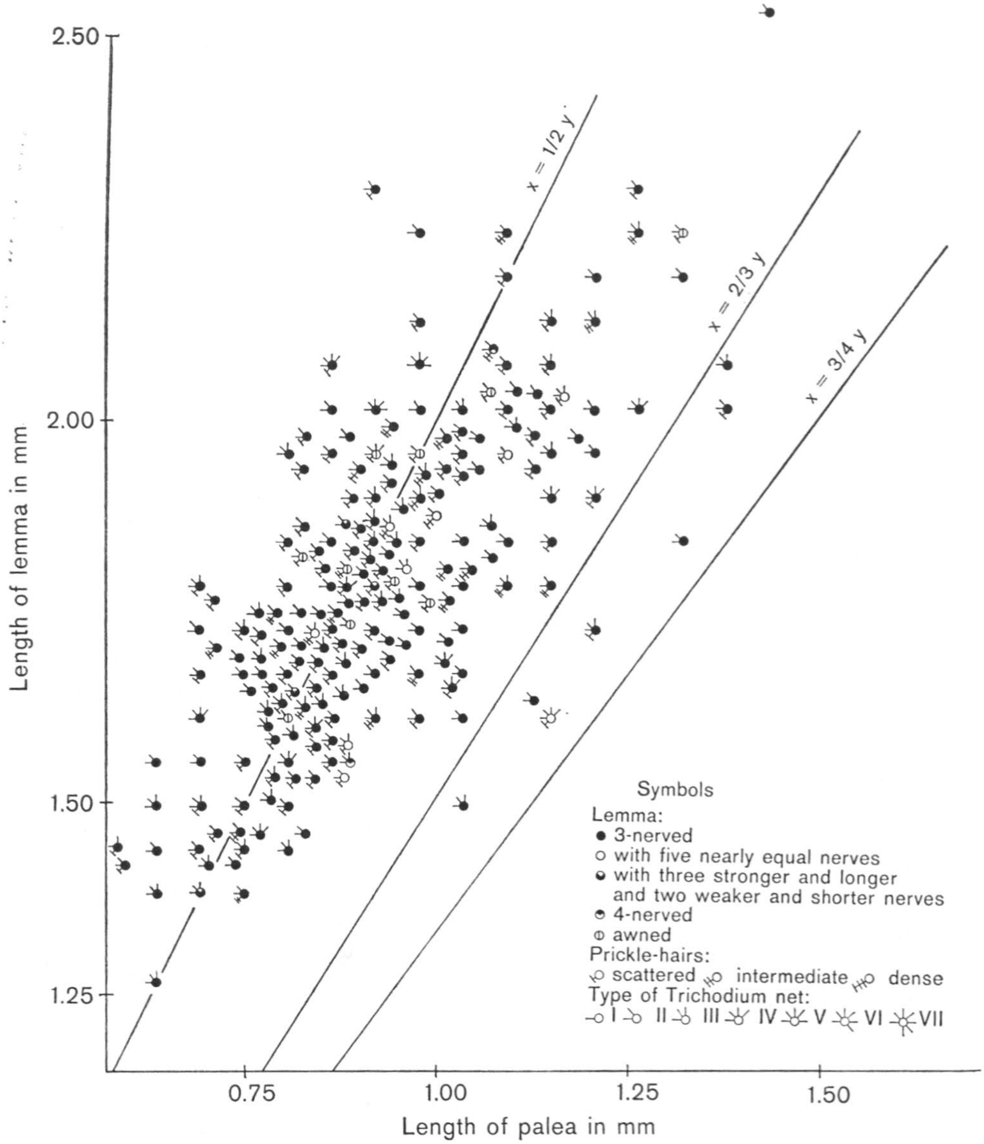
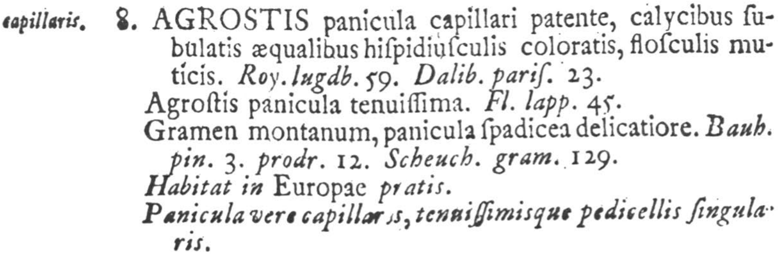


FIG. 8. Pictorialized scatter diagram illustrating the variation of some floret characters in *A. capillaris*. Specimens included marked with ″ in the list of specimens studied.

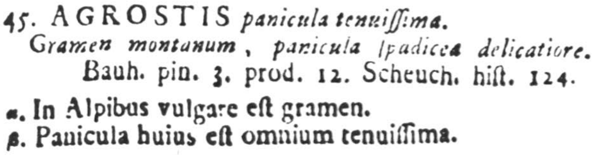
Nomenclature

The identity of Linnaeus's *A. capillaris* has been much disputed. The protologue in Species Plantarum (LINNAEUS 1753: 62), given under ***Muticae,* is as follows:



capillaris. 8. AGROSTIS panicula capillari patente, calycibus ſubulatis æqualibus hiſpidiuſculis coloratis, floſculis muticis. *Roy. lugdb.* 59. *Dalib. pariſ.* 23.
Agroſtis panicula tenuiſſima. *Fl. lapp.* 45.
Gramen montanum, panicula ſpadicea delicatiore. *Bauh. pin.* 3. *prodr.* 12. *Scheuch. gram.* 129.
Habitat in Europae *pratis.*
Panicula vere capillaris, tenuiſſimisque pedicellis ſingularis.

The trivial name *capillaris* clearly refers to very fine hair-like panicle branches, as does also the last descriptive sentence. *A. capillaris,* as here understood, has the finest panicle branches of all the Fennoscandian *Agrostis* species. The phrase-name was modified from Royen's (1740: 59) »1. *AGROSTIS panicula compressa, calycibus subulatis aequalibus hispidiusculis coloratis.*» This species was, however, rather collective, as the Herbarium Royen in L contains two sheets with that phrase-name, one of which contains 7 culms of *A. capillaris,* 5 culms of *A. stolonifera,* 1 top with panicle of *A. gigantea* and 1 culm of *A. canina,* and the other with specimens of *A. stolonifera.* Royen's (1740) polynomial thus included *A. capillaris,* but might be considered to agree better with *A. stolonifera.* Linnaeus (1753: 62), however, modified it in one essential detail in Species Plantarum, as he changed »*panicula compressa*» to »*panicula capillari patente*», thus making it agree rather well with *A. capillaris.* Linnaeus's quotation of Dalibard (1749: 23) must be considered unimportant as the latter author did not give his own description but cited »fl. leyd. prodr. 59» (= Royen 1740), fl. suec. 62 (= Linnaeus 1745: 62) »fl. lap. 45» (= Linnaeus 1737b: 26) and »Pin. 3» (= C. Bauhin 1623: 3), all included in Linnaeus's protologue. Importance must certainly be attached to the quotation of Linnaeus's (1737b: 26) own Flora Lapponica with the following protologue:



45. AGROSTIS *panicula tenuiſſima.*
Gramen montanum, panicula ſpadicea delicatiore.
Bauh. pin. 3. prod. 12. Scheuch. hiſt. 124.
α. In Alpibus vulgare eſt gramen.
β. Panicula huius eſt omnium tenuiſſima.

The identity of this grass has been rather much disputed. Wahlenberg (1812) considered it perhaps synonymous with his *A. alpina* (including *A. stricta* and *A. mertensii*). J. E. Smith (1791: 54) regarded the description in Flora Lapponica as having been made from a specimen (No. 21 according to Savage 1945) in LINN. This specimen was determined by Philipson (1937) as *A. delicatula* Pourr. (= *A. truncatula* Parl.), which is a species from southern Europe, and does not occur at all in N.W. Europe. Thus SMITH must have made a mistake, as only plants from Lapland were described in Flora Lapponica, but the herbarium sheet designated by him is the reason why at least KUNTH (1833), WILLKOMM & LANGE (1861) and ASCHERSON & GRAEBNER (1899) considered *A. capillaris* synonymous with *A. delicatula*. In my opinion the protologue in Flora Lapponica agrees with *A. capillaris*, as SOMMERFELT (1826: 3) has already pointed out. LINNAEUS's Lapland Herbarium at Institute de France in Paris includes one sheet marked »45. *Agrostis panicula tenuissima*» with two specimens. The specimen on the right is *A. capillaris*, and the one on the left is *A. stolonifera*, as was noted by TH. M. FRIES (1861: 260).

In both Species Plantarum and Flora Lapponica, LINNAEUS quoted »*Gramen montanum, panicula spadicea delicatiore*» of C. BAUHIN (1623· 3, 1658: 36) and SCHEUCHZER (1719: 129). The protologues of C. BAUHIN are very short and insufficient, but TRINIUS (1822: 243) considered them to relate to »*A. vulgaris*». SCHEUCHZER (1719) cited C. BAUHIN, among others, and described a grass with long pointed ligules. This description disagrees with *A. capillaris*, but TRINIUS (1822) also related it to »*A. vulgaris*». The distribution »Habitat in Europae pratis» given by LINNAEUS in Species plantarum fits *A. capillaris*.

As far as I know, *A. capillaris* L. 1753 has never been typified. Possible lectotype material is the herbarium sheet in Paris (see above) relating to the polynomial in Flora Lapponica, and the herbarium sheets in Herbarium Royen (in L, cf. p. 101) relating to ROYEN's (1740) polynomial. Although LINNAEUS changed ROYEN's phrase-name, he cited it and thus made it clear that he still included the corresponding specimens in the species. As the number of *A. capillaris* was underlined in LINNAEUS's own copy of Species Plantarum, the Linnaean herbarium in London (LINN) presumably contains original material, too. SAVAGE (1945: 14) lists two sheets determined as *A. capillaris* in the handwriting of LINNAEUS (No. 15 and 21). About sheet No. 15 H. LINDBERG (1958: 16) gives the following information: »'8'. On a label of Seguier Gramen vol. 3. 157, N:o 20. L. has added '*Agrostis capillaris*'. Four uniform tops of a pale form of *A. stolonifera* and farthest to the left on the sheet one whole culm with a different habit, which might possibly be *A. canina v. mutica*» (original in Swedish). PHILIPSON (1937) reports that Seguier's book was published in 1754 and rightly concludes that the specimen must have been obtained by LINNAEUS after 1753, and thus cannot have influenced his concept of *A. capillaris* L. 1753. Sheet No. 21 with *A. truncatula* Parl. (= *A. delicatula* Pourr., see above) may have been in the Linnaean herbarium prior to 1753. It would not, however, be wise to typify *A. capillaris*, which LINNAEUS knew mainly from Sweden, with a plant from southern

Europe, which is quite unknown in N.W. Europe (cf. PHILIPSON 1937), although the protologue does not definitely exclude this possibility. H. LINDBERG (1958) lists one other sheet, which in fact represents *A. capillaris*, but lacks any handwriting of LINNAEUS. No original material other than the sheets listed above is known to me.

Since the protologue in Species Plantarum appears to agree with *A. capillaris* as here understood, it seems to me the wisest solution to typify the name with a specimen of this species either in the Lapland Herbarium in Paris or in Herbarium Royen (in L). The right-hand specimen of »45. *Agrostis panicula tenuissima*» in the Lapland Herbarium is very incomplete, consisting of a panicle with a piece of culm without any leaves. Therefore I prefer to designate as the lectotype of *A. capillaris* L. 1753 the more complete specimen in Herbarium Royen (in L, Fig. 27). MALTE (1928: 116) proposed that the name *A. capillaris* should be dropped as having been variously interpreted by different authors. Such a rejection is sanctioned by the Code (Art. 69) in the case of names which have become »a long-persistent source of error». It must be admitted that the name *A. capillaris* has been used in different senses (see pp. 65, 70), but that is still more the case with many other names in common use (e.g. *A. stolonifera*). Thus I cannot consider *A. capillaris* a name that has become a long-persistent source of error in the sense of the Code.

A. pumila L. 1767 must be rejected according to article 71 of the Code, as it was based on specimens infected by the smut fungus *Tilletia sphaerococca* (Wallr.) Fisch. v. Waldh. (see p. 23).

Remarks on taxonomy

BRADSHAW (1959, 1960; Welsh material) has shown that remarkable differences can develop between populations of *A. capillaris* in nature. Thus even within restricted areas several morphologically and physiologically differentiated populations may occur. BRADSHAW (1960) studied this differentiation with the aid of transplant experiments. Very short distances, even 50 m, were considered by BRADSHAW (1959) to be enough to isolate two populations from one another in some instances. This population differentiation was regarded by BRADSHAW (1959, 1960) as depending on the elimination of less well-adapted biotypes by natural selection. As the species occurs in a great many different habitats there are consequently a great many population types, too. The populations differed from one another in respect to inflorescence height, vegetative height, the diameter of the tufts, the density of the inflorescences, the density of the vegetative shoots, the length and width of the panicles, etc. The adaptive nature of the variation was shown, for example, by the fact that the populations of wind-swept habitats had the smallest panicles. It is interesting that some populations of *A. capillaris* have shown a genetically determined physiological adaptation to soils with concentrations of lead, copper, zinc or nickel which would be toxic for most populations of the species (Bradshaw 1952, Jowett 1958, 1964 and Gregory & Bradshaw 1965).

Bradshaw (1959) stressed, however, that there is a continuous series of transitions between different habitats in nature. In the same way the differentiated types of *A. capillaris* are not completely distinct from one another, and intergradations occur between them. Therefore Bradshaw (1959) concluded that, although genetically determined, this infraspecific variation cannot be taxonomically classified. The population differentiation shown by Bradshaw can be clearly observed in the eastern Fennoscandian *A. capillaris*, too.

Another source of variation of *A. capillaris* in Fennoscandia is the large quantities of seeds nowadays imported for lawns, roadsides, etc., mainly from Oregon in the U.S.A. (see p. 74). It is clear that the plants gradually spread to the surroundings, and in addition offer considerable new genetic material, which by recombination can be incorporated into other populations.

Awned individuals have been paid some attention in Fennoscandian floras. They have usually been called f. or var. *aristata* (see p. 66). The oldest infraspecific epithet at varietal level is probably *A. vulgaris* var. *canina* Sincl. It is interesting to note that A. S. Hitchcock (1937: 521, 1951: 341) considered the awned type in N.E. North America (upon which *A. stricta* Willd. is based) to be native, while all the other types were regarded as introduced. In the eastern half of Fennoscandia the awned type has, however, no distinct distribution of its own, but occurs here and there intermingled with awnless *A. capillaris* in both natural and hemerobic habitats all over the region.

Plants with decumbent and ascending culms and stolons occur but are rather rare. They are found in both hemerobic and ahemerobic habitats, and do not appear to differ in their distribution and ecology from the common type of *A. capillaris*. Stoloniferous types have been described and named in the literature: *A. vulgaris stolonifera* G. F. W. Mey. was based on Ehrhart's Calamariae Gramina & Tripetaloideae N:o 71 collected in Uppsala in Sweden; Blytt (1847: 148) and Andersson (1852: 102) name stoloniferous clones with the same epithet but do not cite Meyer. However, intermediates occur, and these stoloniferous types do not appear to deserve taxonomic recognition in eastern Fennoscandia.

Another variant to which attention has been paid in Fennoscandian floras is characterized by hairy lemmas (basionym *A. vulgaris* var. *setulosa* Murb.;

the lectotype specimen has a geniculately ascending culm and decumbent stolons). Minute lemma hairs are also characteristic of the Mediterranean species *A. castellana* Boiss. & Reut., according to PAUNERO (1947) and SCHOLZ (1965). The latter author reports that *A. castellana* has, at least recently, been extensively spread in Central Europe with the seed of »*A. tenuis* Highland bent» (»Highland bent» imported to Finland from Oregon in the U.S.A. is, however, *A. capillaris*, and *A. castellana* has not yet been found at all in Fennoscandia). As *A. castellana* is known to form obviously fertile hybrids with *A. capillaris* and intergrade with that species (FOUILLADE 1932, PAUNERO 1947), lemma hairs in *A. capillaris* may have been derived by introgression from *A. castellana*. In addition to the type specimen of var. *setulosa* from Jylland, MURBECK mentioned one specimen from Bh in Sweden, and the author has seen lemma hairs in one specimen from LyL Tärna, Storfjället, in Sweden (leg. O. Rune 1947, UPS) near the western border of the area of this investigation.

Plants are not infrequently found that can be classified as *A. capillaris* but resemble *A. gigantea* (or possibly *A. stolonifera*) in one, or even in several characters, (e.g. length of the palea, structure of the Trichodium net, form and length of the ligule, scabrousness of panicle branchlets — see Fig. 9). Introgression seems to be a probable explanation of this variation (cf. p. 115). But I am unable to decide whether such variation could also arise independently in *A. capillaris*.

A. capillaris is rather closely related to *A. gigantea* and *A. stolonifera*, and hybridizes frequently with them. The characters of *A. capillaris* that separate it best from *A. stolonifera* are its comparatively short and truncate ligules, the panicle branchlets which during flowering project in all directions, the occurrence of extravaginal rhizomes, and the type of Trichodium net. It differs from *A. gigantea* in having shorter ligules, smoother panicle branchlets and pedicels, shorter paleas and a well-developed Trichodium net. The hybrids of *A. capillaris* are mostly sterile, with non-dehiscent anthers, and intermediate in respect to diagnostic characters. At least the hybrids with *A. gigantea* may be partly fertile, too.

Habitats

A. capillaris is strongly hemerophilous and certainly occurs both as an apophyte and as a hemerochore. The influence of human settlement on the habitats may be strong or very weak, and ecological factors such as soil acidity, light, water and nutrients seem to limit the occurrence of *A. capillaris* very little. The species is very often abundant. Among the hemerobic habitats are various meadows and pastures, arable land, gardens, roadsides, ditches, paths (in both open and shady places), waste land, railway embankments and yards, etc. In addition *A. capillaris* is cultivated as one of the most important lawn grasses. MANNER (1970: 22) lists *A. capillaris* as suitable for a wide variety of different lawn types. It is also used as a soil-binder along main roads. The import of *A. capillaris* seeds into Finland is considerable, amounting to about 80 tons a year during the years 1966—69 (according to information from the State Seed Testing Station [Valtion Siementarkastuslaitos]). According to some importers (Kesko Ltd., Hankkija Ltd.), the seeds are nowadays mainly »Highland bent» from Oregon in the U.S.A.

The »botanical composition» of hay fields in Finland has been studied by PAATELA (1953). According to him *Agrostis* spp. (certainly mostly *A. capillaris*) are among the most important grasses of the hay fields, and show no distinct differences in average abundance between southern and northern Finland (Inari in Li was the northernmost district studied). *A. capillaris* is certainly spread with hay seeds, as KITUNEN (1921: 12) and OLSONEN (1950: 46—47) listed *Agrostis* spp. among the most important weeds of timothy and red clover seeds sold in Finland. Although not cultivated for hay, *A. capillaris* gradually increases in abundance in older hay fields, becoming one of the most important grasses (ROIVAINEN 1928: 137, BENUM 1958: 124). MUKULA & al. (1969) give information about the frequency of the species in spring cereal fields. Its good shoot regeneration makes it an excellent grass for pastures (ROIVAINEN 1928).

A. capillaris is frequent in many regions in natural habitats, too. In many areas it must certainly be considered indigenous, but the species is also frequent as a synantrope, and the two types of occurrences are hard to distinguish from each other. Presumably indigenous occurrence is common along the coasts of the Baltic Sea and its gulfs. Here the natural habitats include shore cliffs. The species grows rather high up, in crevices rarely or never covered by the sea, and extends up to areas with scattered trees and a cover of reindeer lichens. The shore localities also include forest margins, often with alder trees or bushes, by shore meadows or sandy and gravelly shores.

In the inner parts of Finland and Sweden the natural habitats include shores of different kinds by rivers and lakes, spring and brook margins, some rich or poor minerotrophic mires with a thin peat cover, fairly sparse deciduous forests or spruce woods, etc. JALAS (1958: 480) reported possibly indigenous occurrence on sandy heaths with lichen vegetation in Ok Vaala, Rokua, far from human settlement. KUJALA (1921: 6—7) and AHTI & HÄMET-AHTI (1971: 40) regarded the species as a possible relic from the period of cultivation by burning-over when occurring in seemingly native habitats in Ks. Interest attaches to the occurrence of *A. capillaris* in lower oroarctic meadow communities in the coastal regions of at least Nrd and Trs in Norway (see p. 144) recently reported to me by I. Kytövuori. When investigating oroarctic meadows, Kytövuori found *A. capillaris* to be a frequent and often abundant to dominant plant in coastal regions of Nrd and Trs. Several of the meadows studied were far from human habitations. The only human influence was grazing by sheep and reindeer, sometimes heavy, sometimes very slight. The altitude of the meadows was about 300—700 m. Although the species clearly benefits by grazing, it seems reasonable to consider it native in these meadows. NORMAN (1895: 594) recorded the species from oroarctic localities in northern Norway, but later BENUM (1958) recorded it only as a synantrope, occurring in ± hemerobic habitats in Trs. The oroarctic occurrences in northern Norway have presumably often been overlooked owing to the fact that the species flowers very late in such habitats (end of August to beginning of September), or does not flower at all in unfavourable years. In Trs in Norway the species occurs on bird cliffs, too (BENUM 1958).

Distribution

General distribution

HULTÉN (1962: 214 map 204, 1968: 99) has mapped the total distribution of *A. capillaris*. It covers the whole of Europe (including Iceland and the Faeroes) and the Caucasus and extends through western Siberia to Lake Baikal in the east. Recently it has been reported farther southeast, from Persia, by BOR (1970). It occurs as an introduced species in N.E. North America (considered indigenous there by A. S. HITCHCOCK 1937, 1951) and also in the west of that continent (between 40 and 60° N. lat.), in southernmost Greenland, in Australia and Tasmania, in New Zealand and on St. Helena. The area in N. Africa indicated by HULTÉN in 1962 is omitted from the map of 1968. As HULTÉN (1962) mentions, it is certainly introduced in many places outside the area outlined in his map. It occurs throughout western Fennoscandia, where it is considered common (HULTÉN 1971 map 159, HYLANDER 1953a: 322).

Distribution in the investigation area

The eastern Fennoscandian material of *A. capillaris* studied by me was collected all over the region (Fig. 9). However, it is difficult to decide where the species should be considered partly indigenous and where wholly introduced and in some areas its frequency is difficult to estimate.

In southern Finland, up to Ob and Ks, and the coastal provinces of Sweden, *A. capillaris* is very frequent, at least in all inhabited areas. The distribution gaps in Fig. 9 are probably due to the fact that these parts of Finland and Sweden are poorly collected (cf. pp. 34—35). Occurrence in natural habitats

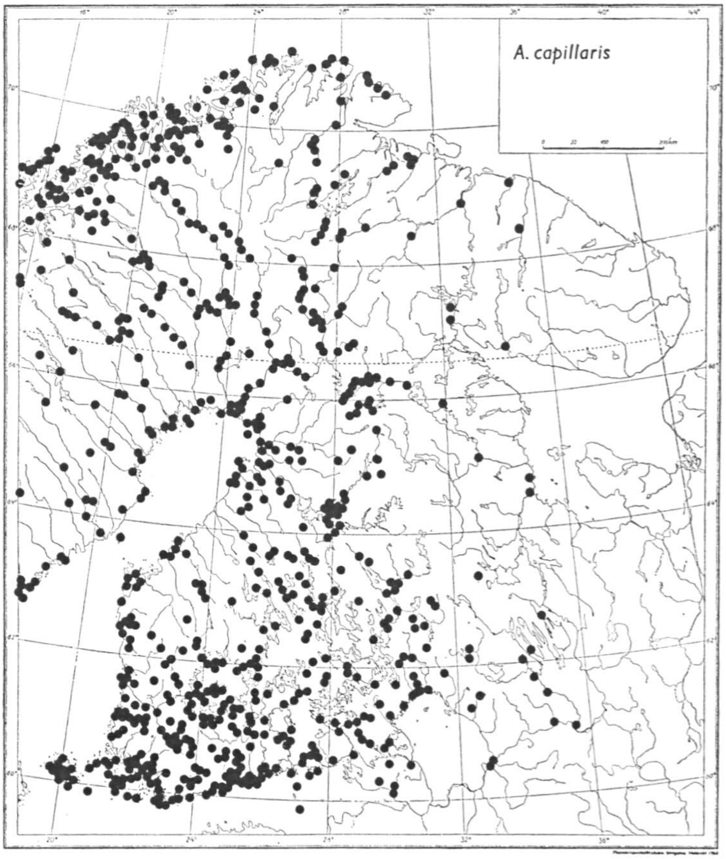


Fig. 9. The distribution of *A. capillaris* in the eastern half of Fennoscandia according to the specimens examined.

is reported for this area but it is very hard to decide whether the species is to be considered native all over it. The material from the Leningrad Region and the Karelian A.S.S.R. is rather scanty but here, too, the species can be considered frequent (Šiškin 1955, Ramenskaja 1960). In the inner parts of northern Finland and Sweden, *A. capillaris* occurs frequently along all roads and around human settlement. The species has certainly been introduced very long ago, but its frequency and abundance seem to have increased greatly during the last few decades, owing to the enlargement and improvement of the road network, forestry and mire drainage. The species is also frequent, but usually rather scarce, by many rivers, on mainly sandy or gravelly shores where human influence is very slight (seen by me on the shores of the Ounasjoki, Kitinen and Kemijoki in Finland and reported from similar habitats in northern Sweden by G. Björkman 1939: 12—13, Selander 1950: 34, Wistrand 1962: 67, 68, Wistrand & Lundquist 1964: 35).

Although the material available from the Murmansk Region is scanty, the species is probably distributed all over the region, except perhaps in some oroarctic areas (cf. Kuzeneva 1953), its occurrences probably being similar to those in adjacent parts of Finland and Norway. In 1967 the species was very common all along the road from Lotta to Murmansk (my observation). In northern Norway it is common along roads and all around human settlement (cf. Norman 1895, Benum 1958, Dahl 1934). An exception seems, however, to be the oroarctic plateaus of Finnmarksvidda and the Varanger peninsula, from which no herbarium material is available, and where the species is lacking over vast areas (my observation on travels Alta—Kautokeino—Enontekiö in 1965 and Tana—Berlevåg in 1969). The species is very probably native in the oroarctic meadows of Nrd and Trs (see p. 75), where it ascends to 1 000 m (Norman 1900: 1346). Occurrence in natural oroarctic habitats seems to depend on the oceanity of the climate as it is quite unknown in Finland, and restricted to the coastal regions of Nrd and Trs, extending only to westernmost LL in Sweden (Selander 1950; reported also from such habitats in Jmt outside Fig. 9 by H. Smith 1920 and Kilander 1955).

Agrostis stolonifera L.

A. stolonifera Linnaeus 1753: 62. — *Vilfa stolonifera* (L.) Palisot de Beauvois 1812: 16. — *Decandolia stolonifera* (L.) Bastard 1809: 29. — *A. alba* ssp. *stolonifera* (L.) Jirasek in Dostal 1950: 2051. — *A. polymorpha* [var.] *δ stolonifera* (L.) Hudson 1778: 31. — *A. alba* [var.] *β. stolonifera* (L.) Smith 1824: 93 quoad basion. — Lectotypus: sub. nom. »*Agrostis culmo repente, vagina supremi folii ventricosa*» in Herbarium Royen (L)!, Ic. 28. — Non *A. stolonifera* sensu Leers 1775, nec Farwell 1920 (vide p. 66), nec J. E. Smith 1800: 80, nec Gaudin 1811: 79 (vide p. 82), nec *A. vulgaris* a. *stolonifera* G. F. W. Meyer 1836 (vide p. 66).

A. palustris Hudson 1762: 27. — *A. polymorpha* [var.] *δ palustris* (Huds.) Hudson 1778: 32. — *A. stolonifera* var. *palustris* (Huds.) Farwell 1920: 351. — Lectotypus: sub nom. »119. *Gramen Miliac. maj. panic. viridi*» in Herbarium Petiver (BM, vide infra p. 85).

A. sylvatica Hudson 1762: 28 (nom. rejic. monstr., vide p. 23). — Non Poll. 1776 (vide p. 65).

A. vinealis Schreber 1771: 46 (vide p. 40). — *A. alba* ssp. d) *vinealis* (Schreb.) K. Richter 1890: 43. — Non *A. vinealis* sensu Lawalree 1956: 53 (pro syn., vide p. 37).

A. stolonifera [var.] *α erecta* Retzius 1779: 14 (nom. illeg. pro *A. stolonifera* var. *stolonifera*).

A. stolonifera [var.] *β decumbens* Retzius 1779: 14.

A. flava O. F. Müller 1782 Tab. 751.

A. maritima Lamarck 1783: 61. — *Vilfa maritima* (Lam.) Palisot de Beauvois 1812: 16. — *A. alba* [ssp.]*δ. maritima* (Lam.) Arcangeli 1882: 768 non G. F. W. Mey. 1823 (vide infra). — *A. stolonifera* [var.] *δ maritima* (Lam.) Koch 1837: 78 non S. F. Gray 1821 (vide infra). — *A. stolonifera* f. *maritima* (Lam.) Mela & Cajander 1906: 68 non S. F. Gray 1821. — *A. alba* [var.] *β. stolonifera* [f.] f] *maritima* (Lam.) Blytt 1847: 150 non G. F. W. Mey. 1823. — Typus: Gallia, »Environs de Narbonne». Leg. Pourret (P-LA), isotypus in P-LA!

A. maritima Withering 1796: 132 non Lam. 1783 (vide supra).

A. decumbens Hall. fil. ex Gaudin 1811: 78 non Host 1809 (vide p. 97). — *Vilfa decumbens* Palisot de Beauvois 1812: 16, 147 (pro *A. decumbenti* Gaud. 1811). — *A. alba* [ssp.] *β. decumbens* Arcangeli 1882: 768 (pro *A. decumbenti* Gaud. 1811). — *A. alba* var. 1. *vulgaris* subvar. *decumbens* G. F. W. Meyer 1823: 134 (pro *A. decumbenti* Gaud. 1811). — *A. alba* [f.] II. *decumbens* Gaudin 1828: 187 (pro *A. decumbenti* Gaud. 1811). — Lectotypus: in G (Hackel & Briquet 1907: 37—38).

A. patula Gaudin 1811: 80. — *Vilfa patula* (Gaud.) Palisot de Beauvois 1812: 16, 148. — *A. alba* [ssp.] *γ. patula* (Gaud.) Arcangeli 1882: 768. — *A. alba* var. *prorepens* subvar. *patula* (Gaud.) Hegi 1908: 224. — *A. alba* [f.] III. *patula* (Gaud.) Gaudin 1828: 188. — *A. stolonifera patula* (Gaud.) Andersson 1852: 101. — Lectotypus in G (Hackel & Briquet 1907: 39).

A. stolonifera var. *aristata* Sinclair 1816: 232.

A. straminea C. J. Hartman 1819: 4. — *A. alba* [ssp.] h) *straminea* (Hartm.) K. Richter 1890: 43. — *A. stolonifera* [var.] *β. straminea* (Hartm.) C. J. Hartman 1846: 13. — Typus: vide infra p. 85.

Vilfa stolonifera [var.] *δ maritima* S. F. Gray 1821: 146 (pro *A. maritima* With. 1796, vide supra).

A. alba var. 3. *coarctata* G. F. W. Meyer 1823: 137. — Non *A. coarctata* Hoffm. 1800 (vide p. 36).

A. alba var. 4. *maritima* G. F. W. Meyer 1823: 138.

A. stolonizans Besser in Schultes & Schultes 1827: 567. — *A. alba* ssp. *stolonizans* (Bess.) Lavrenko 1935: 151. — Lectotypus: »e Volhynia». Leg. Besser (H)!

A. stolonifera [var.] *β compacta* C. J. Hartman 1832: 19. — Lectotypus: Suecia, Bh, Göteborg. Leg. G. Wahlenberg (UPS)!

A. stolonifera (var.) *γ aristata* C. J. Hartman 1832: 19 (nom. nov. pro *A. straminea* Hartm. 1819) non Sincl. 1816 (vide supra).

A. stolonifera [var.] *δ maritima* C. J. Hartman 1843: 24 (nom. superfl. pro *A. stolonifera β compacta* Hartm. 1832, vide supra) non S. F. Gray 1821 (vide supra).

A. stolonifera [var.] *γ. prorepens* W. D. J. Koch 1844: 902. — *A. prorepens* (Koch) Golubeva 1924: 120 (non *A. prorepens* »G. Meyer» 1883: 56, nom. nud. inval.). — Lectotypus: in Herbarium W. D. J. Koch (L)!, vide p. 88.

A. alba [var.] *β. stolonifera* [f.] b) *coarctata* Blytt 1847: 149 (pro *A. coarctata* Reich. 1834, vide infra) non G. F. W. Mey. 1823 (vide supra). — *A. stolonifera coarctata* Andersson 1852: 101 (pro *A. alba β. stolonifera* b) *coarctata* Bl. 1847) non (Hoffm.) Pers. 1805 (vide p. 36).

A. alba [var.] *β. stolonifera* Blytt 1847: 149 non (L.) Sm. 1824 (vide supra).

A. alba β. stolonifera [f.] d) *laevigata* Blytt 1847: 149. — *A. stolonifera laevigata* (Bl.) Andersson 1852: 101.

A. stolonifera viridula Andersson 1852: 101.

A. stolonifera [var.] *a*) *vulgaris* Heuffel 1858: 225 (nom. illeg. pro *A. stolonifera* var. *stolonifera*).

A. stolonifera [var.] *γ*) *tenuis* Heuffel 1858: 226 (nom. nov. pro *A. coarctata* Reich., vide infra).

A. stolonifera var. *bottnica* Hylander 1953b: 356.

A. alba auct. (saltem p.p.) non L. 1753 (vide p. 101): Smith 1800: 81, Schrader 1806: 209, Hartman 1820: 45, Blytt 1847: 149 (saltem guoad *β. stolonifera*, vide supra), Grisebach 1853: 436, Mela 1877: 162, et al.

A. coarctata auct. non Hoffm. 1800 (vide p. 36): Schrader 1806: 209, Reichenbach 1834 ic. 1431.

Description

Loosely — rather densely tufted, sometimes mat-forming, perennial, sometimes submersed. *Vegetative shoots* intra- and/or extravaginal; intravaginal few—very numerous (rarely totally absent), erect and then rather short (up to 1/2 the length of the culms), or short — long decumbent and geniculately ascending, or procumbent up to 2-m-long branched or unbranched rooting stolons; extravaginal always ascending nearly at once

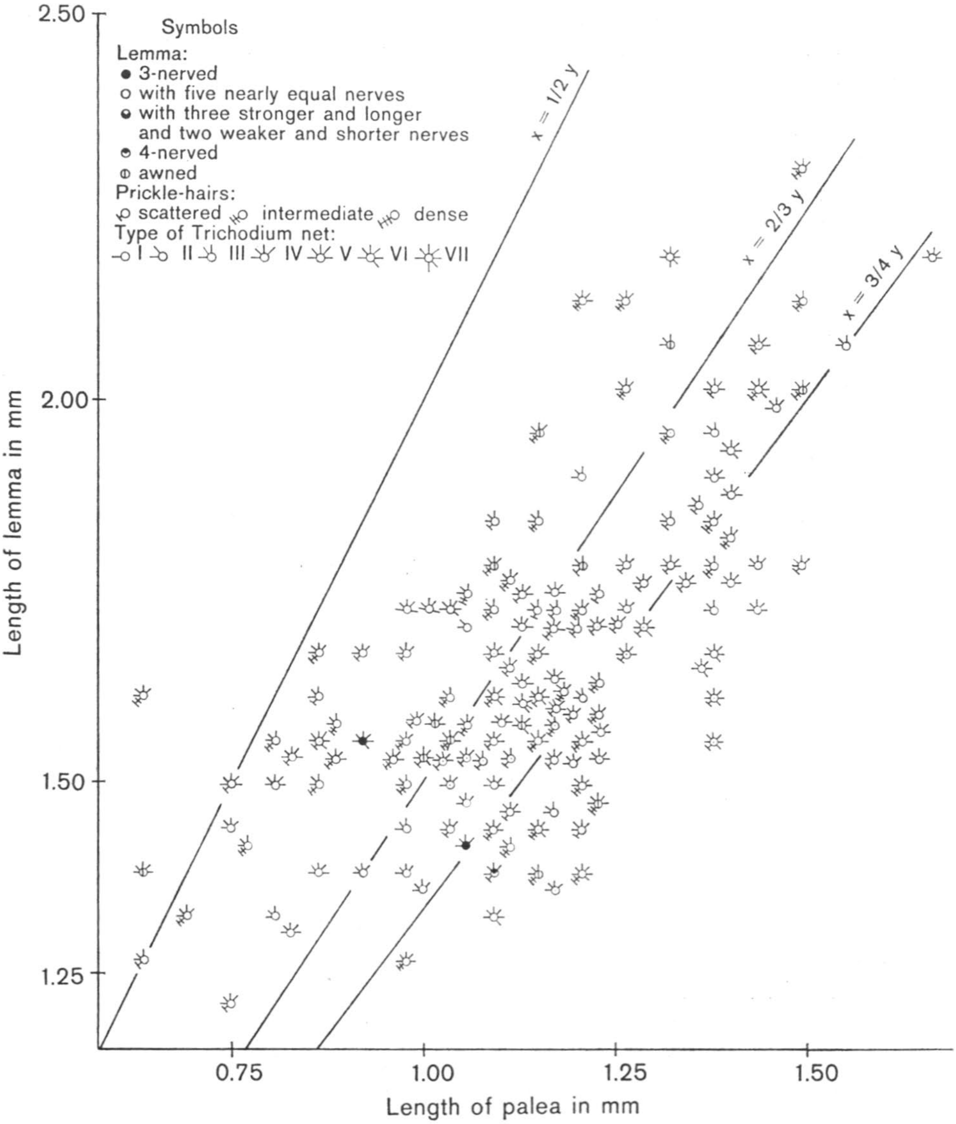


FIG. 10. Pictorialized scatter diagram illustrating the variation of some floret characters in *A. stolonifera*. Specimens included marked with ″ in the list of specimens studied.

and furnished with only up to three scale-leaves. *Culms* erect or bent at the base, or short — rather long decumbent and geniculately ascending and then often branching and rooting at the nodes, (5—) 15—100 (—150) cm tall, stout—slender, stiff, 2—5-noded. *Leaf* laminae varying very much in size on both culms and vegetative shoots, 1—25 cm long and 0.5—8 mm wide, flat or in drought with involute margins, bright—dark—glaucescent green, sometimes purplish, smooth—scabrous, 10—30-nerved; sheaths smooth, generally the same colour as the blades, or often more purplish than the blades. *Ligule* acute—broadly obtuse or even nearly truncate, on uppermost culm leaf 1.5—7 mm long, often with split apex, on second culm leaf 1.0—5 mm long and 0.5—2 times as long as wide; stomata about 28—54 μm long. *Panicle* 1—20 cm long, lanceolate—ovate, rather dense—very diffuse, purplish, brownish, greenish or yellowish, after flowering quite contracted — semicontracted; branches richly—sparsely branched, dividing at about 1/3—1/2 their length, together with the branchlets and pedicels scabrous — quite smooth. *Spikelets* about 1.5—3.5 mm long; glumes elliptic—lanceolate, with acute—acuminate apices, dorsally scabrous on the upper half, or rarely quite smooth. *Lemma* 1.2—2.5 mm long, ovate—broadly lanceolate, with truncate—broadly—narrowly obtuse apex, 5-nerved, 4-nerved or with 3 stronger and longer and 2 weaker and shorter nerves, very rarely 3-nerved; the nerves usually end very near — rather far (about 1/4 the length of the lemma) from the lemma margin, but are rarely very shortly excurrent; awn usually absent, when occurring rather short and straight (shorter than the lemma) and often present only in some spikelets in the panicle, attached above the middle of the lemma; prickle-hairs quite absent or scattered or intermediately dense on the lemma; Trichodium net of types II—VII (most often IV—V). *Palea* usually about 2/3—3/4, sometimes only about 1/2, the length of the lemma. *Anthers* purplish or yellowish, about 1.0—2.3 mm long and somewhat shorter than the lemma.

Figs. 1, 2, 10, 28, 35 b-d, 36 a-c, 42 b-h, 46 h-j, 48 i-k, 49, 51 c-e, 53 c, 55 d, 56 a-c.

Cytology

The cytology of Nordic *A. stolonifera* has been very thoroughly investigated by S. O. BJÖRKMAN in Sweden, who, however, published only a very brief account (BJÖRKMAN 1954a: 255—256). No less than 900 clones were studied, mostly of Swedish origin (concerning part of these, see p. 147), but also from Finland (see p. 145), Denmark, Norway (see p. 147), England, Wales, Scotland, Switzerland and Iceland. Out of this material about 600 specimens had the tetraploid number 2 n = 28, 160 specimens were pentaploid (2 n = 35), and 135 specimens were hexaploid (2 n = 42). Only two aneuploid specimens (2 n = 33, 41) were found by Björkman in natural populations, despite the fact that the different cytotypes were found together, and by experimental crossing produced a F_1 generation with varying aneuploid and euploid chromosome numbers (BJÖRKMAN 1954a: 256).

Most chromosome counts made on *A. stolonifera* have revealed a tetraploid number (2 n = 28): NIELSEN & HUMPHREY (1937: 278, sub nom. *A. alba*, seed material without indicated origin), SOKOLOVSKAJA (1937a: 473, 1938: 456, 1955: 851; sub nom. *A. alba*, Russian material), EHRENBERG (1945: 435; Swedish material), DELAY (1948: 110; sub nom. *A. alba*), POLYA (1948: 147; sub nom. *A. alba*, Hungarian material), FELFÖLDY (1951: 183; Hungarian material), JONES (1953: 316, 1956b: 379, 1958 in BRADSHAW 1958: 75; material from Great Britain), LÖVE & LÖVE (1956: 84; Icelandic material), SHIBATA

(1957: 260; sub nom. *A. alba*, Japanese material), HEITZ (1967) and VOVK (1968: 17, 1970: 470; Ukrainian material). CHURCH (1936: 13) reported the number 2 n = 28 for »*A. palustris* Huds.» and 2 n = 56 for »*A. alba* var. *maritima* (Lam.) Meyer», the former without indicated origin, the latter from Massachusetts in North America. In the latter he found a lso a very irregular meiosis. 2 n = 30 was found by BOWDEN (1960: 543; sub nom. *A. palustris*) in Canadian material. In addition to euploid (2 n = 28, 42) numbers, JUHL (1953: 331) reported several aneuploid numbers (2 n = 30, 32, 44, 46) for specimens evidently growing wild in different localities in Schleswig-Holstein in Germany. SOKOLOVSKAJA (1937a, 1938) studied some Asiatic taxa evidently belonging to *A. stolonifera* s. lat. For *A. mongholica* Roshev. and *A. sibirica* V. Petr. she reported the number 2 n = 28, while *A. hissarica* Roshev. was hexaploid (2 n = 42). 2 n = 35 was found by SOKOLOVSKAJA (1937a, 1938) in Russian »*A. prorepens*», and she supposed that the taxon in question had originated through hybridization between »*A. alba*» and *A. canina* (LÖVE & LÖVE 1961: 68 and HESS & al. 1967: 256 have misinterpreted SOKOLOVSKAJA and report 2 n = 70).

I made some chromosome counts on Finnish material of *A. stolonifera:*

N Borgå, Pellinge, Hasselö. Stony sea-shore. 17.VII.1966 Wdn (H), 2 n = 28. This clone has erect culms and extravaginal vegetative shoots, which ascend at once and are then erect and stiff. The leaves are somewhat glaucescent, and anthocyanin pigment is lacking throughout the plant. N Borgå, Drägsby, roadside ditch. 20.VI.1966 Wdn (H), 2 n = 35. This clone has low geniculately ascending culms and very long procumbent stolons. No seeds are set, and the paleas measure about 1/2 the length of the lemmas.

Ok Sotkamo. Growing submersed and sterile on sandy lake shore. 3.VIII.1966 Wdn (H), 2 n = 35. When cultivated in the Botanical Garden this clone proved identical with the foregoing one.

Lps Pechenga (Petsamo). Sandy shore of Lota River (Luttojoki) about 25 km from the Finnish boundary. 1.VIII.1967 Wdn (H), 2 n = 28. This clone belongs to the northern type described on p. 89.

It is very interesting to note that the two clones (from Ok Sotkamo and N Borgå) which apparently morphologically resemble SOKOLOVSKAJA's »A. prorepens» both proved pentaploid (2 n =35). They do not set any seeds, but have dehiscent anthers, which produce variable-sized pollen.

In the meiosis of tetraploid *A. stolonifera* there are regularly 14 bivalents (CHURCH 1936: 13, S. O. BJÖRKMAN 1954a: 255, JONES 1956b: 378). In the hexaploid and pentaploid cytotypes of *A. stolonifera* a varying number of univalents, bivalents and trivalents occur, according to BJÖRKMAN (1954a). At full syndesis 14 trivalents could be found in hexaploid clones, which thus behaved as autotriploids. Complete pairing with 7 trivalents and 7 bivalents could be found in the pentaploid clones.

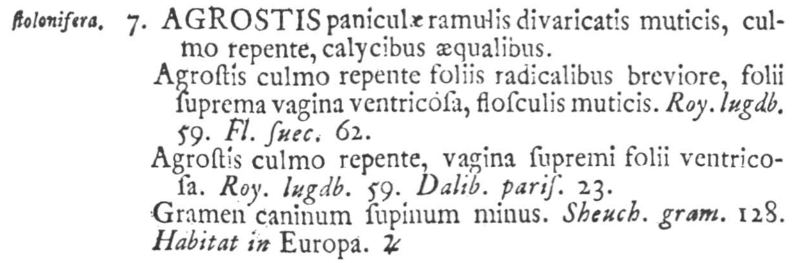
JONES (1956b) studied the meiotic chromosome pairing in hybrids between tetraploid *A. stolonifera* and related species. He considered the *A. stolonifera* studied a strict allotetraploid, and ascribed to it the constitution $A_2A_2A_3A_3$ (JONES 1956c: 399).

S. O. BJÖRKMAN (1954 a) reported that he had tried to correlate the different chromosome numbers he had encountered in *A. stolonifera* with other characters. He was, however, quite unable to attribute any taxonomic value to the different cytotypes. They could all occur within the same morphological type of *A. stolonifera*. The different cytotypes were found both growing together in the same locality and apart from one another.

Nomenclature

The name *A. stolonifera* L. 1753 has been lectotypified by A. S. HITCHCOCK (1904: 141). The lectotype selected was sheet No. 20 (according to SAVAGE 1945) in the Linnaean herbarium in London (LINN). This sheet contains two culms of *Polypogon semiverticillatus* (Forsk.) Hyl. (= *Agrostis semiverticillata* [Forsk.] Christens. = *A. vertillicata* Vill.), according to MUNRO (1862: 40), A. S. HITCHCOCK (1904) and H. LINDBERG (1958: 16) and caused e.g. J. E. SMITH (1800), GAUDIN (1811) and A. S. HITCHCOCK (1904, 1905) to regard *Agrostis stolonifera* as synonymous with *Polypogon semiverticillatus*. As LINNAEUS (1753) described the species occurring in Sweden (Flora Suecica was cited, see p. 83), where *Polypogon semiverticillatus* has been found later only adventitiously, and the lectotype selection was contrary to current usage of the name *A. stolonifera*, it must be considered a most unhappy typification (cf. S. O. BJÖRKMAN 1960: 88). Later even A. S. HITCHCOCK (1920: 128) changed his mind in respect to the fitness of his earlier typification. According to the Code (Art. 8), a lectotype designation must, however, be followed unless it can be shown that the type material cannot be original material, or that the choice was based upon a misinterpretation of the original description, or was made arbitrarily (cf. p. 10). The question whether the selected type is to be considered original material can be examined first. The number of *A. stolonifera* is underlined in LINNAEUS's own copy of Species Plantarum (JACKSON's 1912 Index contains an error on this point, but it was corrected later by SAVAGE 1937: 5; checked by me on xerocopy), which, according to JACKSON (1912), means that LINNAEUS had a specimen of the species in his herbarium prior to 1753. As sheet No. 20 has no date, or information about its collector from which the date might be deduced, it can hardly be decided whether it is original material or not. A further point which should be mentioned is that on the sheet LINNAEUS wrote »*Agrostis stolonifera*» and, above this, »△ tica» (= aquatica; the latter sign was erroneously interpreted by A. S. HITCHCOCK 1904 as »Attica»). If it could be shown that »△ tica» was written prior to 1753, it could be claimed that LINNAEUS considered the specimens a deviating variant of *A. stolonifera*, and this would make them unsuitable as the type of *A. stolonifera*. But as the sign »△ tica» was written above »*Agrostis stolonifera*», and not in the same sequence, it can hardly be shown not to have been added later.

We can now turn to LINNAEUS's original description in Species Plantarum (1753: 62) and A. S. HITCHCOCK's (1904) interpretation of it. The description is as follows:



ſtolonifera. 7. AGROSTIS paniculæ ramulis divaricatis muticis, culmo repente, calycibus æqualibus.

Agroſtis culmo repente foliis radicalibus breviore, folii ſuprema vagina ventricoſa, floſculis muticis. *Roy. lugdb.* 59. *Fl. ſuec.* 62.

Agroſtis culmo repente, vagina ſupremi folii ventricoſa. *Roy. lugdb.* 59. *Dalib. pariſ.* 23.

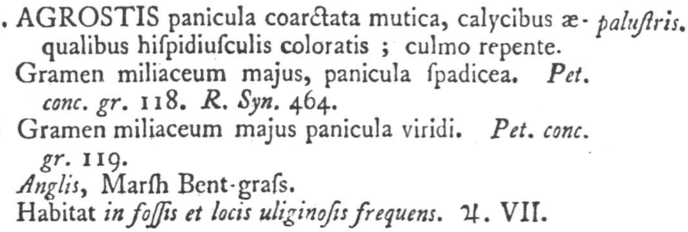
Gramen caninum ſupinum minus. *Scheuch. gram.* 128.

Habitat in Europa. ♃

As regards the trivial name »*stolonifera*», stolons occur both in many types of *A. stolonifera* as here understood, and also in *Polypogon semiverticillatus*, according to e.g. PHILIPSON (1937: 100), PAUNERO (1947: 588) and HUBBARD (1968: 307; the statement of HESS & al. 1967: 256 that stolons are absent in *P. semiverticillatus* is apparently erroneous, or else they are not always lacking). The words »*culmo repente, calycibus aequalibus*» in the phrase-name fit both *A. stolonifera* and *P. semiverticillatus*, while »*ramulis divaricatis*» fit neither of these species, but fit *A. capillaris* (the character of divaricate branchlets has caused *A. stolonifera* L. 1753 and *A. stolonifera* α L. 1755 to be interpreted as *A. capillaris* by many authors, see p. 66). Much attention was paid by A. S. HITCHCOCK (1904) to the polynomials cited by LINNAEUS. The polynomial in »Fl. suec. 62» (LINNAEUS 1745: 23, not 62) was ROYEN's (1740: 59) »*Agrostis culmo repente, vagina supremi folii ventricosa*» modified by the addition of the words »*flosculis muticis*». In »Dalib. paris 23» (DALIBARD 1749: 23) both LINNAEUS (1745) and ROYEN (1740) were cited. As emphasized by A. S. HITCHCOCK (1904), the ventricose leaf sheath (»*vagina ventricosa*») described in the polynomial fits *P. semiverticillatus*, while these do not usually occur in *A. stolonifera*, and therefore HITCHCOCK regarded the polynomials of at least ROYEN (1740) and DALIBARD (1749) and possibly also partly that of LINNAEUS (1745) as *P. semiverticillatus*. A study of the corresponding specimen in Herbarium Royen (in L) shows, however, that this was an error.

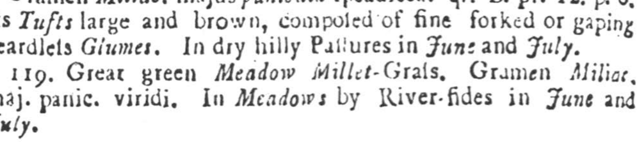
»*Agrostis culmo repente, vagina supremi folii ventricosa*» in Herb. Royen is namely a specimen of *A. stolonifera* with the panicles just emerging and having the uppermost leaf sheath ventricose (see Fig. 28). The fact that ROYEN's polynomial really is *A. stolonifera* is also supported by the cited polynomials »Raj. syn. 402» (RAY 1724: 402), »Bauh. pin. I. theatr. 13» (C. BAUHIN 1623: 1, 1658: 13), »Scheuchz. hist. 128» (SCHEUCHZER 1719: 128) and »Bauh. hist. 2. p. 459» (J. BAUHIN & J. CHERLERUS 1651: 459), which all represent *A. stolonifera,* as judged from their descriptions and the figure in C. BAUHIN (1658: 13). A. S. HITCHCOCK (1904) regarded the polynomial of SCHEUCHZER (1719: 128) as *P. semiverticillatus,* but in my opinion this must be considered a misinterpretation. The description of SCHEUCHZER contains nothing definitely indicating *P. semiverticillatus,* and in addition that species was described by SCHEUCHZER (1719: 130) under a different polynomial, while all the polynomials and figures directly or indirectly quoted for »*Gramen caninum supinum minus*» represent *A. stolonifera* (C. BAUHIN 1658: 13, J. BAUHIN & J. CHERLERUS 1651: 459, LOBEL 1581: 21, TABERNAEMONTANUS 1588: 637 and GERARDE 1597: 24). »*Gramen caninum supinum minus*» was identified in the same way as here by TRINIUS (1822: 181). A. S. HITCHCOCK's (1904) interpretation and typification of *A. stolonifera* was essentially based on his erroneous determination of ROYEN's and SCHEUCHZER's polynomials. It is thus obvious that HITCHCOCK's (1904) lectotype choice »was based upon a misinterpretation of the original description» in the sense of Art. 8 of the Code, and is therefore superseded. Thus *A. stolonifera* L. 1753 needs a new lectotype. Material which can be regarded as original with complete certainty is ROYEN's specimen of »*Agrostis culmo repente, vagina supremi folii ventricosa*» (cf. p. 101), and a specimen in Stockholm (S; LINDMAN 1908: 37), which lacks a determination of LINNAEUS, but whose locality (»Scaniae arena mobilis») is that of the peculiar *A. stolonifera* described by LINNAEUS (1751: 338—339) in »Skånska Resa». Besides these, there is one sheet in London (LINN) with handwriting of LINNAEUS and 6 culms of *A. stolonifera* (H. LINDBERG 1958: 16), but as its date of acquisition can hardly be decided, it must be considered less suitable as a type than the other two sheets. Since the type of *A. stolonifera* collected in Scania was segregated by Linnaeus in 1755 as »*β Agrostis stolonifera arenaria,*» the specimen in Stockholm must probably be considered somewhat unsuitable (cf. Guide for the determination of types 4 e, p. 72 in the Code). Therefore the specimen of »*Agrostis culmo repente, vagina supremi folii ventricosa*» in Herbarium Royen (L; Fig. 28) is now designated as the lectotype of *A. stolonifera* L. 1753. The type locality is probably in the Netherlands. The narrow very dense panicle and the folded leaves seem to indicate a sea-shore type.

The name *A. palustris* Huds. 1762 must apparently be typified with the aid of the cited polynomials as the greater part of Herbarium Hudson has been burnt (STAFLEU 1967), and no Hudsonian type material of the name exists in the British Museum (communication of Dr. A. Melderis). The protologue of *A. palustris* in Hudson's (1762: 27) Flora anglica is as follows:



5. AGROSTIS panicula coarctata mutica, calycibus æ- *paluſtris.*
qualibus hiſpidiuſculis coloratis ; culmo repente.
Gramen miliaceum majus, panicula ſpadicea. *Pet.*
conc. gr. 118. *R. Syn.* 464.
β Gramen miliaceum majus panicula viridi. *Pet. conc.*
gr. 119.
Anglis, Marſh Bent-graſs.
Habitat *in foſſis et locis uliginoſis frequens.* ♃. VII.

The two quoted polynomials of PETIVER (1716) were described as follows:



118. Great brown *Meadow Millet*-Graſs.
Gramen *Miliac.* majus *paniculâ* ſpeadiceâ. qi? B. pr. 12. p. 6. Its *Tufts* large and brown, compoſed of fine forked or gaping beardlets *Glumes*. In dry hilly Paſtures in *June* and *July*.
119. Great green *Meadow Millet*-Graſs. Gramen *Miliac.* maj. panic. viridi. In *Meadows* by River-ſides in *June* and *July*.

A comparison of PETIVER's two polynomials with HUDSON's own description makes it clear that No. 119, although segregated as β by HUDSON, corresponds best with HUDSON's own description of *A. palustris* (e.g. trivial name and habitats). No. 118 in Herbarium Petiver (BM) is, as could be supposed, *A. capillaris*, while No. 119 belongs to *A. stolonifera* (determined from spikelets fallen off and delivered by Dr. A. Melderis to me). Therefore »119 *Gramen Miliac. maj. panic. viridi*» in Herbarium Petiver (BM) is now designated as the lectotype of *A. palustris* Huds. 1762. The type locality is in Great Britain. The name *A. straminea* Hartm. 1819 has recently been used by CVELEV (1964) for an eastern arctic sea-shore type of *A. stolonifera*. Unfortunately there is apparently no original material of the name in Uppsala (UPS) or Copenhagen (C), where at least most of Hartman's plants are kept (Index herbariorum 1954: 258), but in the type locality mentioned in the protologue (sea-shore in Halland on the W. coast of Sweden) types occur which approach the W. European sea-shore types (upon which *A. maritima* Lam. is based; cf. MURBECK 1898 and HOLMBERG 1922), and thus disagree with the plants described by CVELEV.

Owing to SCHRADER's (1806) application, *A. coarctata* Ehrh. ex Hoffm. has been regarded by some authors as belonging to the *A. stolonifera* group, but, as was long ago pointed out by J. E. SMITH (1824: 94), G. F. W. MEYER (1836: 657, 1849: 638) and HACKEL & BRIQUET (1907: 39), the type material of this name belongs to the *A. canina* group (see p. 36).

Remarks on taxonomy

A. stolonifera is an extremely variable taxon in the eastern half of Fennoscandia in respect to nearly every character. The species clearly consists of several population groups with different origins and post-glacial migration histories, which then probably hybridized, causing a variation pattern which is very hard to classify taxonomically. It is especially interesting that characters which in other species seem rather stable (e.g. ligule length and form, type of Trichodium net, length of palea, density of prickle-hairs) vary very much in *A. stolonifera*. On the average some differences can be distinguished between different population groups, but the variation amplitude is very large, at least in respect to some characters, and overlapping occurs between the different population groups. Therefore I prefer not to separate any infraspecific taxa yet, but the variation of some different population groups is described below. Concerning the taxonomic value of the chromosome number character, see p. 82.

The sea-shore populations along the Baltic Sea and its gulfs (Figs. 35 c, 36 b). The variation encountered in the area studied is extremely great, but largely without any regional trends. The culms may be erect, and then range from up to 1-m-tall stout culms to only about 10-cm-tall and rather slender culms. In addition there frequently occur shorter or longer decumbent geniculately ascending culms, 15 cm—1 m tall. All intermediates between quite erect and long decumbent culms occur. The intravaginal vegetative shoots vary similarly from procumbent up to 1-m-long stolons to more or less decumbent and geniculately ascending shoots to quite erect shoots. Extravaginal vegetative shoots also occur, which ascend nearly at once, are erect and have less than three scale-leaves. The leaf blades vary in length from only about 3 cm to nearly 20 cm, and in width from only 0.75 mm to about 8 mm. The colour of especially young leaves is often ± glaucescent, but varies very much. Purplish leaf sheaths and blades are frequent, but green leaves without any purplish colour occur frequently, too. The ligules range from long and narrowly obtuse to short and broadly obtuse to nearly truncate. The length on the second culm leaf is about (1.0—) 1.5—5 mm. Short ligules seem to be more frequent along the Gulf of Bothnia than along the Gulf of Finland. The length and form of the panicles (Fig. 42 b, c) vary very much. The length ranges from about 2 cm to 20 cm. The form at flowering ranges from lanceolate to ovate, and the panicles vary from rather dense to very diffuse. In fruit the panicles range from quite contracted to semicontracted with patent branches and more or less contracted branchlets and pedicels. The branchlets and pedicels vary from very scabrous to quite smooth. The lemmas range from ovate and truncate to lanceolate and narrowly obtuse. Usually the lemmas are 5-nerved, but 4-nerved ones and lemmas with 3 longer and 2 shorter nerves also occur (and very rarely 3-nerved lemmas). The paleas are about 2/3 the lengths of the lemmas (paleas shorter than 1/2 the lemmas are very rare). The Trichodium net ranges from types III to VII. The prickle-hairs may occur intermediately densely, or may be only scattered, or quite absent. In cultivation experiments in the Botanical Garden the quantitative characters (e.g. culm height, length and amount of vegetative shoots) were to some extent modified, but great genotypical differences in respect to these characters were definitely found to exist.

Morphological types differing in respect to some characters with clearly adaptive significance (e.g. culm height and type of vegetative shoots) colonize different habitats, in the manner shown by BRADSHAW (1959, 1960) for *A. capillaris*. But all intergradations between the different types seem to occur, and different types with intergradations occur quite near one another in different shore habitats. Some apparently non-adaptive characters (e.g. panicle closing during fruiting, scabrousness of panicle branchlets, type of Trichodium net, density of prickle-hairs) do not show any correlation with habitats.

Some authors have tried to segregate infraspecific or even specific taxa from the Baltic sea-shore populations. For example, HYLANDER (1953a: 321, 1953b: 356) described as var. *bottnica* Hyl. a very conspicuous extreme in the variation series, characterized by rather tall tufted erect culms and erect vegetative shoots, long narrow panicles contracting during fruiting, and usually purplish leaf sheaths and panicles (the specimen in Fig. 35 d has these characters). VILJASOO (1966) tried to divide Estonian sea-shore *A. stolonifera* into »*A. stolonifera* var. *maritima* Lam.» (with dense panicles and scabrous panicle branches) and »*A. straminea* C. J. Hartm.» (with smooth panicle branches). The sea-shore types growing in W. Europe are not very uniform, but are described as always being stoloniferous with short internodes and leaves on the stolons. The leaves are said to be often stiff and with involute margins and often greyish or glaucous green. The culms are rather low, prostrate at the base and then geniculately ascending, often with short internodes and somewhat loosely fitting sheaths. The panicles are rather short, narrow, with densely crowded spikelets and often lobed (cf. *A. alba* B. II. *maritima* in ASCHERSON & GRAEBNER 1899: 176 and *A. stolonifera* var. *stolonifera* in PHILIPSON 1937: 95—98). These characters are found in a more or less extreme form also in sea-shore populations of *A. stolonifera* on the west and south coasts of Sweden and in Denmark (MURBECK 1898: 4 sub nom. var. *maritima,* and HOLMBERG 1922: 142 sub nom. var. *compacta*). Names given to such Swedish types are probably *A. stolonifera β decumbens* Retz. (possibly based on the Linnaean descriptions of *Agrostis stolonifera arenaria* in Skånska Resa [1751: 338], and Flora Suecica [1755: 22] as it was said to have »*fol. undulatis*» just as stressed by LINNAEUS), *A. straminea* Hartm. 1819 (type locality: in Halland; see p. 85), *A. stolonifera β compacta* Hartm., *A. stolonifera γ aristata* Hartm. and *A. stolonifera δ maritima* Hartm. Such characters can be found also in sea-shore populations of *A. stolonifera* in Finland, but in a much less extreme form (specimens with such characters named f. *maritima* in MELA & CAJANDER 1906).

It seems questionable whether extremes in a continuous variation series belonging to the same population can be separated as distinct taxa. In my opinion in amphimictic species even infraspecific taxa comprise populations (and not extreme individuals selected from one population) reproductively rather well isolated from one another, e.g. by geographic or ecological factors.

The inland populations in S. Finland and the adjacent part of the U.S.S.R. (Figs. 35 b, 36 a).

A. stolonifera in the inland of S. Finland seems to vary somewhat less than the Baltic sea-shore populations. All the biotypes seem to be stoloniferous, with procumbent or ascending stolons. The culms are mostly geniculately ascending and rather low, about 20—40 cm tall. The leaf blades are usually less than 15 cm long, and about 1.5—4 mm broad. The leaves are bright or dark green, sometimes purplish on the sheaths. The ligules of the second leaf blades measure about (1.0—) 1.3—4 mm in length.The panicles (Fig. 42 f, h) are usually less than 10 cm long, lanceolate—ovate, usually with scabrous branchlets and pedicels, semi-contracted or contracted after flowering. Clones with paleas only about 1/2 the length of the lemmas or still shorter are comparatively frequent, but clones with longer paleas occur, too. The density of prickle-hairs and type of Trichodium net varies rather much. Some clones are pentaploid and do not set any seeds (see p. 81; perhaps they are identical with SOKOLOVSKAJA's *A. prorepens;* cf. S. O. BJÖRKMAN 1960: 35). The name *A. stolonifera* var. *prorepens* Koch has been used by HYLANDER (1953a) for stoloniferous inland clones from Fennoscandia. The type of the name is probably from Switzerland as »herb. helv.» was written on the label of the type specimen. The inland populations are largely spread hemerochorously and are probably mostly introduced, though their origin is unknown. To some extent stoloniferous *A. stolonifera* has been used as a lawn grass in Finland (see p. 91). A. S. HITCHCOCK (1951) and HUBBARD (1968) report that the types of *A. stolonifera* used as lawn grasses originate from sea-shore populations.

The northern inland and sea-shore populations (Fig. 36 c).

In Sweden Rune (1953) and Selander (1950) have paid attention to northern inland populations of *A. stolonifera* on shores and serpentine ground, which in schedis have been named »var. *arctica*» by T. Vestergren. Similar populations are scattered over widely separate areas in N. Finland, N. Norway and the Murmansk Region (see p. 95). Common characters for these populations are comparatively low culms, about 5—20 (—30) cm tall, with the uppermost culm leaves after flowering below the middle of the culm. The leaf laminae are narrow (about 0.5—3 mm wide) and comparatively short (less than 7 cm long). Stolons are produced especially after flowering, but are rather short (—30 cm long). Very interesting are the short, obtuse—broadly obtuse ligules, on the second culm leaf only about 0.5—1.5 mm long and 1.0—1.5 times as long as broad (see Fig. 46 j). The panicles are usually lanceolate, only 1—6 cm long, with very short branches (less than 1 cm long) and strongly contracted after flowering (Fig. 42 d, e). The branchlets of the panicles are scabrous. The floret characters vary rather much between different populations, but also within the populations. The lemmas are often broadly ovate and nearly truncate, with distinct nerves ending very near the edges, but narrower lemmas with nerves ending well before the edges also occur. The Trichodium net ranges from types II to VI. The prickle-hairs are often rather dense, but may be quite absent, too. The paleas are frequently conspicuously long (about 3/4 the length of the lemmas) and broad (Fig. 51 c). In N. Sweden these northern inland populations contain some very conspicuous extremely dwarf types. In Li and Ks in Finland and in the Murmansk Region clones occur that are very similar to the Swedish types, but especially in Ks the trend of variation is towards taller and stouter types with broader leaves and longer ligules (up to 3 mm long on the second culm leaf), and larger panicles with longer branches (up to 3 cm).

The sea-shore populations of *A. stolonifera* in N. Norway and the Murmansk Region (except the coasts of the White Sea) are much less variable than the Baltic populations, and resemble rather much the northern inland populations. They are rather low (10—30 cm tall), have geniculately ascending culms and develop stolons. The stolons are frequently numerous and may be rather long (up to 50 cm). The ligule on the second culm leaf is rather short (about [0.75—] 1—3 mm long). The panicles seem always to be rather small (up to 7 cm long) and narrow, and strongly contracted after flowering. The lemmas are mostly of the narrowly ovate, obtuse type, smooth or with rather dense prickle-hairs, and have mostly Trichodium nets of type V or VI, rarely better developed Trichodium nets. Cvelev (1964) described an arctic sea-shore type of *A. stolonifera*, which he called »*A. straminea* Hartm» (for the identity of this name see p. 85), extending eastwards along the north coast of the U.S.S.R. to the Kara Sea. I have studied some specimens of this taxon from Kolguev and the Bol'chesemelska tundra (kept in LE), and found them essentially similar to the N.E. Fennoscandian sea-shore clones, although clearly more extreme in respect to dwarfness. These eastern plants invariably had smooth lemmas and undeveloped Trichodium nets.

As one passes southwest along the coast of N. Norway, there seems to be a gradual change to taller types with longer ligules and larger and denser panicles. This cline has not yet been studied.

Habitats

The population groups of *A. stolonifera* in the eastern half of Fennoscandia differ rather much from one another in their habitats, and will therefore be considered separately. However, a common feature seems to be that they all require basic or circumneutral soils and avoid very acid habitats, unlike some other *Agrostis* species.

The sea-shore populations on the coasts of the gulfs of the Baltic Sea have colonized practically all kinds of shores. They are among the pioneers on islets just rising above the water; they grow in rock crevices; they are found on pure mineral soil, such as sand, clay or gravel of different kinds, and also grow on shores with a thin or thick humus layer. The richest occurrences are in the so-called saline belt (in the sense of, e.g., BRENNER 1921: 30, LEMBERG 1933: 11 and OLSONI 1948) just above the normal water-line but often submersed during the growing period. In this belt on shore meadows the species is often abundant—dominant and meadow-forming. Common accompanying species are *Triglochin maritimum, Juncus gerardii, Eleocharis uniglumis, Glaux maritima, Plantago maritima* and, along the Gulf of Bothnia, *Deschampsia bottnica*. In rock crevices the species is often accompanied by *Puccinellia retroflexa* and *Sagina nodosa*. On the outer bird skerries it is abundant around rock-pools, also far up from the sea. Submersed clones occur in rock-pools and on sheltered shores.

Along the coast of N. Norway the distribution pattern of *A. stolonifera* is somewhat different. There I have seen it mainly in and around low-lying marshes at the mouths of rivers and rivulets. Accompanying species were *Festuca rubra, Puccinellia phryganodes, Puccinellia retroflexa, Eleocharis uniglumis, Stellaria humifusa* and *Plantago maritima*, and, in east Fnm, also *Juncus arcticus, Carex rariflora* and *Saxifraga aizoides*. In South Nesseby in Fnm the species occurred also in small rock-pools and crevices on shore cliffs together with, e.g., *Carex glareosa*. There the bedrock consisted of granite. Such occurrence seemed to be absent from shore cliffs consisting of schists in other parts of N. Norway (possibly owing to more effective drainage). The species occurs on sea-shores along the coasts of the Murmansk Region and the Karelian A.S.S.R., too.

In the inland of S. Finland *A. stolonifera* occurs in a wide variety of mostly ± hemerobic and moist habitats. These include lake and river shores (especially loamy and/or hemerobic), field and road ditches, waste places, railway banks and yards, and moist by-roads and paths. To some extent the species is also cultivated as a lawn grass (the seed has been of German or Swedish origin in recent years, according to the importers Kesko Ltd. and Hankkija Ltd.).

The northern inland populations occur in some widely different habitats. These include sandy or gravelly shores by lakes and rivers, some of which have been reported to be flooded even as late as at the beginning of August (SELANDER 1950: 34). Here the species may be mat-forming. It occurs also on eutrophic paludified shores with a thin peat layer and in other eutrophic fens, evidently often near springs (at least in Ks in Finland and in TL in Sweden, see pp. 146, 147). Further, plants belonging to the northern populations have been collected from several dry and moist habitats on serpentine ground in N. Sweden and Finland (the Swedish localities have been thoroughly described by RUNE 1953, 1957; a note about some Finnish localities has been given by ULVINEN 1962).

Distribution

General distribution

Maps of the total distribution of *A. stolonifera* s. lat. have been published by HULTÉN (1962 map 188, 1968: 100) and it is here outlined according to HULTÉN unless otherwise stated. It covers the whole of Europe (including Iceland and the Faeroes) and extends eastwards on the Asian continent through Siberia (except the northernmost parts) to the Lena River. East, north and south of this Siberian area the species has numerous smaller isolated areas, where it is evidently mostly introduced (e.g. Kamchatka, Japan, and occurrences in different parts of China). In S.W. Asia the species occurs all over Turkey and is listed by BOR (1970: 298) from several localities in Iraq, Persia, Turkestan, Afghanistan and W. Pakistan. *A. stolonifera* occurs also in N. Africa.

In North America the species is distributed through almost the whole of the U.S.A. (absent in Florida and some south central areas, and with only scattered localities in Alaska) and southernmost Canada, and occurs in Nova Scotia, the island of Newfoundland, and along the whole northeast coast of Labrador. A. S. HITCHCOCK (1951: 338—339, sub nom. *A. stolonifera* and *A. palustris*) considered the species native along the coasts of northern North

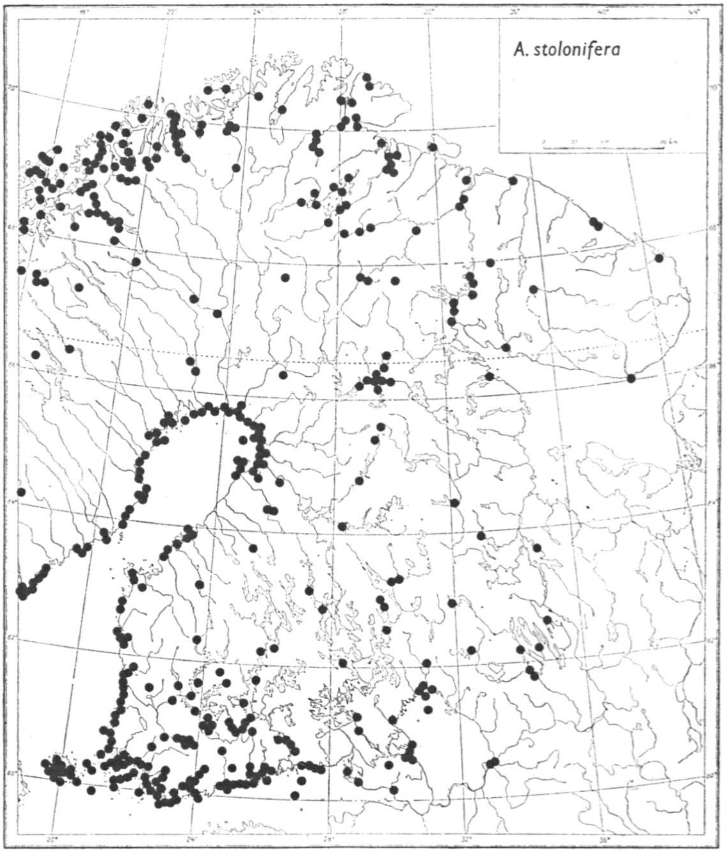


FIG. 11. The distribution of *A. stolonifera* in the eastern half of Fennoscandia according to the specimens examined.

America, but elsewhere wholly introduced. In southernmost Greenland it is introduced.

A. stolonifera is certainly introduced in a great many places in the southern hemisphere (known at least from Tristan da Cunha, S. Africa, S. Australia, New Zealand, S. Chile, the Juan Fernandez Is. and the Falkland Is.).

In the western half of Fennoscandia *A. stolonifera* is mostly quite common, especially along the coasts, but rare or absent in mountainous areas (HULTÉN 1971 map 158, HYLANDER 1953a: 321).

Distribution in the investigation area

Since their distribution patterns are quite different, the different population groups are again considered separately.

The sea-shore populations along the coasts of the Baltic Sea and its gulfs. *A. stolonifera* has been collected all along the coasts of Finland and N. Sweden

(Fig. 11), where it is frequent and abundant. The gaps on the west coast of Finland are certainly not real. Its distribution extends through all the archipelago zones from the outermost islets to the innermost bays and river mouths, but seems to stop abruptly at the point where the influence of the sea-water ceases, the species being apparently absent or very rare along most of the rivers. However, populations whose morphology is similar to that of the Baltic sea-shore populations occur on the shores of Lake Ladoga. *A. stolonifera* has been reported from the coasts of the White Sea, from both the Karelian A.S.S.R. (RAMENSKAJA 1960) and the Murmansk Region (KUZENEVA 1953), but I have seen very few specimens and therefore cannot decide about the general morphology of this population. The specimens from Kk Keret and LIm Kandalaksha (leg. N. Savich 792) are, however, rather tall and erect and seem to fall within the variation of the Baltic populations. One specimen (leg. Zinserling 913) from Lp Lumbovka is rather tall (40 cm) and erect and resembles the »*bottnica*» type of HYLANDER, while the specimen from LIm Umba is lower but approaches this type, too. The other specimens from sea-shores in LIm and Lp resemble more the eastern arctic sea-shore type (see p. 89).

The origin of the Baltic sea-shore *A. stolonifera* is certainly heterogeneous. The W. European sea-shore type (see description on p. 87) has probably contributed to its variation. The distribution area of *A. stolonifera* along the coasts of the Baltic Sea is quite continuous (HULTÉN 1971 map 158), and, especially on the west and south coasts of Sweden, types approaching the W. European sea-shore populations occur. Characters of these western populations are also found in a much less extreme form in Finnish sea-shore populations (see p. 88). Other populations which may well have contributed to the variation are the eastern sea-shore populations on the north coast of the European part of the U.S.S.R. (see p. 89), as many other northern sea-shore plants have colonized large parts of the Baltic coasts (e.g. *Carex glareosa* and *Potentilla anserina* ssp. *egedii*). However, hybridization between these populations probably cannot explain the whole variation range encountered, as both are rather low, geniculate and stoloniferous. Some tall erect type with erect vegetative shoots must probably have contributed to the variation, too. Erect *A. stolonifera* types are described by e.g. SUESSENGUTH (1936: 307 sub nom. *A. alba* var. *genuina* and var. *coarctata*) from Central Europe (but belong partly to *A. gigantea*), and may possibly be responsible for part of the variation in Fennoscandia, as may perhaps acending stoloniferous inland types, too.

The inland populations of S. Finland and the adjacent part of the U.S.S.R. The southern inland populations of *A. stolonifera* are clearly hemerophilous (cf. pp. 88, 91), and it is hard to decide to what extent these populations are native. Even most of their shore localities are more or less hemerobic. Formerly *A. gigantea* was united with *A. stolonifera* and the older literature and HULTÉN's (1950, 1971) map 158 are erroneous. Specimens of *A. stolonifera* have been collected from all the provinces of the Finnish mainland. All specimens from Lk and Li and most from Ks belong to the northern type and are dealt with later (pp. 95, 96). The inland specimens from the other provinces are from widely scattered localities and the species is evidently not common inland, except in south Ta and the Lohja—Vihti region in Ab, where numerous specimens have been collected. Its frequency in these regions may be explained by the abundant supply of eutrophic as well as hemerobic habitats. The common occurrence shown in HULTÉN's map 158 for the inland of Finland and Sweden adjacent to the Gulf of Bothnia is contradicted by the material seen by me. In N. Sweden *A. stolonifera* is very rare inland. The localities in PL, LL and TL belong to the northern type. In the inland localities in Nb and ÅsL, *A. stolonifera* seems to be hemerochorous and of southern origin. The northernmost localities in Finland of hemerochorous, apparently southern *A. stolonifera* lie in Ob Kemijärvi and Rovaniemi. In the Leningrad Region (ŠIŠKIN 1955) and the Karelian A.S.S.R. (RAMENSKAJA 1960) »*A. stolonizans*» has been considered rather common. Fig. 11 does not contain very many dots in these regions, but the amount of herbarium material from there is generally much smaller than from Finland, and this material does not exclude the possibility that occurrence is more frequent in these regions than in the adjacent part of Finland.

Very little is known about the origin and immigration history of the southern inland population of *A. stolonifera.* The northern type may have contributed to the variation encountered, as some northern taxa with similar distributions in Fennoscandia occur far south in Finland (e.g. *Oxytropis campestris* ssp. *sordida* and *Astragalus alpinus* ssp. *arcticus;* see JALAS 1950). Further, it may be mentioned that some characters occurring here and there in inland *Potentilla anserina* ssp. *anserina* in Finland were supposed by ROUSI (1965) to have been acquired from *P. anserina* ssp. *egedii,* a taxon now absent from the inland, but thought by ROUSI to have colonized late-glacial shores there. In Ks (see p. 89) plants occur that form an intergradation between typical northern and types of more southern appearance, but further south, at least in Finland, typical plants of the northern population are absent. They may, however, have occurred formerly and disappeared through hybridization, as in the case of *Potentilla anserina* ssp. *egedii.*

Some localities of *A. stolonifera* near the coast on river or lake shores may also be relics of the sea-shore population, e.g., judging from its morphology, this is the case with the population in Ob Kemi, Ala-Paakkola, about 25 km from the coast.

It is, however, obvious that the origin of most of the southern inland populations must be sought elsewhere than in the other two E. Fennoscandian populations here described. For instance, the short paleas frequently encountered in the southern inland populations do not occur in the other two population groups. In the European part of the U.S.S.R. (GOLUBEVA 1921, ŠIŠKIN 1934, VOVK 1965) and in Central Europe (ASCHERSON & GRAEBNER 1899, SUESSENGUTH 1936) stoloniferous types of *A. stolonifera* are reported to be widespread, and among these types the origin of much of the variation encountered in Fennoscandian inland clones must certainly be sought. For the origin of types cultivated in lawns, see pp. 88, 91.

The northern inland and sea-shore populations. In the inland of N. Sweden, N. Finland and the Murmansk Region a morphologically varying but still heterogeneous type (see p. 89) has been collected from scattered localities in widely distant areas in PL, LL, TL, Lk, Ks, LIm, LV, Li, Lps and Lt, as shown by Fig. 11. Outside the area of this map several localities are known from LyL, ÅsL and Jmt in Sweden (RUNE 1953, 1957; specimens in UPS and S seen by me). The northern type ascends to about 1 100 m and the lower oroarctic zone in Swedish Lapland (see p. 147; SELANDER 1950, RUNE 1953, 1957). The habitats (see p. 91) vary rather much and their only common features seem to be a rather open plant cover and weak competition from other plants, as already pointed out by RUNE (1953), who was doubtless right in concluding (1953: 87) that these *A. stolonifera* populations were to be considered epibiotics — plants surviving only in localities with weak competition. The northern inland populations most resemble the *A. stolonifera* populations growing on sea-shores in N.E. Europe (see p. 89). The resemblance to these populations and the present distribution in N. Fennoscandia suggest that the northern *A. stolonifera* populations were among the first colonists of open ground during the late-glacial period (concerning late-glacial colonists see e.g. IVERSEN 1954 and KALELA 1961a: 319). If this is the case, the present occurrences are relics of a formerly continuous distribution. Immigration from the northeast seems probable. A similar distribution in the inland of N. Fennoscandia is shown especially by *Astragalus alpinus* ssp. *arcticus* (JALAS 1950 map 10), which, however, is much commoner in N. Finland. As already noticed (p. 89), the northern inland *A. stolonifera* populations vary considerably in respect to some floret characters. In the light of the material seen, this variation has to some extent a geographical pattern. In the western part of the area, up to Lps and Ks in the east, clones occur fairly frequently that have rather dense prickle-hairs on the lemmas and/or well-developed Trichodium nets (type III or even II), but these characters are not found in the clones collected east of this area (see p. 90). However, clones with quite smooth lemmas and undeveloped Trichodium nets also occur on the western margin of the area shown in Fig. 11. This variation pattern could be explained by assuming that populations with developed Trichodium nets and rather abundant prickle-hairs on the lemmas survived the Ice Age in Fennoscandian refugia, and subsequently hybridized with populations of eastern origin. On the other hand the material seen from the Kola Peninsula is very scanty, as is also the material from the regions still further east, and the eastern populations may well be more variable than the few specimens studied indicate.

On sea-shores *A. stolonifera* is distributed all over the coasts and islands of N. Norway and the Kola Peninsula. In view of its restriction to the mouths of rivers (see p. 90), the species is presumably nowhere as frequent as on the Baltic coasts. In Fig. 11 there are clearly many more dots in Nrd and Trs than in Fnm. Benum (1958) considered the species common in Trs, while Dahl (1934) regarded it as uncommon in Fnm. There are records from riversides and lake shores in the inland of N. Norway (see pp. 147, 148). Benum (1958: 124) reported also apophytic occurrence, »chiefly near the sea». Along the coasts of the Murmansk Region there are only very few dots in Fig. 11. The species (sub nom. *A. maritima* and *A. stolonizans*) was considered rare there by Kuzeneva (1953). Along the north coast of the Karelian A.S.S.R. *A. stolonifera* is certainly much more widespread than the only dot in Fig. 11 indicates (see Ramenskaja 1960 sub nom. *A. maritima* and *A. prorepens*). The northern sea-shore populations are probably, at least where the Kola Peninsula is concerned, mostly of eastern origin (see p. 89), but morphologically some clones from the coasts of the White Sea resemble the Baltic population (see p. 93). Hultén (1950: 60) lists some other European sea-shore plants which occur on the coasts of the White sea and the Baltic area, but are absent further east in the U.S.S.R. (e.g. *Atriplex longipes, Angelica archangelica* var. *litoralis,* and *Cakile maritima*). The Baltic population of *A. stolonifera* may prove to belong to this group. On the coasts of Norway *A. stolonifera* has a quite continuous distribution (see e.g. Hultén 1971 map 158). The populations in N. Norway may well be of heterogeneous origin if the western and eastern populations meet just there. This seems to be indicated by the variation of some characters (see p. 90), but this question has not been studied in any detail.

Agrostis gigantea Roth

A. gigantea Roth 1788: 31. — *Vilfa gigantea* (Roth) Palisot de Beauvois 1812: 16. — *A. alba* ssp. *gigantea* (Roth) Jirasek in Dostal 1950: 2051 non Spenn. 1825 (vide infra). — *A. stolonifera* ssp. *gigantea* (Roth) Janchen 1953: 64 (nom. nud. inval.). — *A. vinealis* [var.] *β gigantea* (Roth) Persoon 1805: 76. — *A. alba* Spielart a. *gigantea* (Roth) G. F. W. Meyer 1836: 655 non Spenn. 1825; W. D. J. Koch 1837: 781 ut [var.] *β*. —

A. stolonifera f. *gigantea* (Roth) MELA & CAJANDER 1906: 68 (quoad basion) non Schübl. & Mart. 1834. — Lectotypus originalis in B (PHILIPSON 1937: 91) destructa (vide infra p. 100), lectotypus novus: Germania (?). Leg. Roth, in Herbarium Albrecht de Haller filius (G)! Vide infra p. 100, ic. 29.

A. nigra WITHERING 1796: 131. — *Vilfa nigra* (With.) S. F. GRAY 1821: 145. — *A. vulgaris* var. *nigra* (With.) J. D. HOOKER 1884: 477. — *A. tenuis* [var.] b. *nigra* (With.) DRUCE 1908: 79. — *A. capillaris* var. *nigra* (With.) DRUCE 1932: 350. — Typus: vide PHILIPSON 1937: 93.

A. dispar MICHAUX 1803: 52. — *Vilfa dispar* (Michx) PALISOT DE BEAUVOIS 1812: 16. — *A. alba* [var.] *γ. dispar* (Michx) WOOD 1861: 774. — *A. gigantea* var. *dispar* (Michx) PHILIPSON 1937: 93. — Lectotypus: in P (PHILIPSON 1937: 93), isotypus (P)!

A. decumbens HOST 1809: 31. — Non Gaud. 1811 (vide p. 78).

A. alba [var.] *γ. gigantea* SPENNER 1825: 94 (»*Gigantea*»; pro »*A. gigantea* Gaud. — non Roth.»). — *A. stolonifera* [var.] *β. gigantea* SCHÜBLER & MARTENS 1834: 64 (pro *A. gigantea* sensu GAUDIN 1811: 81). — Lectotypus: vide infra sub nom. *A. alba* IV. *maior*.

? *A. alba* [var.] *γ. major* WIMMER & GRABOWSKI 1827: 53.

A. alba [f.] *IV. maior* GAUDIN 1828: 189 (»*A. alba* * *maior* Gaud. 1828» in HYLANDER 1953a: 321, nom. inval.) non Wimm. & Grab. 1827 (vide supra). — *A. stolonifera* var. *maior* FARWELL 1920: 351 (»*major*»; pro *A. alba IV maiori* Gaud. 1828). — Lectotypus: sub nom. *A. gigantea* in Herbarium Albrecht de Haller filius (G; specimen 2 sub nom. *A. alba* var. *gigantea* subvar. *silvatica* in HACKEL & BRIQUET 1907: 37)!

?*A. alba* [var.] ? *γ. elata* BLYTT 1847: 150. — *A. stolonifera elata* (Bl.) ANDERSSON 1852: 101.

A. vulgaris β repens LAESTADIUS 1856: 83. — Lectotypus: Suecia, Nb Pajala, Leg. L. L. Laestadius (UPS)! Ic. 30.

?*A. maeotica* KLOKOV 1950: 41. — Holotypus: »RSS Ucr., dit Staliniensis, prope oppidum Ossipenko, peninsula maeotica Kossa Berdianskiensis. 26 VIII 1937, legit G. Bilyk» (KW, isotypus in LE).

?*A. sabulicola* Klokov 1950: 37. — Holotypus: »RSS Ucr., dit Odessana, distr. Tzurjupiensis, in arena Kazavzo-Lagerskaja, 12 VII 1932, legit M. Kossetz» (KW, isotypus in LE).

A. alba auct., non L. 1753 (vide p. 101): SCHRADER 1806: 209 (p.p.). C. J. HARTMAN 1820: 45 (p.p.), GRISEBACH 1853: 436 (p.p.), MELA 1877: 162 (p.p.), 1895: 431 (p.p.), 1899: 422 (p.p.), ŠIŠKIN 1934: 183 (p.p.) ,1955: 116 (p.p.), A. S. HITCHCOCK 1937: 522, 1951: 803, KUZENEVA 1953: 157 (p.p.), RAMENSKAJA 1960: 103 (p.p.), et al.

A. stolonifera auct mult. (p.p)

Description

Usually loosely tufted, perennial. *Vegetative shoots* extravaginal or intravaginal; extravaginal at first subterranean, usually rather stout, furnished with more than three scale-leaves, then ascending and forming erect vegetative aerial shoots; intravaginal usually rather short (up to 1/2 the length of the culms), erect, rarely forming procumbent stolons. *Leaf* laminae flat or sometimes involute in drought, about 3—12 mm wide and up to 20 cm long, 15—35-nerved, both sides very rough — quite smooth, bright or dark, glaucescent, greyish or yellowish green; stomata about 36—59 μm long; sheaths coloured like the leaves, or sometimes tinged with purple, smooth or scabrous. *Ligule* usually obtuse, sometimes acute, or nearly truncate, on upper culm leaves often with split apex; on uppermost culm leaf up to 8 mm long, on second culm leaf about 1.5—6 mm long and about 0.75—2 times as long as wide, on lower culm leaves and leaves of sterile shoots about 1.4—3 mm long. *Culms* about (15—) 40—150 cm tall, (3—) 4—6-noded, usually erect, stiff and rather stout, sometimes geniculately ascending, very rarely decumbent and branching at base and then ascending. *Panicle* usually rather large (but varying widely in size, about 4—40 cm long), ovate—lanceolate, rather loose but richly branched, brownish,

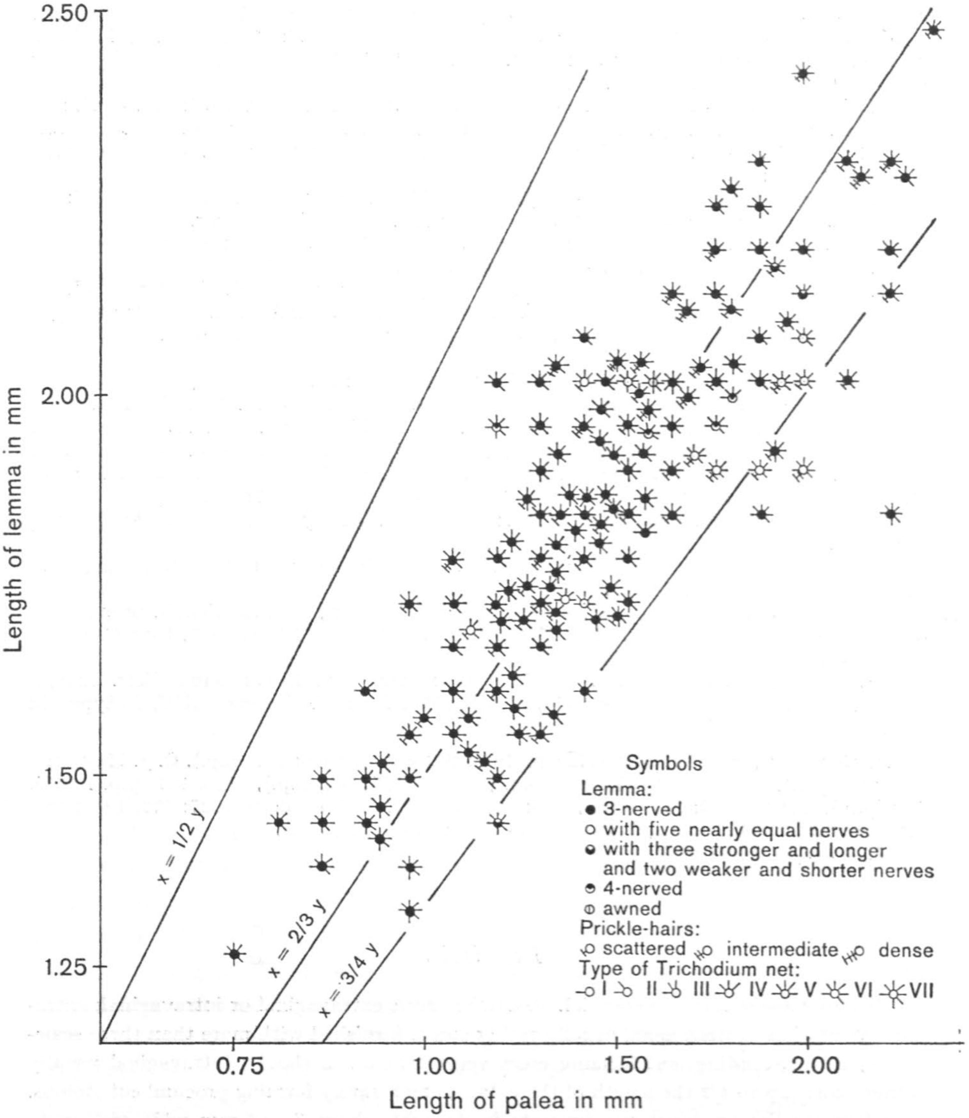


FIG. 12. Pictorialized scatter diagram illustrating the variation of some floret characters in *A. gigantea*. Specimens included marked with " in the list of specimens studied.

purplish or greenish; branches of the same node of unequal length, usually divided in one plane and forming separate horizontal verticils; branches dividing at about 1/3—1/2 their length, patent or slightly raised after flowering with branchlets and pedicels closing in different degrees to these; branchlets and pedicels usually scabrous — very scabrous. *Spikelets* about 2.0—3.5 mm long; glumes ovate—lanceolate, dorsally scabrous. *Lemma* ovate, obtuse, about 1.5—2.8 mm long, usually 3-nerved with shortly excurrent lateral nerves, rarely 4- or 5-nerved, or with 3 stronger and longer and 2 weaker and shorter nerves, smooth or with some scattered prickle-hairs, unawned, or rarely furnished with a short straight awn issuing from the upper half of the lemma; Trichodium net undeveloped, types VI—VII. *Palea* about (1/2—)2/3—3/4 the length of the lemma. *Anthers* somewhat shorter than the lemma, yellowish or purplish.

Figs. 1, 2, 12, 29, 30, 31, 37, 43, 46 k, l, 48 l, 51 f, 56 d, 57 a.

Cytology

S. O. BJÖRKMAN (1954a: 257) reported the chromosome number 2 n=42 for 217 clones of *A. gigantea*, mainly of Swedish origin (concerning part of this material, see pp. 149, 150, 151). In two clones four supernumeraries were found. Most other authors have found the hexaploid number too: SOKOLOVSKAJA (1937a: 466, 1938: 457, 1955: 851; material from the U.S.S.R.), SOKOLOVSKAJA & STRELKOVA (1939: 50; material from the U.S.S.R.), MAUDE (1939: 22, 1940: 18; sub nom. *A. nigra* With., material from Great Britain), JONES (1953: 316, 1956c: 394; material from Great Britain), BOWDEN (1960: 544; Canadian material of both var. *gigantea* and var. *dispar*) and LÖVE & LÖVE (1961: 68, 365, 1964 in LÖVE & SOLBRIG: 103; Canadian material). In addition to 2 n=42, JUHL (1952: 331) found the number 2 n=46 in material from Schleswig-Holstein in Germany. Recently VOVK (1968: 17, 1970: 740) found both hexaploid (2 n=42) and tetraploid (2 n=28) numbers in Ukrainian *A. gigantea*, and 2 n=42 was reported for the evidently closely related *A. sabulicola*, while *A. maeotica* was found to be tetraploid. Hexaploid numbers in plants raised from seed samples, whose origin was not indicated, but which probably represented *A. gigantea*, were found by AVDULOV (1928: 66 sub nom. *A. alba* L., 1931: 145 sub nom. *A. alba* var. *coarctata* Neilr.), MÜNTZING (1937: 215 sub nom. *A. stolonifera*) and SKOVSTED (1939: 433). 2 n=42 was found in »*A. palustris*» (evidently = *A. gigantea*) of Japanese origin by MORIYA & KONDO (1950: 128), ONO & TATEOKA (1953: 20), TATEOKA (1955: 68) and SHIBATA (1957: 260).

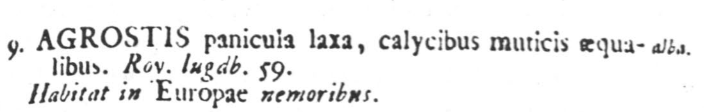
The author obtained the number 2 n=42 for some clones representing different infraspecific taxa of the species (see p. 24).

In meiosis 21 bivalents normally occur (JONES 1953: 316, 1956c: 394, BJÖRKMAN 1954a: 257). On the basis of a study of the chromosome pairing in the meiosis of the hybrids *A. gigantea* × *tenuis* and *A. gigantea* × *stolonifera*, JONES (1956c: 398) has shown that, if *A. capillaris* and *A. stolonifera* have the genome formulas $A_1A_1A_2A_2$ and $A_2A_3A_3A_3$ respectively, *A. gigantea* can be given the formula $A_1A_1A_2A_2A_3A_3$. JONES (1956 c) stated, however, that the various genomes, although given the same symbols, need not be entirely identical in the different species.

Nomenclature

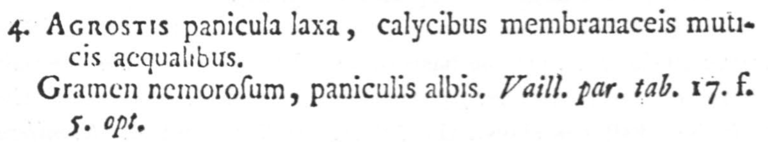
As regards the type of *A. gigantea* Roth 1788, Philipson (1937: 91) stated that »Roth's specimen is in the Botanical Museum, Berlin». According to a communication from that Museum (B), the specimen was destroyed during World War II. In view of the division of the species into infraspecific taxa, the selection of a new lectotype from other extant material of A. W. Roth must be considered important. Two herbarium sheets of *A. gigantea* sent by Roth to Albrecht de Haller filius are known to exist in Geneva (G, Hackel & Briquet 1907: 37). One of these similar specimens (Fig. 29) is now selected as the new lectotype of *A. gigantea* Roth 1788.

A. alba L. 1753 has been considered by many authors (see above p. 97) to include *A. gigantea* Roth. The identity of *A. alba* has been much disputed. A. S. Hitchcock (1905: 25) selected sheet No. 23 (Savage's 1945 numbering) in the Linnaean herbarium (LINN) in London as lectotype of the name. Later Hitchcock (1920) reported that the number of *A. alba* was not underlined in Linnaeus's own copy of Species Plantarum, and the sheet was thus presumably placed in the Linnaean herbarium after 1753 (as interpreted by Jackson 1912) and is of minor importance for the identification of *A. alba*. This assumption is supported by the fact that Savage (1945: 14) did not consider the handwriting of the sheet to be Linnaeus's (though Lindberg 1958 was not of this opinion). Sheet No. 23 in LINN must then be considered only a neotype of *A. alba* which has no significance if any original material is known to exist (cf. p. 56). Linnaeus's protologue for *A. alba* in Species Plantarum (1753: 63) is as follows:



9. AGROSTIS panicula laxa, calycibus muticis æqua- *alba.*
libus. *Roy. lugdb. 59.*
Habitat in Europae *nemoribus.*

The phrase-name, which does not give very much information, is taken in slightly modified form from Royen (1740: 59):



4. Agrostis panicula laxa, calycibus membranaceis muticis aequalibus.
Gramen nemoroſum, paniculis albis. *Vaill. par. tab.* 17. f. *5. opt.*

As the Linnaean herbaria do not contain any pre- 1753 material of *A. alba*, Linnaeus's phrase-name was taken from Royen, and no other quotations were given, it seems obvious that *A. alba* L. 1753 must be typified by Royen's phrase-name and corresponding herbarium material. There is one specimen in Herbarium Royen in Leiden (L) of »*Agrostis panicula laxa, calycibus membranaceis muticis aequalibus*», but it is not *Agrostis*, but a species of *Poa*, probably *P. nemoralis* L. 1753. As Herbarium Royen was listed in the preface of Species Plantarum (LINNAEUS 1753) among herbaria consulted by LINNAEUS, the specimen mentioned above can certainly be considered original material, and is now selected as the lectotype of *A. alba* L. 1753. The Royenian specimen has earlier been identified as *Poa* by BOWDEN (1960: 542), at least, and the phrase-name of VAILLANT (1723) quoted by ROYEN has long been known to be a species of *Poa*, probably *Poa nemoralis* L. (H. RICHTER 1840: 77, PIPER 1918: 4, PHILIPSON 1937: 91, PUNT 1964: 10).

A. nigra With. 1796 was regarded by PHILIPSON (1937) as a synonym of *A. gigantea* var. *dispar*, whereas ASCHERSON & GRAEBNER's (1899) and A. S. HITCHCOCK's (1951) descriptions agree better with var. *gigantea* as described by PHILIPSON. If the typification suggested by PHILIPSON is correct, the other authors have evidently misapplied the name.

MURBECK's (1898), H. LINDBERG's (1900), MELA & CAJANDER's (1906) and HIITONEN's (1933; pro syn.) use of Roth's epithet *gigantea* is erroneous, as they applied it to awned specimens, mainly of *A. stolonifera*.

Remarks on taxonomy

A. gigantea closely resembles some tall types of *A. stolonifera*. The only completely reliable separating character seems to be the occurrence of extravaginal subterranean rhizomes with more than three scale-leaves in *A. gigantea*. *A. capillaris* differs in having a shorter palea, developed Trichodium net (types II—III) and smoother panicle branchlets and pedicels. The hybrids of *A. gigantea* with *A. capillaris* and *A. stolonifera* are intermediate and usually sterile.

Agrostis gigantea Roth var. *gigantea*

This variety as described by PHILIPSON (sub nom. *A. gigantea* var. *ramosa* [S. F. Gray] PHILIPSON; a superfluous [but legitimate] combination, as *A. gigantea* Roth was cited in synonymy), is characterized by »culms procumbent and branching below. The sterile shoots often extensively trailing as stolons» (PHILIPSON 1937: 91). Specimens matching this description are certainly rare in the eastern half of Fennoscandia. I have seen only one herbarium specimen (N Helsinki, 1879 Hj. Hjelt [TURA], Fig. 37 a) which seems to be referable to this taxon, evidently occurring as an introduced weed. The rest of the material can be divided into two indigenous varieties occurring in natural habitats, and a rather heterogeneous group of hemerochorous types. The indigenous taxa are *A. gigantea* var. *repens* (Laest.) Widén, and *A. gigantea* var. *glaucescens* Widén.

A. gigantea var. *repens* (Laest.) Widén, comb. nova

A. vulgaris β repens L. L. LAESTADIUS 1856: 83. — Lectotypus: Suecia, Nb Pajala. Leg. L. L. Laestadius (UPS)! Ic. 30.

Loosely tufted, perennial. Culms erect, (20—) 40—100 cm tall. Leaf laminae rather narrow (—7 mm wide) and pointed, upper side very scabrous, under side very scabrous — slightly scabrous but basal half rarely nearly or quite smooth, light green or lightly greyish green, in shady habitats darker green; sheaths very scabrous — nearly smooth, sometimes quite smooth, coloured like the blades; basal sheaths very rarely lightly purplish. Panicle greenish or lightly brownish-purplish, semicontracted after flowering.

Var. *repens* occurs on shores of lakes and rivers. The habitats are usually sandy or gravelly or have at most a thin moss or humus layer over mineral soil. The variety has also been collected from rock crevices on shores. It never occurs on peaty shores. The occurrences on lake shores extend from the normal water line to the bordering trees. The plant cover is always more or less open. The lakes by which var. *repens* occurs all seem to be rather large, with a periodically flooded treeless shore zone. In N. Finland and the Murmansk Region the habitats seem to be primarily erosion shores of larger rivers, and in Ks also lake shores.

Var. *repens* seems to be slightly apophytic, invading some hemerobic habitats near shores (see e.g. LAESTADIUS 1856). On the other hand, it clearly seems to suffer from the regulation of natural waters resulting in destruction of the shore habitats.

The range of var. *repens* in the eastern half of Fennoscandia is presented in Fig. 13. The distribution shows very little zonal differentiation, extending northwards from the southern boreal zone to the orohemiarctic zone. The taxon clearly seems to belong to KALELA's (1961a: 325—325) group of »taiga species», which are fairly tolerant of a maritime climate. The distribution is very similar to that of, e.g., *Chamaedaphne calyculata* (HULTÉN 1971 map 1374), with a perhaps more pronounced avoidance of the coastal areas (which may be partly edaphically determined). Migration into eastern Fennoscandia has evidently taken place both from the northeast, across the narrow part of the White Sea, and from the southeast, across the isthmus between the White Sea and Lake Ladoga. This is indicated by the present distribution, and KALELA's (1943, 1961a) studies on the immigration of eastern plants

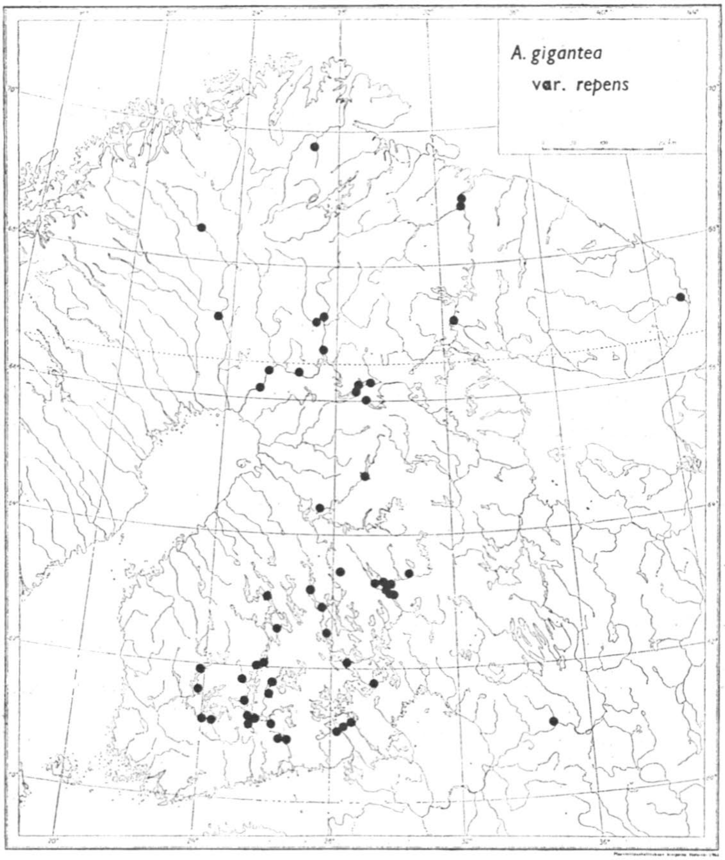


FIG. 13. The distribution of *A. gigantea* var. *repens* in the eastern half of Fennoscandia according to the specimens examined.

occurring in the forest zone. In the north the present distribution suggests that var. *repens* has migrated across the watershed into Finnish Lapland along valleys in the Kuusamo-Salla region, like many other eastern alluvial plants (see KALELA 1943). The few occurrences in Li and Lt may be the result of migration along the valley between Kandalaksha and Kola, also a migration route of other eastern alluvial plants (KALELA 1943: 49). The present distribution suggests that migration after the Boreal period has been insignificant.

In the southern half of Finland var. *repens* seems fairly frequent on the shores of larger unregulated lakes. In N. Finland it must formerly have been much commoner than today, in view of the occurrence of hybrids with *A. capillaris* and *A. stolonifera* (pp. 116—117, 124—125, Figs. 18, 22). The evident decrease in frequency can apparently partly be ascribed to a climatic deterioration occurring since its immigration, partly to competition with its hybrids. The distribution of *A.* × *bjoerkmanii* in N. Sweden suggests that var. *repens* did not, at least, extend far westward there. In the Murmansk Region and the Karelian A.S.S.R. *A. gigantea* var. *repens* is certainly much more widespread than the few scattered points in Fig. 13 indicate. KUZENEVA's (1953) »*A. alba*» is stated to occur over the greater part of the Kola Peninsula, and, judging from the description and illustration of this taxon, I suspect that these occurrences can mainly be referred to *A. gigantea* var. *repens* and *A.*×*bjoerkmanii*.

The total area of *A. gigantea* var. *repens* is not known. *Cvelev* (1964: 45) mentions an arctic type of *A. gigantea* occurring in the arctic U.S.S.R. eastwards to western Siberia, which, after studying herbarium material, I consider probably convarietal with var. *repens*. Some specimens collected by A. K. Cajander from alluvial shores along the Lena River seem likewise to correspond morphologically to var. *repens*. All these specimens were named *A. laxiflora* by A. K. Cajander and this name in A. K. CAJANDER (1903) may well largely represent *A. gigantea* var. *repens*. Non-Fennoscandian specimens of *A. gigantea* studied by me and considered to be var. *repens* are listed below:

Timanskaya Region: Indiga, 1928 A. A. Dedov (LE); Pesh River, 1892 G. Tamfiljev (LE); Sula River, 1892 G. Tamfiljev (LE), 1931 A. A. Kortshagin, M. B. Kortshagina & A. G. Shenberg (LE).

Bolshesemelskaya Region: Neruta River, 1930 V. N. Andrejev & C. Savkina (LE); Shapkina River, 1921 A. A. Grigoriev (LE), 1921 Dm. Rudnev (LE, 2 specimens.)

Middle Lena: Agrafena Island, 1901 A. K. Cajander 2020 (H, LCU); between Yakutsk and the mouth of the Aldan, 1901 A. K. Cajander 2021 (LCU).

A. gigantea var. *glaucescens* Widén, var. nova

Holotypus: Fennia, N Borgå, Pellinge, W. Sandö. Gravelly sea-shore. 9.VIII.1970 K. G. Widén (H). Ic. 37 d.

Diagnosis: Planta alta — mediocriter alta, (20—) 40—130 cm alta. Caulis plerumque erectus. Folia ± glaucescentia, laminis vaginisque ± laevibus. Vaginae basales culmorum interdum leviter antocyani colore, vaginae supraterraneae innovationum plerumque antocyani colore.

Tufted, perennial. Culms usually erect, stiff, about (20—) 40—130 cm tall. Leaf laminae usually rather long, narrow (up to 7 mm wide) and pointed, smooth—scabrous on upper side, smooth—subscabrous on under side, in second culm leaf basal half of under side smooth — nearly smooth; sheaths smooth; laminae and sheaths usually ± glaucescent, as young darker and then gradually becoming more yellowish; sheaths on young vegetative shoots often purplish, basal sheaths of the culm sometimes lightly purplish. Panicle greenish or brownish purple, semicontracted after flowering.

A. gigantea var. *glaucescens* is a sea-shore plant growing on the coasts of Finland and N. Sweden, as is seen in Fig. 14. I have also seen herbarium specimens from Hls in Sweden (collected by T. Vestergren, in S), just outside the area of Fig. 14. No other localities are known yet. An almost identical

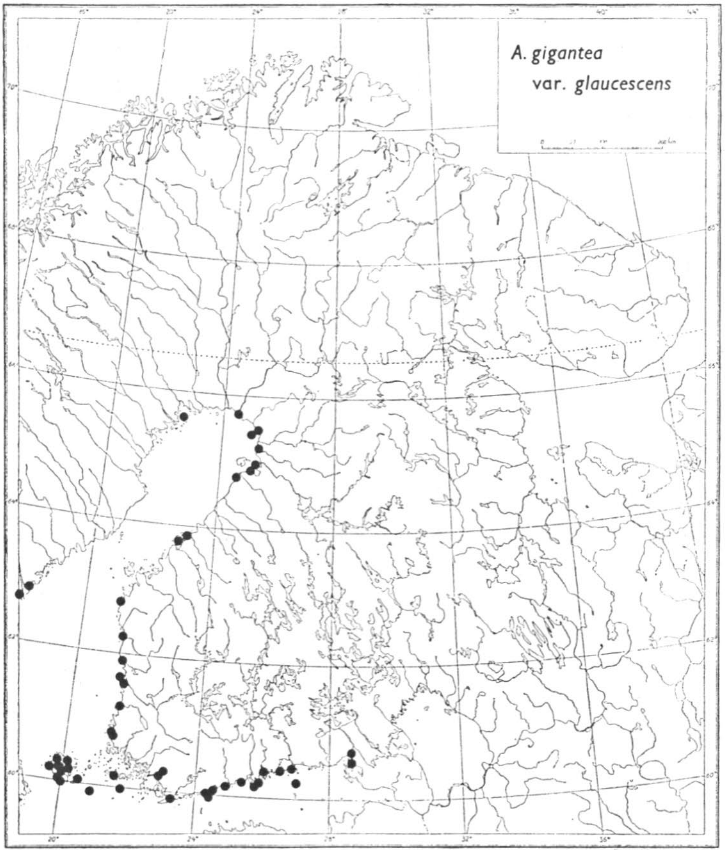


FIG. 14. The distribution of *A. gigantea* var. *glaucescens* in the eastern half of Fennoscandia according to the specimens examined.

distribution is shown by *Eleocharis palustris* ssp. *palustris* var. *Lindbergii* (STRANDHEDE 1961, 1966, STRANDHEDE & DAHLGREN 1968), for which STRANDHEDE (1961) supposes an eastern origin. *A. gigantea* var. *glaucescens* may prove an endemic sea-shore plant in the Baltic area, thus joining group 47 c of HULTÉN (1950), containing *Cuscuta europaea* var. *halophyta*, *Euphrasia bottnica*, *Myosotis baltica*, *Atriplex longipes* ssp. *praecox*, *Deschampsia bottnica* and *Artemisia borealis* ssp. *bottnica*, to which *Juncus articulatus* var. *hylandri* was recently added (HÄMET-AHTI 1966). Morphologically var. *glaucescens* is rather similar to var. *repens*. When cultivated side by side, however, the two taxa maintain their characteristics, though some overlapping in the morphological variation is evident. Considering the geographic isolation of the two taxa, I regard taxonomic recognition at the varietal level as justified despite the morphological overlapping.

The habitats of *A. gigantea* var. *glaucescens* are sea-shores, preferably gravelly shores with ± open plant cover in the suprasaline belt (see p. 90). Occurrences in rock crevices and in shore meadows with a more closed plant cover are known, too. Common accompanying plants are *Agrostis stolonifera* (most abundant somewhat lower on the shore), *Elytrigia repens* var. *maritima, Festuca rubra, Phalaris arundinacea, Juncus arcticus* ssp. *balticus* (along the Gulf of Bothnia), *Vicia cracca, Leontodon autumnalis,* etc. In the archipelago the plant probably occurs mainly in the two middle zones (in the sense of HÄYRÉN 1948), being rare in the outermost and innermost zones. My experience suggests that the variety may be common in many places along the coasts of the Gulfs of Finland and Bothnia but, unlike *A. stolonifera,* it is nowhere very abundant.

Other infraspecific taxa of *A. gigantea*

When var. *gigantea,* var. *glaucescens* and var. *repens* are removed, the remaining material of *A. gigantea* from the eastern half of Fennoscandia is still heterogeneous. It consists mainly of plants from ± hemerobic habitats. This material includes the tallest culms (up to 1.5 m) and the broadest leaves (up to 1.2 cm). The panicles are often richer in spikelets than in the two indigenous varieties, and have frequently numerous short branches, and may often remain quite open after flowering. Most of the variation reported in the description of the species (pp. 97—99) is encountered among the hemerochorous types. Glaucescent colour and completely smooth leaves seem, however, to occur only in var. *glaucescens,* while specimens with stolons and procumbent branching culms must evidently be referred to var. *gigantea.* Some specimens from hemerobic habitats not very close to shores greatly resemble var. *repens* (e.g. the specimens from Kl Suistamo, Kb Suoyarvi and Ks Kuolayarvi, Ala-Kurtti). The representatives of *A. gigantea* from hemerobic habitats certainly comprise taxa of different origin, which deserve taxonomic recognition. On the basis of the available material I have not, however, been able to make any taxonomic subdivision.

As already noted (p. 101), the name var. *gigantea* cannot on morphological grounds be used for most of the hemerochorous types of *A. gigantea* in eastern Fennoscandia. They all fall within the limits of variation of *A. gigantea* var. *dispar* (Michx) Philipson, as described by PHILIPSON (1937), and this name can evidently be used, as is done here, at least until further taxonomic subdivision is made. *A. dispar* Michx was described from South Carolina in the USA, where the plant occurs only as introduced. *A. alba? γ elata* BL. 1847 may be an older name at varietal level, but in the absence of type material (not present in BRSL, C, GB, O), its correct application is unknown.

From PL in Sweden specimens of *A. gigantea* have been collected (se p. 151) which, though otherwise similar to var. *repens*, are very dwarf (only about 15—40 cm tall; Fig. 31). The habitats are lake or river shores, where this type is very probably indigenous. Similar specimens collected in Jmt in Sweden have been seen by me (collected by Th. Lange, in TURA). Whether this type of *A. gigantea* occurs elsewhere in western Fennoscandia is unknown to me. At present I prefer not to include the specimens in any of the infraspecific taxa of *A. gigantea* here treated. A study of material from western Fennoscandia may reveal the taxonomic position of the indigenous N. Swedish type more exactly.

Var. *dispar* has been collected from a wide variety of hemerobic, often rather dry habitats, such as hay, potato and corn fields and their margins, gardens, arable or waste land in harbours, towns and villages, on roadsides, railway embankments, etc., usually avoiding very dense communities. The origin of the populations of var. *dispar* occurring in the eastern half of Fennoscandia is largely unknown. Some seed of var. *dispar* has been sold for lawns. According to information from some importers (Kesko Ltd., Hankkija Ltd.), the seed used recently has been of Polish origin, but has not proved very suitable (oral communication). Information about earlier imports is impossible to obtain as the species was united with *A. stolonifera* as *A. alba* coll. The taxon may also have been spread with timothy and clover hay seeds, as *Agrostis* spp. were listed by KITUNEN (1921: 12) as some of the most abundant weeds among these seeds. In North America the species has been extensively cultivated for hay and on pastures (in addition to being used as a lawn grass, HITCHCOCK 1951: 341). No cultivation in Finland for hay production is known to me. Var. *dispar* has been collected from most parts of the eastern half of Fennoscandia (Fig. 15). It is probably fairly common in S. Finland up to northern Ob and southern Ks. In Norway and northern Sweden it seems very rare. From the Soviet part of Fennoscandia very few specimens have been seen by me. However, RAMENSKAJA's (1960) and ŠIŠKIN's (1955) information about »*A. alba*» in the Karelian A.S.S.R. and the Leningrad Region suggests that it is widely distributed there, too.

Since *A. gigantea* has only very recently been consistently separated from *A. stolonifera* coll., its total area is not very well known. HULTÉN (1968: 100) recently gave a map of the distribution in the northern hemisphere: the distribution covers N. Africa north of the Atlas mountains, almost the whole of Europe, and large parts of Siberia to the Lena River in the east. Isolated areas are marked by HULTÉN in the Anadyr region, Japan, S.E. China and the Pamir region. SOKOLOVSKAJA (1937 b) has discussed the variability and economic utility of *A. gigantea* in the Russian part of Eurasia. Geographical differentiation of morphological characters was reported by SOKOLOVSKAJA,

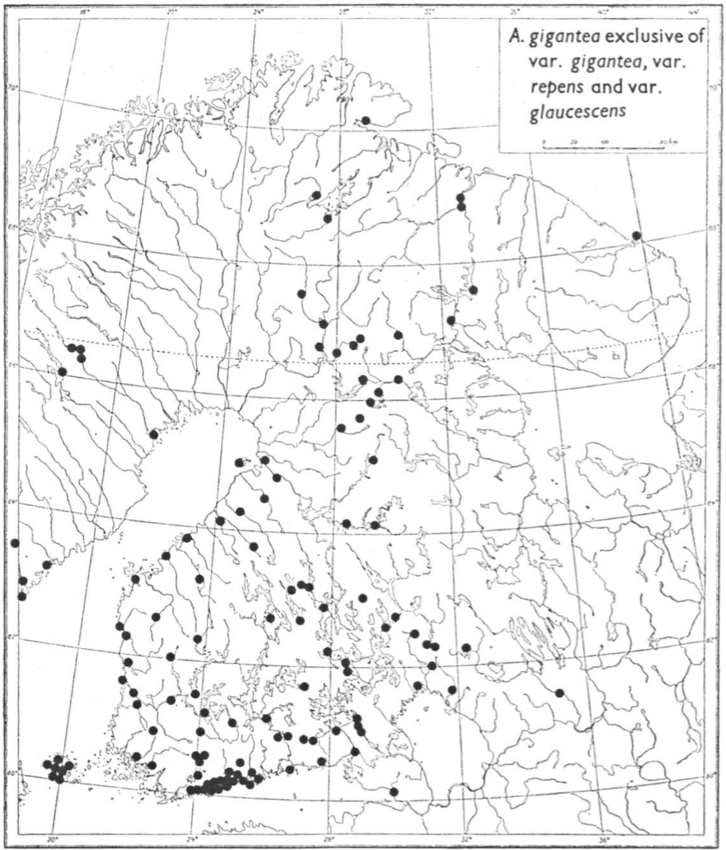


Fig. 15. The distribution of *A. gigantea*, exclusive of var. *gigantea*, var. *repens* and var. *glaucescens*, in the eastern half of Fennoscandia according to the specimens examined.

but no infraspecific taxa were described. The types reported by her all seem to exclude *A. gigantea* var. *gigantea*, so that this is perhaps a west European taxon (cf. Ascherson & Graebner 1899: 177 sub nom. *A. nigra*). *A. gigantea* seems to have spread considerably hemerochorously in the Eurasian area. The distribution of indigenous *A. gigantea* is not exactly known. Outside Eurasia the species is reported to occur only as introduced. The area in North America extends (according to Hultén 1968) through the whole continent and lies mainly between 40—50° N. lat., though extending on the western coast to southern Alaska in the north and to about 35° N. lat. in the south. A. S. Hitchcock (1951: 341) mentioned both var. *gigantea* (sub nom. *A. nigra;* rare) and var. *dispar* (sub nom. *A. alba;* commoner) from North America, but considered them both to be introduced from Eurasia. As introduced the species is known from southernmost Greenland (Böcher & al. 1968), Australia and New Zealand (Philipson 1937).

C. Interspecific hybrids

1. *Introduction*

The first report of an *Agrostis* hybrid was probably given by Mercier (in Reuter 1861: 300), who described »*A. canino—vulgaris*» from Geneva in Switzerland. Later Murbeck (1898), however, doubted whether the specimens described really represented *A. canina* × *vulgaris*. 18 years later the same hybrid was again reported, now from Prussia, by Sanio (1889: 107).

Right at the end of the 19th century Murbeck (1898) wrote that he had found that the difficulties encountered in the determination of taxa of the genus *Agrostis* were due to the fact that »hybridization played a not unimportant role within the genus» (original in Swedish). Murbeck stressed that the hybrids had decreased fertility or were quite sterile in respect to both pollen and seed formation, and thus could be identified. In his work, which is a classic in Nordic *Agrostis* research, Murbeck (1898) described the hybrids »*A. stolonifera* × *vulgaris*», »*A. canina* × *stolonifera*», »*A. borealis* × *stolonifera*» and »*A. canina* × *vulgaris*», of which the first three had not been reported before. Some twenty years later Weber (1920) described thoroughly an *Agrostis* from northern Germany, which he called *A. intermedia*. He showed that this was intermediate between »*A. alba*» (probably = *A. stolonifera*) and *A. vulgaris* (= *A. capillaris*). It was intermediate in respect to its ecology, too, and Weber thought that it was a hybrid, but a very interesting one because it had very efficient vegetative reproduction, locally forming large stands. Other workers made similar observations in respect to this taxon, e.g. Fouillade (1911, 1932) in France, Jansen & Wachter (1934: 215) in the Netherlands and Bradshaw (1958) in Great Britain.

In 1953 Davies reported very interesting results obtained by experimental crossing of British *Agrostis* species. Davies obtained most of the possible hybrid combinations. Some hybrids were nearly wholly sterile in respect to seed production, while *A. capillaris* × *gigantea* and *A. gigantea* × *stolonifera* were as fertile as their parent plants. Jones (1956a, b, c) showed that low seed fertility was paralleled by marked pollen sterility. Extensive experimental crossings have also been made by S. O. Björkman in Sweden, but he published only one very short communication (Björkman 1954a) about successful crosses.

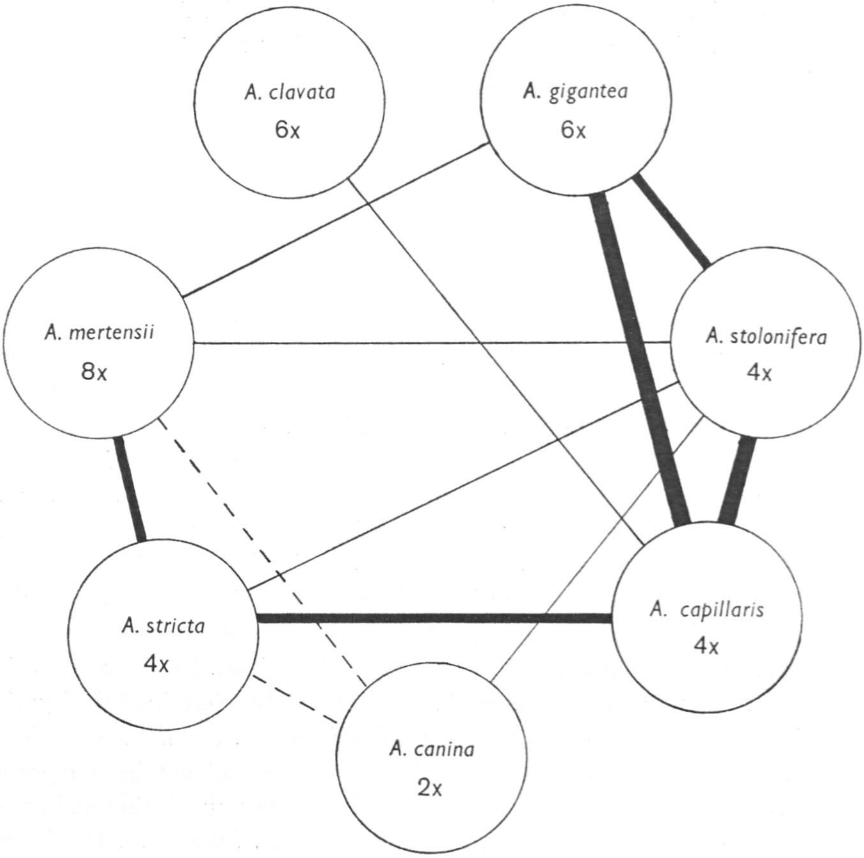


FIG. 16. Diagram summarizing the knowledge of the hybridization between the different Fennoscandian *Agrostis* species. Thick connecting lines indicate evidently frequent hybridization in large parts of the investigation area. Medium connecting lines indicate that hybridization is restricted to some regions of the investigation area, where the hybrid may, however, be locally frequent and abundant. Thin connecting lines indicate that hybridization is very rare. A broken connecting line indicates that only artificial hybrids are known.

By studying the meiotic behaviour of the experimental hybrids made by DAVIES (1953), JONES (1952, 1953, 1956a, b, c) was able to draw very valuable conclusions about the genetic affinities between the species concerned.

In Fennoscandia some hybrids are rather common and occur more or less independently of their parent species. In some areas they even form an important part of the vegetation, thanks to their effective vegetative propagation.

In the evolution of genera with frequent polyploidy, hybrids must certainly be very important because they serve as raw material for the formation of allopolyploid taxa. Among the native Fennoscandian species of *Agrostis*, *A. canina* is the only diploid one, while all the others are polyploid.

The knowledge about the hybridization of Fennoscandian *Agrostis* species is summarized in Fig. 16.

2. Hybrids within sect. Agrostis

Agrostis mertensii* × *stricta

This hybrid has been experimentally produced by S.O. BJÖRKMAN (1954 a: 258), but has not been found earlier growing wild. I have found specimens which must be referred to this hybrid in four localities in N. Finland and N. Norway, and in addition I have seen three herbarium specimens from other localities (see Fig. 24, p. 132, and p. 151). Owing to the rather great similarity between *A. mertensii* and *A. stricta* (northern population group), the hybrid is hard to detect. It differs from the parent species in having non-dehiscent anthers about 1 mm long and about 1/2 the length of the lemma (being thus intermediate). Neither pollen nor seeds are formed. Extravaginal rhizomes seem always to occur in the hybrid, as in *A. stricta*, though these are extremely rare in *A. mertensii*.

On one specimen (from Trs Kvaenangen) I could count the hexaploid chromosome number (2 n=42), which is to be expected for the hybrid between *A. mertensii* (n=28) and *A. stricta* (n=14).

The habitats where I have seen *A. mertensii* × *stricta* have been gravelly shores of rivers or rivulets, both with and without a thin humus layer. There were many plants in the localities in Li Utsjoki. The vegetative propagation of this hybrid seems to be effective.

A. mertensii × *stricta* has certainly been much overlooked. *A. mertensii* seems nearly always to occur in the habitats of the northern populations of *A. stricta*, and thus there are evidently numerous opportunities for hybridization. Many new localities will most probably be detected.

Figs. 24, 36 d, 44 a, 48 m.

3. Hybrids within sect. Vilfa

***Agrostis* × *bjoerkmanii* Widén, nom. nov. (= *A. capillaris* × *gigantea*)**

Holotypus: Fennia, Ta Asikkala, Pulkkila ridge. 25.VIII.1947 J. Jalas; cult. Upsaliae, S. O. Björkman 1784, 2 n=35+3 (UPS)! Ic. 32.

Diagnosis: Planta ± caespitosa, caulibus robustis et plerumque erectis, rhizomis repentibus. Ligula foliorum mediorum 1.3—3.3 mm et inferiorum 1—2 mm longa, apice rotundata. Panicula ovoidea, post anthesin non vel parum contracta. Palea circ. 1/2—2/3 lemmae aequans. Trichodium-reticulum lemmae typo IV—VI.

Description

Tufted, perennial. *Vegetative shoots* intravaginal or extravaginal; intravaginal erect, about 1/4—1/2 (—2/3) the length of the culms; extravaginal subterranean, up to 20 cm long, stout, scaly, branched or unbranched. *Culms* usually erect, 3—5-noded, rather stout, about 50—130 cm tall. *Leaf* laminae flat, about 5—10 mm broad, 15—30-nerved, smooth or scabrous, green or somewhat glaucescent. *Ligule* obtuse — nearly truncate, about (0.5—) 1.0—2.0 mm long on shoot and lower culm leaves, about 1.3—3.3 mm long and 0.5—1.2 times as long as wide on second culm leaf, and about 2—4 mm long on uppermost culm leaf. *Panicle* ovate — elliptic with the verticils of branches more separate than in *A. capillaris*, brownish, purplish or greenish; branches patent even after flowering; branchlets and pedicels nearly smooth — scabrous, after flowering approaching the branches to greater or lesser degree. *Spikelets* about 1.8—3.0 mm long; glumes narrowly ovate — lanceolate, dorsally smooth or somewhat scabrous. *Lemma* about 1.6—2.4 mm long, ovate, obtuse, usually distinctly 3-nerved with shortly excurrent lateral nerves, rarely 5- or 4-nerved or furnished with 3 stronger and longer and 2 weaker and shorter nerves; prickle-hairs absent or scattered; Trichodium net of types III—IV. *Palea* about 1/2—2/3 the length of the lemma. *Anthers* usually thin, non-dehiscent and filled with abortive pollen, sometimes dehiscent and having up to 90 % morphologically good pollen. *Seeds* usually not set. *A. capillaris* seems to hybridize readily with *A. gigantea* var. *repens*, var. *glaucescens* and var. *dispar*.

Figs. 2, 17, 32, 38 a, b, 44 b, c, 47 a, b, 48 n, o, p, 51 g, 57 b, c.

Cytology

Stuckey & Banfield (1946) were probably the first to determine the chromosome number of *A.* × *bjoerkmanii* (see p. 67). It is, however, probable that the numerous aneuploid numbers they reported for plants raised from seeds collected in nature do not occur in nature or are very rare, as Björkman (1954a: 256—257) and Jones (1956b, c) have pointed out.

Björkman (1954a) and Jones (1956c) found the pentaploid number $2n=35$ in experimentally made F_1 hybrids between *A. capillaris* and *A. gigantea*, and in clones of *A.* × *bjoerkmanii* in nature. I found the same number in some clones collected in Sb, Om, Lk and Le (see p. 24).

In meiosis Jones (1956c) regularly found 14 bivalents and 7 univalents, but trivalents were very rare. He gave *A.* × *bjoerkmanii* the genome formula $A_1A_1A_2A_2A_3$, while that of *A. capillaris* was regarded as $A_1A_1A_2A_2$ and that of *A. gigantea* as $A_1A_1A_2A_2A_3A_3$.

Nomenclature

A. × *bjoerkmanii* is named after the Swede Sven Oskar Björkman († 1956), who has performed very thorough investigations on the cytology, taxonomy and anatomy of the genus *Agrostis* (see p. 6).

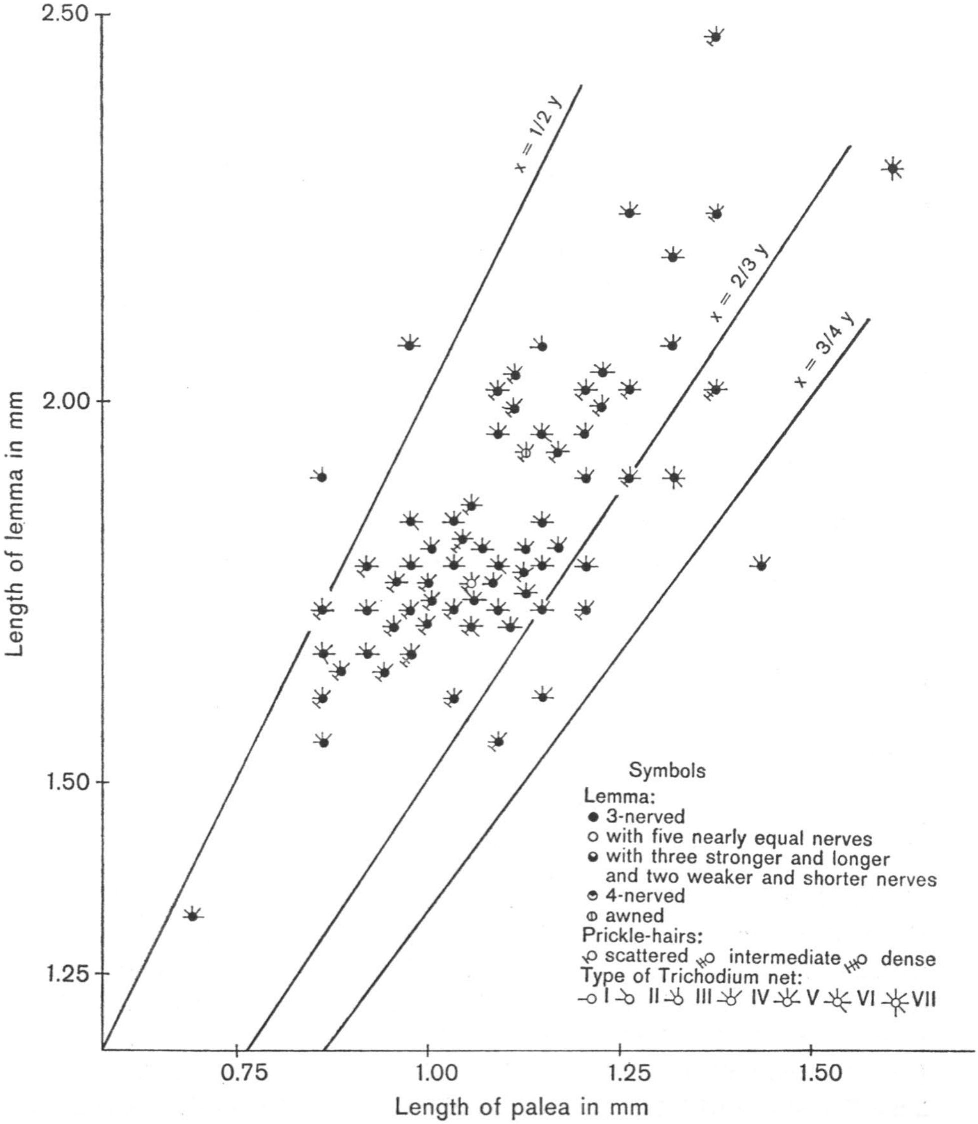


FIG. 17. Pictorialized scatter diagram illustrating the variation of some floret characters in *A.* × *bjoerkmanii*. Specimens included marked with ″ in the list of specimens studied.

Some reports in the literature of »*A. stolonifera* × *vulgaris*» may partly or wholly be based on material of *A.* × *bjoerkmanii*. Such are at least those of MURBECK (1898; see pp. 152—153) and H LINDBERG (1900; see pp. 151—152).

As *A.* × *bjoerkmanii* occurs over large areas, partly frequently and abundantly and independently of one of its parent species, I consider it practical to use a binomial rather than a formula.

Remarks on taxonomy

Both the indigenous eastern Fennoscandian types and the introduced types of *A. gigantea* seem to form hybrids with *A. capillaris* very easily. The ready formation of this hybrid was experimentally confirmed by DAVIES (1953) on material from Great Britain.

Most of the clones of *A.* × *bjoerkmanii* studied by me had sterile pollen and set no seed. Some clones with dehiscent anthers and up to 90 % morphologically good pollen were found, but these evidently all represented hybrids between introduced *A. gigantea* types and *A. capillaris*. Unlike most hybrids from the eastern half of Fennoscandia, the experimental hybrids studied by JONES (1953) were markedly fertile and produced as many seeds per panicle as their parent species. The formation of both F_2 and backcross individuals under experimental conditions has been reported by S. O. BJÖRKMAN (1954a: 257) and JONES (1956c: 397). Thus both euploid (n=14 or 21) and aneuploid hybrid gametes could function in these experiments, while only euploid (2 n=35) hybrid individuals have been found in nature (BJÖRKMAN 1954a, JONES 1956c). JONES (1956c: 398) stated that »F_1 plants have been found under natural conditions, but it is extremely unlikely that further generations are produced». I cannot quite agree with this statement of JONES, which is based on the usually low viability of aneuploid individuals and their apparent absence from nature. Account must be taken of the fact that euploid hybrid gametes are formed and really function, as is shown by experimental results obtained by BJÖRKMAN (1954a table 3): when crossing *A. capillaris* × *gigantea* (2 n=35) with pollen of *A. gigantea* (2 n=42), he obtained, in addition to 36 aneuploid plants, one individual with the number 2 n=35 and one with 2 n=42. Crossed with pollen of *A. capillaris* (2 n=28), the same hybrid clone yielded 4 individuals (out of 20) with the number 2 n=28. Similar results were obtained by JONES (1956c table 4) in a cross between *A. gigantea* (2 n=42) and pollen of *A. capillaris* × *gigantea* (2 n=35): two plants with 2 n=35 and one with 2 n=42 were obtained (out of 24 plants). The euploid gametes of *A.* × *bjoerkmanii* probably have either the constitution A_1A_2 (n=14) or $A_1A_2A_3$ (n=21), which two constitutions are the same as those of the gametes of *A. capillaris* and *A. gigantea*. Although largely homologous and having identical designations, the A_1 and A_2 genomes of *A. capillaris* and *A. gigantea* need not necessarily be completely identical, as JONES (1956c) rightly pointed out. Thus gene migration from *A. capillaris* to *A. gigantea* or vice versa does not seem to be completely prevented by the low viability in natural populations of aneuploid backcross derivatives or F_2 individuals. Similarly the variation of the pentaploid (2 n=35) hybrid cytotype may be enriched by backcrossing of euploid hybrid gametes with gametes of the parent species. ANDERSON (1948, 1949) has pointed out that hybrid derivatives resembling one of the parent species are usually the best adapted to their environment and therefore not eliminated by natural selection. In the case of *A.* × *bjoerkmanii* pentaploid hybrids seem very well adapted, too. The modern opinion seems to be that different levels of polyploidy need not form an effective barrier to gene migration, either in the case of autopolyploidy or allopolyploidy, though the aneuploid hybrid derivatives have very low viability (LEWIS 1967, DAVIS & HEYWOOD 1963: 224).

Within the eastern half of Fennoscandia *A.* × *bjoerkmanii* is very variable in respect to most characters. This variation is partly due to to the fact that the parent species are variable, and at least most different types are able to form hybrids with the other species. In my opinion the variation may be observed to trend towards the parent species (see Fig. 17). Likewise specimens somewhat deviating in the direction of the hybrid occur in the parent species, especially in *A. capillaris* (see Fig. 8). This variation in *A. capillaris*, *A. gigantea* and *A.* × *bjoerkmanii* might be due to gene migration occurring through euploid hybrid gametes.

When binary names are used for hybrids, according to the Code (article H.1), »all descendants of crosses between individuals of the same parent species receive the same binary name». Taxa formed by introgression are, however, regularly taxonomically treated as belonging to the parent species, and not to the hybrid (see e.g. DAVIS & HEYWOOD 1963: 472). In the case of *A. capillaris* and *A. gigantea* individuals deviating only slightly in the direction of the other species are here treated as belonging to the species and not to the hybrid, partly because the hybrid derivation of such variation must be regarded as an open question. The individuals here treated as *A.* × *bjoerkmanii* are intermediate in respect to several characters.

Very interesting are clones from the shores of the Muonio River in Le and Lk, which by Montell in schedis (TURA) have been named *A. tenuis* f. *riparia*. These male and female sterile clones resemble *A.* × *murbeckii* in many respects: the culms are rather low (up to 30 cm tall), the panicles are rather narrow and small, and their lemmas are four- or five-nerved. Fig. 38 a shows one such clone cultivated in the Botanical Garden. The chromosome number $2\,n=35$ was, however, determined for two clones from Le Enontekiö, Lassinoja, which is in conformity with *A.* × *bjoerkmanii*, while the chromosome number of *A.* × *murbeckii* would probably be $2\,n=28$.

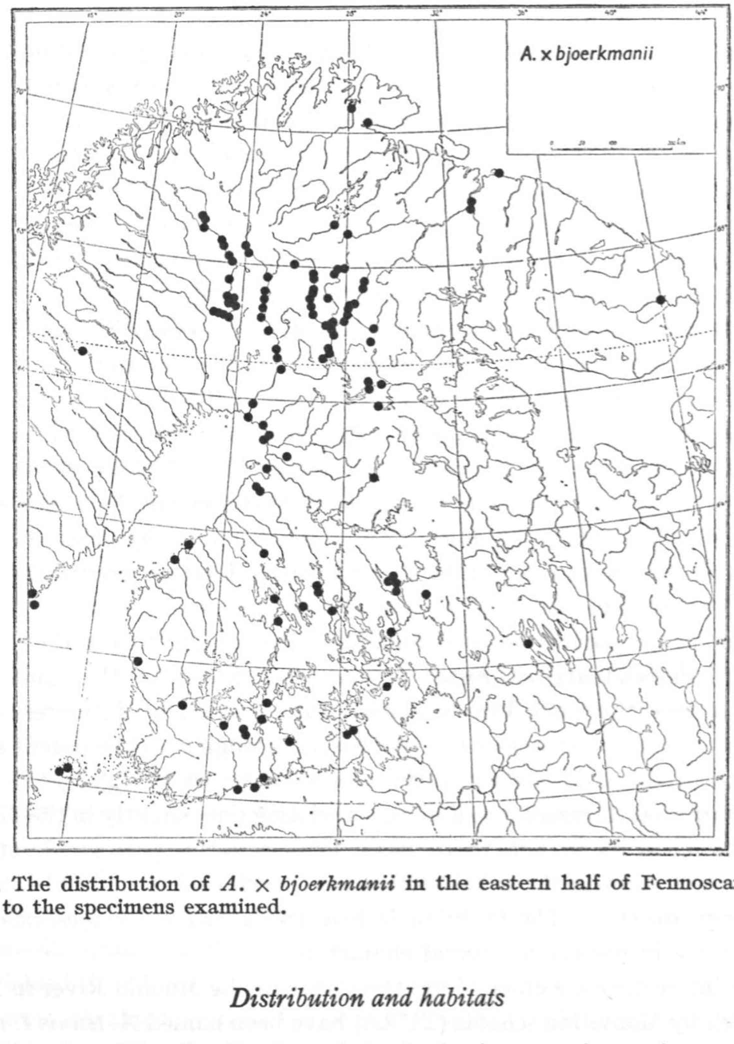


Fig. 18. The distribution of *A.* × *bjoerkmanii* in the eastern half of Fennoscandia according to the specimens examined.

Distribution and habitats

Fig. 18 shows the distribution of the herbarium specimens here regarded as *A.* × *bjoerkmanii*. Along the coasts of the Gulfs of Finland and Bothnia *A. capillaris* and *A. gigantea* var. *glaucescens* frequently grow together. My observations indicate that the hybrid is frequent and easily formed there. It regularly occurs just outside and among the most seaward trees or bushes (usually alder) closer to *A. capillaris* than to *A. gigantea.*

The introduced types of *A. gigantea* nearly always grow together with *A. capillaris*. Hybrids are frequently formed and sometimes they have been collected also occurring independently of *A. gigantea.*

A. gigantea var. *repens* and *A. capillaris* hybridize frequently all over the distribution area of the former taxon. The hybrid is frequently abundant.

It is very interesting to note the wide distribution, frequency and great abundance of *A.* × *bjoerkmanii* (evidently representing *A. gigantea* var. *repens* × *capillaris*) on river shores in northern Ob, in Lk and southern Le and Li in Finland, because *A. gigantea* var. *repens* at least nowadays is very rare on these shores (cf. p. 103). The habitats in northern Finland include mainly ± sandy or gravelly erosion shores of larger rivers and in addition lake shores in Ks. The hybrid has very effective vegetative propagation thanks to its rhizomes and often occurs abundantly. It grows among low shore willow bushes, but avoids or is sparse in meadow communities with a closed plant cover. I have seen some colonization by *A.* × *bjoerkmanii* of roadsides and cultivated fields in Ks and Lk lying near its shore sites. Although seeds are only rarely set, rather long-distance dispersal certainly occurs down the rivers with the aid of rhizome fragments.

The frequency of *A.* × *bjoerkmanii* in the Karelian A.S.S.R. and Murmansk Region is not known, but it may well be rather frequent there. KUZENEVA's (1953) figure of »*A. alba*» is in my opinion *A.* × *bjoerkmanii*.

The hybrid is probably rare in northern Norway and Sweden as *A. gigantea* is infrequent there.

Agrostis × *murbeckii* Fouillade (= *A. capillaris* × *stolonifera*)

A. × *Murbeckii* FOUILLADE 1932: 799. — Typus incognitus.
A. × *intermedia* C. A. WEBER 1920: 18 non BALBIS 1800: 85.

Description

Tufted, perennial. *Vegetative shoots* few—numerous, intra- and extravaginal; intravaginal short — long, erect or ascending; extravaginal at first usually subterranean, frequently branching, scaly, then aerial and ascending or erect. *Culms* erect or decumbent and often branched at base and then geniculately ascending, about 20—60 cm tall, smooth, 2—4-noded. *Leaf* laminae green, about 2—6 mm wide and 3—15 cm long, about 10—30-nerved, smooth or scabrous; sheaths green or purplish, smooth. *Ligule* obtuse, about 0.7—2.0 mm long on vegetative shoots and lower culm leaves, and about 1.0—3.0 mm long and about 0.5—1.2 times as long as wide on second culm leaf, and up to 4.5 mm long on uppermost culm leaf. *Panicle* about 3—10 cm long, lanceolate — narrowly ovate, brownish or greenish; branches patent or slightly raised after flowering, when branchlets and pedicels approach the branches; pedicels and branchlets smooth, slightly scabrous or intermediately scabrous. *Spikelets* about 2.0—3.5 mm long; glumes lanceolate — narrowly ovate, frequently scabrous on the upper half of the keel. *Lemma* about 1.7—3.3 mm long, ovately lanceolate, obtuse, frequently with three stronger nerves ending at the edge of the lemma, or shortly excurrent, and two weaker and somewhat shorter nerves or with three, four or five equal nerves; prickle-hairs absent or scattered on the surface of lemma; awn usually absent, or rather short and straight, projecting from the middle of the lemma; Trichodium net most often of types II—IV. *Palea* varying from about 1/2 to 3/4 the length

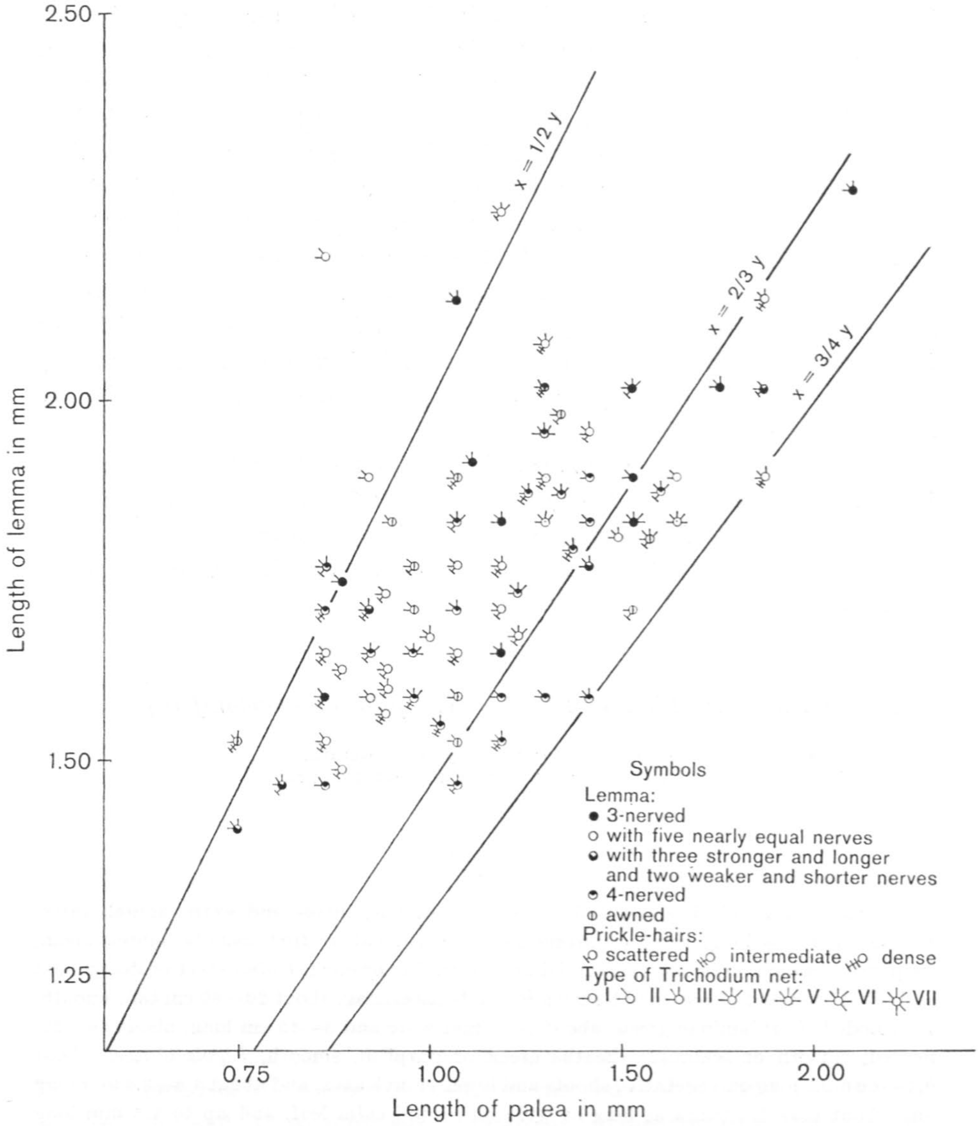


FIG. 19. Pictorialized scatter diagram illustrating the variation of some floret characters in *A.* × *murbeckii*. Specimens included marked with ″ in the list of specimens studied.

of the lemma. *Anthers* thin, usually yellow, mostly non-dehiscent; pollen grains largely empty; seeds usually not set.

All types of *A. stolonifera* seem to hybridize with *A. capillaris*. The great variability of especially the former species is also reflected in *A.* × *murbeckii*.

Figs. 2, 19, 38 c, d, 44 d, e, 47 c, d, 48 q, r, 51 h, 58 a.

Cytology

Jones (1953, 1956b) has studied the meiotic chromosomes of experimentally made hybrids between *A. stolonifera* (2 n = 28) and *A. capillaris* (2 n = 28). Usually only bivalents and univalents occurred, while tri- or quadrivalents could only rarely be observed. The number of univalents ranged from 3.5 to 13.4 per cell. Jones (1956b: 389) concluded that one pair of the genomes of *A. stolonifera* and *A. capillaris* show good homology, while there is only partial homology between the other two. He gave the hybrid the genome formula $A_1A_2A_2A_3$, while the genomes of *A. stolonifera* were designated as $A_2A_2A_3A_3$ and those of *A. capillaris* as $A_1A_1A_2A_2$,

Hybrids are known to serve as raw material for the formation of allopolyploid taxa. Judging from the genome formula given to it by Jones (1956c: 398), *A. gigantea* may have arisen from the fusion of $A_1A_2A_3$ gametes of *A.* × *murbeckii.*

Nomenclature

Murbeck (1898) was the first to describe this hybrid. The oldest binomial, *A.* × *intermedia,* was given by C. A. Weber (1920). This cannot be used, however, owing to the existence of an older homonym, namely *A. intermedia* Balbis (1800: 85; according to the protologue intermediate between »*A. pumila*» and »*A. alpina*»).

Although I have not seen any type material I consider the identity of *A.* × *murbeckii* quite clear. Fouillade (1932) gives a detailed description which clearly eliminates *A.* × *bjoerkmanii* (= *A. capillaris* × *gigantea*).

Remarks on taxonomy

A. × *murbeckii* is the hybrid *A. capillaris* × *stolonifera,* as is shown by its morphology, cytology and the fact that it mainly occurs together with the parent species. In view of the frequency and abundance (pp. 120—121) of this hybrid it seems to me convenient to designate it with a binomial rather than with a formula.

A. × *murbeckii* is mostly clearly intermediate between its parent species. As these, especially *A. stolonifera,* are very variable, a parallel variability is encountered in *A.* × *murbeckii.* In the eastern half of Fennoscandia the hybrid is at least mostly sterile. Some few seeds are only exceptionally observed, and the anthers are thin, yellow, non-dehiscent, and contain almost wholly abortive pollen. Most clones seem to be F_1 hybrids which, however, can spread very effectively vegetatively. Some clones with dehiscent anthers and partially good pollen have been observed. They may represent back crosses or possibly an F_2 generation, which, however seem to be rare as, in my experience at least, the distinction between flowering individuals of *A.* × *murbeckii* and its parent species from the same locality is clear-cut.

The literature contains reports that somewhat contradict the above observations and indicate that sterility may not always be constant in *A* × *murbeckii* (WEBER 1925, FOUILLADE 1932). The explanation may be that different races of the highly variable parent species may have slightly different genetic affinities to one another. Another explanation may be the phenomenon found by LJUBIMOVA (1962), in some grasses, that air humidity and temperature may greatly influence the production of viable pollen and the dehiscence mechanism of the anthers.

Habitats

Most specimens of *A.* × *murbeckii* have been collected from sea-shores (see p. 153). There it is ecologically clearly intermediate between its parent species. On the shores of the Gulfs of Bothnia and Finland *A. stolonifera* has its main occurrence in the saline shore belt (cf. p. 90), while *A. capillaris* occurs higher up in the upper part of the suprasaline belt among and just outside the most seaward trees. *A.* × *murbeckii* has its main occurrence in the lower part of the suprasaline belt. The habitats include shore meadows, sandy and gravelly shores, rock crevices and mossy temporary rock-pools. In consequence of its very effective vegetative propagation, the hybrid is frequently locally abundant. Grazing is advantageous to it. On treeless cliffs with a rich bird fauna, the hybrid may occur far away from the influence of sea-water.

In northern Norway *A.* × *murbeckii* was seen by me growing just in and around the uppermost seaweed wracks. *A. capillaris* grew just above it, e.g. in mats of *Empetrum,* while *A. stolonifera* was found abundantly much lower on the shore in low-lying marshes at river mouths.

Distribution

In the eastern half of Fennoscandia *A.* × *murbeckii* has been collected from scattered localities, mainly along the coasts but also inland (Fig. 20). The hybrid seems to be very easily formed everywhere where the parent species meet, which is confirmed by experimental evidence (DAVIES 1953). However, owing to the variability of the parent species and resultant difficulties in determination, it has frequently been overlooked. My experience suggests that the hybrid will prove common all around the coasts of Finland

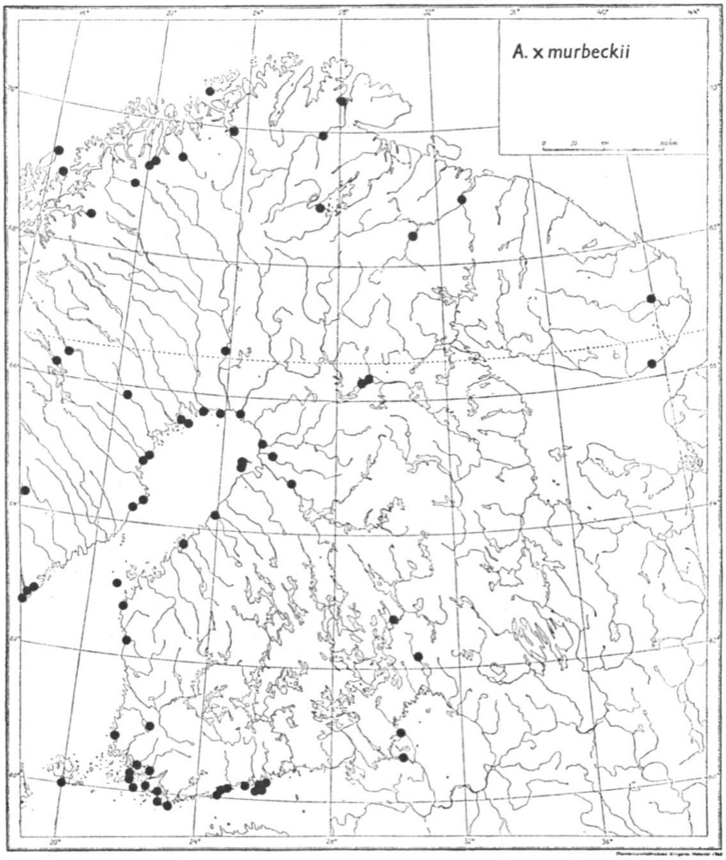


FIG. 20. The distribution of *A.* × *murbeckii* in the eastern half of Fennoscandia according to the specimens examined.

and Sweden. In northern Norway it is certainly rarer owing to the lower frequency of *A. stolonifera* (cf. p. 90).

In 1900 H. LINDBERG reported *A.* × *murbeckii* from 10 localities in eastern Fennoscandia, all in the inland. As *A. gigantea* was then included in *A. stolonifera*, a revision of these records is necessary. In my opinion most of the specimens belong to *A.* × *bjoerkmanii* (see pp. 151—152), while one represents *A. capillaris* (see p. 142) and one *A. gigantea* × *stolonifera* (see p. 154). Some of the localities listed by MURBECK (1898) for the hybrid likewise belong to *A.* × *bjoerkmanii* (see pp. 152—153). Outside Fennoscandia *A.* × *murbeckii* has been reported from at least Germany (WEBER 1920, PAUL 1921 and SUESSENGUTH 1936: 308), France (FOUILLADE 1911, 1932, CAMUS 1958: 349), the Netherlands (JANSEN & WACHTER 1934: 215, JANSEN 1951: 66), Great Britain (BRADSHAW 1958) and Canada (MALTE 1928: 123).

Agrostis gigantea × *stolonifera*

Description

Tufted, perennial. *Vegetative shoots* intravaginal or extravaginal; intravaginal mostly elongated as decumbent stolons; extravaginal at first pale subterranean and scaly, then ascending and forming aerial shoots. *Culms* about 15—50 cm tall, 2—4-noded, decumbent and geniculately ascending, or erect. *Leaf* laminae about 2—5 mm broad, 10—20-nerved, somewhat scabrous, green; sheaths usually green, somewhat scabrous or smooth. *Ligule* obtuse, about 1.5—2.0 mm long on lower culm and shoot leaves, about 1.5—3.0 mm long and 0.75—1.3 times as long as wide on second culm leaf, and up to 4 mm long on uppermost culm leaf. *Panicle* narrowly ovate, oblong or lanceolate, about 3—10 cm long, greenish or lightly purplish; branches dividing at about 1/3—1/2 their length, patent after flowering; branchlets and pedicels usually very scabrous and approach the branches after flowering. *Spikelets* about 1.8—2.4 mm long; glumes narrowly ovate — lanceolate, smooth — somewhat scabrous on the keel. *Lemma* about 1.5—2.1 mm long, ovate, obtuse — blunt, furnished with 3 stronger nerves ending at the edge of the lemma, and 2 weaker ending at about 2/3 the length of the lemma, or 3-nerved with the nerves ending at the edge of the lemma, or sometimes 5- or 4-nerved; prickle-hairs absent or scattered; Trichodium net of types V—VII. *Palea* mostly about 2/3—3/4 the length of the lemma. *Anthers* non-dehiscent with morphologically bad pollen. No seeds set.

Figs. 21, 39 a, b, 45 a, b, 47 e, 48 s, 51 i, 58 b.

Cytology

A pentaploid chromosome number could be determined by me (see p. 24) for one clone from Li Inari. The same number has been found by S. O. Björkman (see p. 154) in one clone from Ks Kuusamo.

JONES (1956 c) studied meiosis in material of *A. gigantea* × *stolonifera* ($2n = 35$) which comprised both experimentally made clones and clones from natural habitats, and regularly found 14 bivalents and 7 univalents. According to JONES, the constitution of the hybrid is $A_1A_2A_2A_3A_3$.

Remarks on taxonomy

A. gigantea × *stolonifera* is one of the hybrids very easily produced in hybridization experiments by DAVIES (1953) with material from Great Britain. When pollinated naturally these hybrids even produced seeds with rather good germination (DAVIES 1953), and up to 30 % morphologically good pollen (JONES 1956c). Also BJÖRKMAN (1954a: 258; probably Swedish material) lists the hybrid between *A. gigantea* and tetraploid *A. stolonifera* in the list of successful combinations.

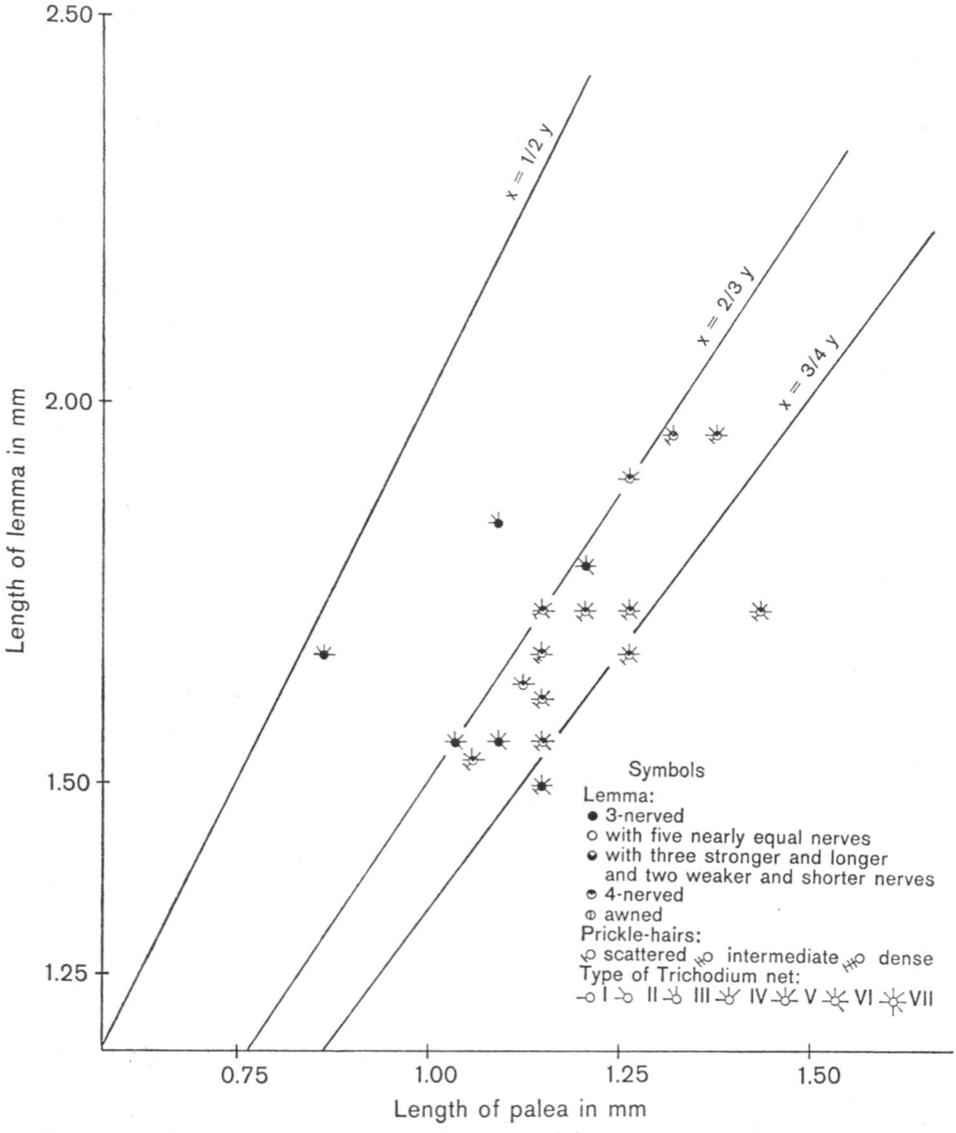


Fig. 21. Pictorialized scatter diagram illustrating the variation of some floret characters in *A. gigantea* × *stolonifera*. Specimens included marked with ″ in the list of specimens studied.

A. stolonifera and *A. gigantea* var. *glaucescens* are sympatric and occur very often together all along the coasts of the Gulfs of Finland and Bothnia. Despite rather extensive search I have been unable to find any hybrids between these taxa there. Although they flower at somewhat different times

(*A. gigantea* flowers most intensively about two weeks later than *A. stolonifera*), overlapping in flowering time regularly occurs and the absence of hybrids cannot depend wholly on this difference. It seems very probable that the infraspecific taxa of *A. stolonifera* and *A. gigantea* differ in their ability to form interspecific hybrids with one another. Nearly all the individuals listed here as *A. gigantea* × *stolonifera* are putative hybrids between the northern inland type of *A. stolonifera* and *A. gigantea* var. *repens* or the little-known indigenous *A. gigantea* type from Swedish Lapland. These hybrids all had closed anthers with aborted pollen and did not set any seeds, thus clearly differing from the hybrids from Great Britain studied by DAVIES (1953) and JONES (1956 c).

Although otherwise similar, the hybrids from Finnish and Swedish Lapland differ clearly from one another in one respect: the individuals collected from Finnish Lapland have nearly always three stronger and two weaker nerves on their lemmas, while the individuals from PL in Sweden are characterized by three equal nerves.

Some herbarium specimens considered by me to be uncertain *A. gigantea* × *stolonifera* are listed below:

Finland, N Helsinki, Munkholmen, filling earth, 1953 E. Häyrén (H). This might be a cross between *A. gigantea* var. *gigantea* and *stolonifera*. The specimen has culms richly branching at the base. The anthers are non-dehiscent.

Finland, Ob Kiiminki, Ylikylä. Islet in Kiiminkijoki below Koitelinkoski, 1963 T. Ulvinen (H, OULU).

Sweden, TL Karesuando, 1840 L. L. Laestadius (UPS). This herbarium sheet contains one specimen with a slender geniculate culm and small narrow acute panicle, thus resembling *A. stolonifera* very much. The lemma is, however, 3-nerved and clearly narrower than in *A. stolonifera*. The anthers are non-dehiscent. The specimen might represent *A. gigantea* × *stolonifera* but this cannot be considered certain because of the scanty material.

Distribution and habitats

Fig. 22 shows the known distribution of *A. gigantea* × *stolonifera* in the eastern half of Fennoscandia. The habitats include ± open sandy or gravelly shores of rivers, lakes or brooks. A thin moss cover may occur, and the hybrid may grow among the bushes closest to the shoreline, even when an open shore belt is absent. The habitats of this hybrid are rather similar to those of *A. stricta* in northern Finland, and like *A. stricta* it extends also to the shores of smaller rivers and lakes than *A.* × *bjoerkmanii*.

In Finland *A. gigantea* × *stolonifera* has been collected from numerous localities in Ks and Li and seems to be ± common along the Utsjoki and Tana Rivers in Li, and perhaps also along some rivers and lakes in Ks. The northern inland type of *A. stolonifera* occurs in these regions, but is, at least in Li,

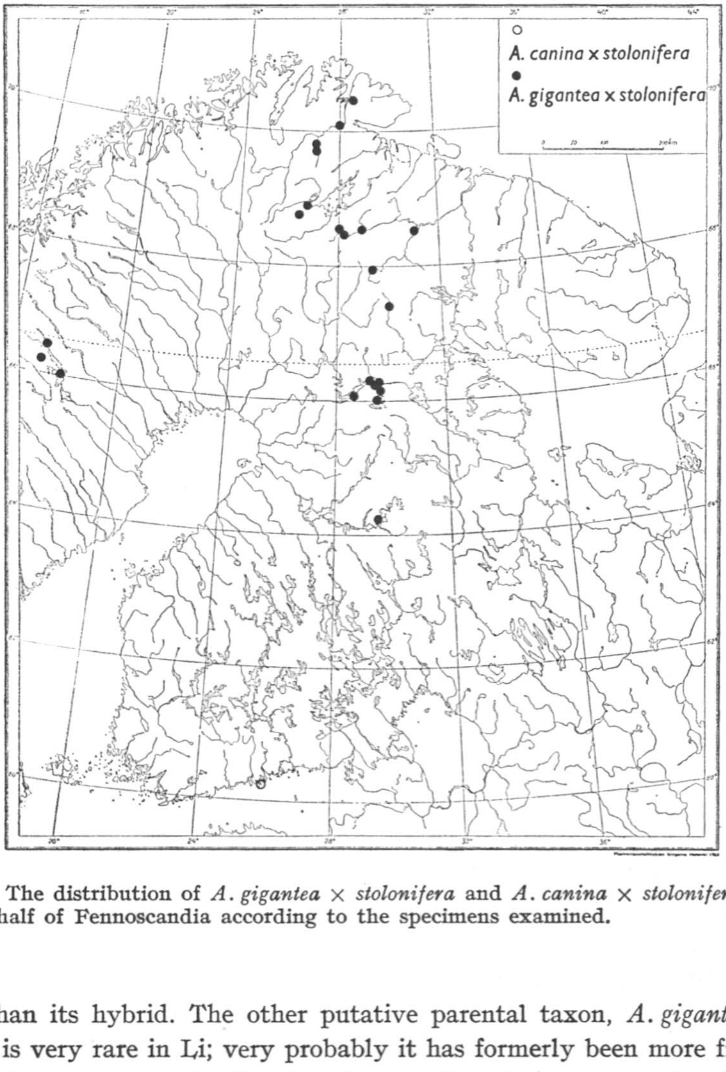


Fig. 22. The distribution of *A. gigantea* × *stolonifera* and *A. canina* × *stolonifera* in the eastern half of Fennoscandia according to the specimens examined.

rarer than its hybrid. The other putative parental taxon, *A. gigantea* var. *repens*, is very rare in Li; very probably it has formerly been more frequent there. *A. gigantea* × *stolonifera* has been collected from some localities in PL in Sweden (cf. Lundquist 1970), but its frequency and distribution there seem still to be poorly known.

Outside the eastern half of Fennoscandia *A. gigantea* × *stolonifera* has been reported at least from Great Britain (Davies 1953: 316). Blom (1961: 67) listed one locality from S. Sweden. His specimens: »Västergötland, Nödinge. N. Surte in ruderatis inter parentes. 19. VII. 1954, 23. VII. 1955 C. Blom (UPS)» have been regarded by me as belonging to this hybrid.

4. Intersectional hybrids

Agrostis canina* × *stolonifera

A. × *Castriferrei* auct. an etiam Waisb. 1905 (vide p. 37): HYLANDER 1966: 434.

I have seen specimens that can be referred to this hybrid from only one locality in the eastern half of Fennoscandia (N Borgå, see p. 154). They have about 30—40-cm-tall, 4-noded, ascending culms. The vegetative shoots are all ascending intravaginal stolons. The leaves are rather narrow and scabrous on both sides, with long narrow ligules (on second culm leaf about 4 mm long and about 1.5—3 times as long as wide). The panicles are about 7—10 cm long, lanceolate, rather dense, with branches dividing at about 1/3—1/2 their length, and slightly scabrous branchlets and pedicels. The lemmas are ovate, obtuse, distinctly 5-nerved, with the lateral nerves ending at the edge of the lemma, and the median nerve entering a nearly straight awn at or slightly below the middle of the lemma. Prickle-hairs occur, and can be classified as intermediately dense. The Trichodium net is of type III. The paleas measure about 1/2 the length of the lemma. The anthers are non-dehiscent, and seeds are not set.

The habitat is a damp meadow, where both the parent species grew together. Probably all the specimens of the hybrid found there belong to the same clone.

A. stolonifera × *stricta* is very similar to this hybrid, but has extravaginal rhizomes.

Neither DAVIES (1953) nor BJÖRKMAN (1954a) has been able to produce *A. canina* × *stolonifera* experimentally.

A. canina × *stolonifera* has been reported in the literature from at least Sweden and Finland (MURBECK 1898: 9, HOLMBERG 1922: 144), Denmark (ANDERSEN 1931: 426), Great Britain (PHILIPSON 1937: 102) and France (CAMUS 1958: 350). As *A. stricta* was earlier included in *A. canina,* and the crossing experiments of DAVIES and BJÖRKMAN were unsuccessful, it seems likely that at least part of the hybrids reported in the literature belong to *A. stolonifera* × *stricta.* HUBBARD (1968: 299) reported only *A. stolonifera* × *stricta* from Great Britain, evidently including the specimen of *A. canina* × *stolonifera* mentioned by PHILIPSON. I have studied the »*A. canina* × *stolonifera*» hybrids reported from Sweden and Finland by MURBECK (1898) and HOLMBERG (1922). For the specimens from TL Karesuando and Le Enontekiö, see p. 129. The other specimens I have considered to be *A. canina* × *stolonifera* on the basis of their shoot morphology.

The identity of *A. castriferrei* Waisb. is unknown to me. WAISBECK (1905: 68—69) stated that it was possibly a hybrid including three different species,

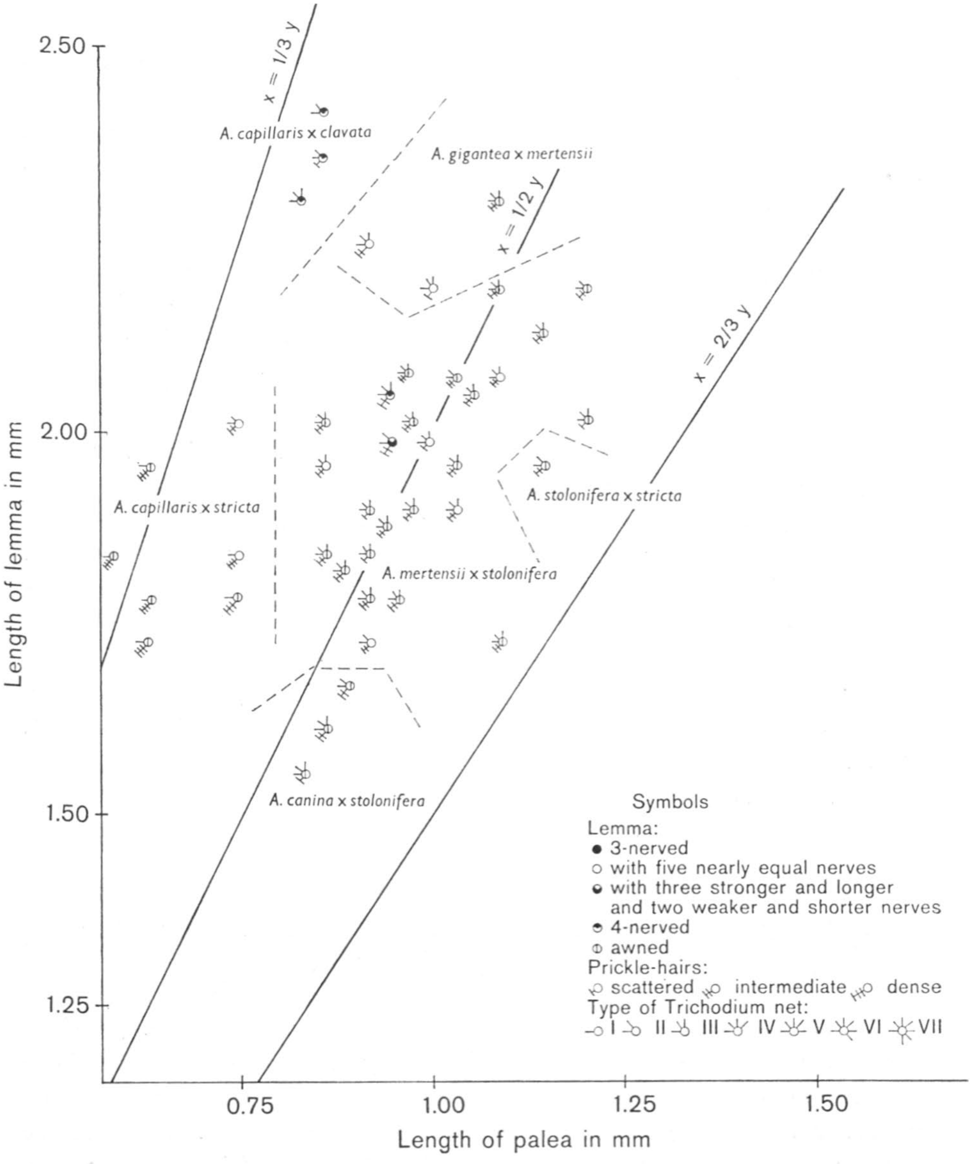


FIG. 23. Pictorialized scatter diagram illustrating the variation of some floret characters in *A. canina* × *stolonifera*, *A. stolonifera* × *stricta*, *A. gigantea* × *mertensii*, *A. mertensii* × *stolonifera*, *A. capillaris* × *stricta* and *A. capillaris* × *clavata*. Specimens included marked with ″ in the list of specimens studied.

namely »*A. alba*», *A. canina* and *A. vulgaris*. HOLUB (1963) considered it a synonym of *A. pusilla*.

Figs. 22, 23, 39 c, 45 c, 47 f, 48 t, 49, 52 d.

Agrostis stolonifera × *stricta*

A clone that, judging from its chromosome number and morphology, must be the hybrid between *A. stolonifera* (n = 14) and *A. stricta* (n = 14) has been collected by me in Ks Kuusamo (see p. 154). Morphologically the clone agrees closely with *A. mertensii* × *stolonifera*, but as the chromosome number was 2 n = 28 it clearly cannot represent that hybrid. The studied clone of *A. stolonifera* × *stricta* has paleas measuring about 1/2 the length of the lemmas (the similar *A. capillaris* × *stricta* differs in having paleas measuring only about 1/3 the length of the lemmas). No difference in ligule length can be observed between this clone and *A. capillaris* × *stricta*. Probably this is due to the fact that the northern populations of *A. stolonifera* usually have very short ligules (see p. 89).

The habitat of the clone was a sandy lake shore. *A. stolonifera* grew there also (the northern type), but *A. stricta* was absent.

Davies (1953) reported obtaining a few viable seeds from experimentally produced hybrids between *A. stolonifera* and *A. stricta* (Welsh material). In the meiosis of these hybrids Jones (1956b: 379) found about 3—9 bivalents and about 7—24 univalents per cell. Some few tri- or quadrivalents were also found. The bivalents can certainly be assumed to be formed by the pairing of the two *A. stricta* genomes in the hybrid. S. O. Björkman (1954a: 258) succeeded in crossing both tetraploid and pentaploid *A. stolonifera* with *A. stricta*.

Figs. 23, 24, 39 d, 45 d, 47 g, 48 u, 52 a, 58 d.

Agrostis mertensii × *stolonifera*

A. vulgaris β repens f. aristata Laestadius **1856: 83 non G. F. W. Mey. 1823 (vide p. 66). — Lectotypus: Suecia, TL Karesuando; »circa templum». 1846 leg. L. L. Laestadius (UPS)!**
A. × lapponica Montell **1943: 93 (nom. inval., ut »*A. borealis* × *tenuis*»).**

Murbeck (1898: 13) reported the previously unknown hybrid »*A. borealis* × *stolonifera*» on the basis of specimens collected by L. L. Laestadius in TL Karesuando and Nb Pajala in Sweden. S. O. Björkman obtained the chromosome number 2 n = 42 for specimens collected in Karesuando (see p. 154), and these must evidently be referred to *A. mertensii* × *stolonifera*. I have counted the hexaploid number for two clones, one from TL Karesuando the other from Le Enontekiö.

The specimens treated as *A. mertensii* × *stolonifera* are loosely — rather densely tufted, with erect or geniculately ascending, 2—4-noded, about 20—30-cm-tall culms. Scaly extravaginal rhizomes and short erect intravaginal vegetative shoots occur. The ligules are obtuse, on the second culm leaf about 1.2—3.0 mm long and about as wide. The panicles are about 4—7 cm long, lanceolate, with rather few spikelets and slightly — intermediately scabrous branches and pedicels. The lemmas have five equal nerves extending to the edge of the lemma, or three stronger and two weaker and shorter nerves. Some lemmas of the panicle have straight awns of varying length. Prickle-hairs occur rather sparsely — intermediately densely. The Trichodium net is of types II—III. The paleas measure about 1/2 the length of the lemmas. The anthers are thin, non-dehiscent, about 1.0—1.5 mm long, and measure 1/2—2/3 the length of the lemma.

Some of the specimens collected by L. L. Laestadius in TL Karesuando and here referred to *A. mertensii* × *stolonifera*, were treated by MURBECK (1898) as »*A. canina* × *stolonifera*». The differentiating characters mentioned by Murbeck (anther length, culm height, number of nerves in the leaf lamina and panicle length and density) did not enable me to divide the material in question into two groups. The hybrid *A. canina* × *stolonifera* would have the chromosome number 2 n = 21, and *A. stolonifera* × *stricta* 2 n = 28. As all the six clones studied cytologically by S. O. Björkman and me had the hexaploid number (2 n = 42), they must be classified as *A. mertensii* × *stolonifera*, and because the other clones collected along the Muonio River agree morphologically with these, they are listed in this work as *A. mertensii* × *stolonifera*. However, it must be stressed that I have not been able to find any morphological characters which distinguish this hybrid from *A. stolonifera* × *stricta* (cf. p. 128). I also refer to *A. mertensii* × *stolonifera* the specimens which MONTELL (1943) described as »*A. borealis* × *tenuis*» (= *A. lapponica* Montell; an invalid name, according to Art 36 of the Code, as no Latin diagnosis was given). According to MONTELL, the specimens could not be »*A. borealis* × *stolonifera*», because the ligules were only 1.5—2.0 mm long. This length falls, however, within the variation range of *A. mertensii* × *stolonifera* given above. In the northern populations of *A. stolonifera* short ligules are frequently encountered (see p. 89), which may explain why the ligules are rather short in the hybrid. In my opinion, *A. mertensii* × *capillaris* should, on the analogy of *A. capillaris* × *stricta* and *A. capillaris* × *clavata*, have paleas measuring only $^1/_3$ the length of the lemmas. Montell's specimens from Ylimuonio (and also specimens collected in Le Enontekiö, and determined by Montell in schedis as »*A. borealis* × *tenuis*») have paleas measureng about $^1/_2$ the length of the lemmas (Fig. 23), and because of this character I classify these specimens, and also all the other material now treated, as *A. mertensii* × *stolonifera* and not as *A. capillaris* × *mertensii*. It must, however, be regarded as probable that the latter hybrid can also be formed. All the known occurrences of *A. mertensii* × *stolonifera* lie in a rather restricted area along the Muonio and Torne Rivers. This is very remarkable as *A. stolonifera* is quite unknown in these regions. In northern Fennoscandia *A. mertensii* and

A. stolonifera grow together in many other regions, but the hybrid has not yet been found there.

Figs. 23, 24, 40 b, 45 e, 47 h, 48 v, 52 b, 59 b.

Agrostis gigantea × mertensii

Specimens that, judging from their chromosome number and morphology, must belong to this hitherto unknown hybrid have been collected by me in Lps Pechenga in the Murmansk Region (see p. 154), The specimens are about 50 cm tall with solitary, erect, 2-noded, slender but stiff culms. Short intravaginal erect vegetative shoots and subterranean scaly rhizomes occur. The ligules are comparatively long and pointed, on the second culm leaf about 2.1—2.5 mm long and about 1.5—2.2 times as long as wide. The panicles are pyramidal and comparatively few-flowered, with very scabrous pedicels and branchlets. The lemmas are 5-nerved, with intermediately dense prickle-hairs. The Trichodium net is well developed, type II. The paleas measure about 1/2 the length of the lemmas. The anthers are thin, non-dehiscent with abortive pollen. Seeds are not set. I found the somatic number $2n = 49$ in root tip mitosis. This number supports the assumption that these specimens represent a hybrid between *A. gigantea* ($n = 21$) and *A. mertensii* ($n = 28$), and, considered together with the morphological characters, seems to exclude all other possible hybrid combinations.

The habitat was a sandy riverside with open vegetation. *A. mertensii* grew there, but *A. gigantea* was not found. Another *A. gigantea* hybrid, namely *A. gigantea × stolonifera*, was, however, also found. *A. gigantea* var. *repens* is over large areas sympatric with *A. mertensii*, and the hybrid is evidently not easily formed, as it has not been reported earlier. Different flowering times may be a factor preventing its occurrence (see p. 25). The morphology of the parent species suggests that they are only distantly related.

Figs. 23, 24, 40 a, 45 f, 47 i, 48 x, 52 c, 59 a.

Agrostis capillaris × stricta

This hybrid is known from a few localities in N. Finland and the Murmansk Region (see Fig. 24, and p. 155). In habit the specimens are rather similar to *A. stricta* (the northern population group). The culms are 2—3-noded and loosely tufted or solitary. Erect intravaginal vegetative shoots and scaly extravaginal rhizomes occur. The ligules are about 1.5—3.5 mm long on the second culm leaf, and about as long as wide (thus distinguishing the hybrid from *A. capillaris*). The panicles are lanceolate — narrowly ovate, and semicontracted after flowering, with intermediately scabrous branchlets and pedicels. The lemmas have five distinct shortly excurrent nerves, and are unawned or bear a short or long awn from the middle or lower half. They have dense or intermediately dense prickle-hairs. The Trichodium net is of type II or I (the two last-mentioned characters distinguish the hybrid from *A. capillaris*). The paleas measure about 1/3 the length of the lemmas (the hybrid is thus intermediate and is differentiated from both the parent species by this character). All the specimens studied had thin non-dehiscent anthers and none had set seeds. The chromosome number 2 n = 28 was obtained by me for clones from Lk Sodankylä Kersilö, Le Enontekiö Palojoensuu, Li Inari and Lps Petsamo.

All the known habitats of *A. capillaris* × *stricta* are river shores. It is very interesting that *A. stricta* is quite unknown in the interior of Lk in Finland, although its hybrid with *A. capillaris* is known from 4 localities (Fig. 24).

It seems probable that *A. capillaris* × *stricta* has been overlooked in N. Fennoscandia owing to its similarity to *A. stricta*, and can be found in many additional localities. There is no material of the hybrid from S. Finland and I did not find it there, although I searched in many localities where the two parent species grow together and flower at the same time. It thus seems that the hybrid must be much rarer in S. Finland than in N. Fennoscandia. This probably reflects a slight difference between the genetic affinities of the two *A. stricta* population groups to *A. capillaris*.

Hybrids between *A. capillaris* and *A. stricta* have been reported in the literature only by Hubbard (1968: 299), who evidently included Philipson's (1937) »*A. canina* × *tenuis*» in this hybrid.

Davies (1953) reported artificially produced hybrids between Welsh *A. capillaris* and *A. stricta*. These hybrids were analysed cytologically by Jones (1956b). I have studied herbarium vouchers (in ABS) of this material. In my opinion clones 39 b R 1 13, 39 b R 1 17, 39 b R 1 25, 39 b R 1 26, 39 b R 1 27, 39 b R 1 30 and 39 b R 1 33 belong to *A. stricta* and 39 b R 1 20A to *A. capillaris* (Jones examined the clones underlined above, and four clones not seen by me). I cannot find any morphological characters in these specimens which indicate that they are hybrids. In addition, seed production is very good in all the specimens. Evidently Davies (1953) and Jones (1956b) were led by the self-sterility they had found in their Welsh *Agrostis* material to assume that all, or at least most, of the progeny formed in controlled interspecific crossings were hybrids. In so doing, they failed to take account of the so-called pseudo-fertility found by Nygren (1946: 229) in the related genus *Calamagrostis*. Nygren defined this pseudo-fertility in the following way: pollen of a related species may »stimulate» autogamy in allogamous species. Evidently most of the »hybrids» between *A. capillaris* and *A. stricta* made by Davies (1953) were in reality *A. stricta*, formed by self-fertilization (clone 39 b R 1 20A was *A. capillaris*). This assumption is supported by the data

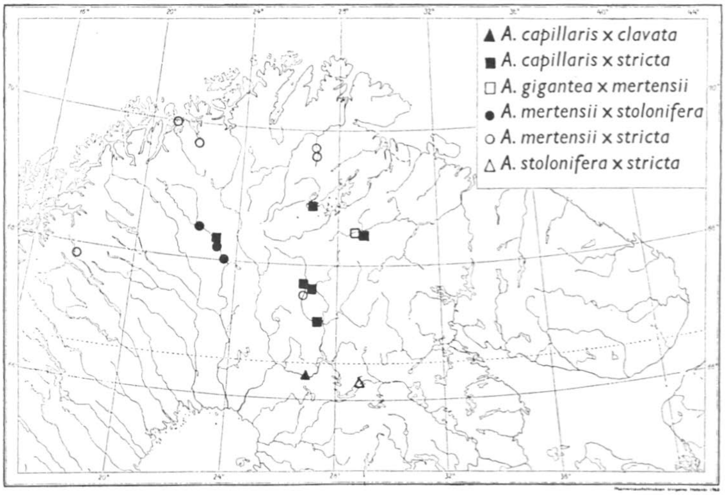


FIG. 24. The distribution of *A. mertensii* × *stricta, A. stolonifera* × *stricta, A. gigantea* × *mertensii, A. mertensii* × *stolonifera, A. capillaris* × *stricta* and *A. capillaris* × *clavata* according to the specimens examined.

on the meiosis of the »hybrids» given by Jones (1956b). They were all stated to have meiotic chromosome pairing identical with that of *A. stricta* (no information was given about the meiosis of clone 39 b R 1 20A), and the pollen production was reported to be good. Jones's (1956b) conclusions about the very close relationship of *A. capillaris* and *A. stricta,* and the rather good homology between the different genomes of *A. capillaris* are evidently invalidated, since they were based on precisely these »hybrids». S. O. Björkman (1954a) does not list *A. capillaris* × *stricta* among successful experimental crosses in his material.

Figs. 23, 24, 40 c, 45 g, 47 j, 48 y, 52 f, 59 c.

Agrostis cfr *capillaris* × *clavata*

Some specimens which, judging from their morphology, must be regarded as *A. capillaris* × *clavata* have been collected from Ob Rovaniemi in Finland. The specimens are loosely tufted with about 50—60-cm-tall, stiff, erect, 4-noded culms. Short extravaginal rhizomes occur. The ligules are obtuse — nearly truncate, about 1.0—1.5 mm long and about as long as broad on the second culm leaves. The panicles are about 10 cm long and rather loose, with nearly smooth branches. The lemmas are smooth, obtuse with three longer nerves ending at the edge of the lemma and two shorter and weaker nerves. The Trichodium net is well developed, type I. The paleas measure about 1/3 the length of the lemma. The anthers are non-dehiscent, about 2/3 the length of the lemma (1/4 the length would have been expected). No seeds have been set.

A. clavata has been collected from the same locality as the specimens described above.

Figs. 23, 24, 40 d, 45 h, 47 k, 48 z, 52 e, 59 d.

5. *Artificial hybrids not found in nature and reported hybrids considered uncertain*

Agrostis canina × *stricta*

A. canina × *stricta* has been artificially produced by both S. O. BJÖRKMAN (1951, 1954a) and DAVIES (1953). The hybrid was found to be quite sterile in respect to pollen and seed production (BJÖRKMAN 1951, DAVIES 1953, JONES 1953, 1956a), as could be expected for a triploid (2 n = 21) hybrid. In meiosis uni-, bi- and trivalents could be found (JONES 1956a: 373).

Although ecologically very different, *A. canina* and *A. stricta* grow together around rock-pools, and the hybrid might arise in such habitats. However, it has never yet been reported as growing wild. I have looked for it around rock-pools in several localities in S. W. Finland, but have not yet found it.

Agrostis canina × *mertensii*

S. O. BJÖRKMAN (1954 a) lists the hybrid between *A. canina* and *A. mertensii* among successful combinations obtained by artificial crossing. The hybrid has not yet been found in nature. It should be looked for in the north of Fennoscandia, where *A. mertensii* is present in at least most of *A. canina*'s northernmost localities. Although *A. canina* generally flowers later than *A. mertensii*, overlapping in flowering time occurs. Since the two species have very different chromosome numbers (2 n = 14 and 56), the hybrid is certainly sterile.

Agrostis canina × *capillaris*

This hybrid was listed by MURBECK (1898) and HOLMBERG (1922) from some localities in Sweden and Norway. I have studied the material in question (in LD, S, UPS). Judging from shoot morphology, ligule length and form, and structure of floret scales none of the specimens actually represent *A. canina* × *capillaris*, but are sterile *A. canina*, *A. canina* × *stolonifera*, *A.* × *murbeckii* or *A. capillaris*.

Neither DAVIES (1953) nor BJÖRKMAN (1954 a) have been able to produce *A. canina* × *capillaris* experimentally. The hybrid was reported from Great Britain by PHILIPSON (1937), but apparently HUBBARD's (1954, 1968) *A. canina* ssp. *montana* (= *A. stricta*) × *stolonifera* includes also the specimens mentioned by PHILIPSON. I do not know the identity of Reuter's (in MERCIER 1861; Switzerland), SANIO's (1889; Prussia), MALTE's (1928; Canada) ANDERSEN's (1931; Denmark) and CAMUS's (1958; France) specimens of »*A. canina* × *vulgaris*» and »*A. canina* × *tenuis*».

Agrostis canina × gigantea

»*A. canina × gigantea*» was reported by HYLANDER (1953a: 323) from Ög Kullerstad in S. Sweden. I have studied the specimens in question (in UPS), and am very doubtful about their hybrid nature, especially because they have dehiscent anthers and seeds that seem to develop normally. All the other intersectional hybrids have been quite sterile. It seems to me that the characters that led HYLANDER to suspect an *A. canina* hybrid were the occurrence of an awn and rather numerous prickle-hairs (density intermediate) on the lemma. Clones of *A. stolonifera* with such lemmas are, however, not very rare, and were even collected by HYLANDER (sub nom. *A. gigantea*) from the same locality as the »hybrid» specimens. The »hybrids» agree also in respect to other characters with the *A. stolonifera* specimens collected from the same locality. The lemmas are 5-nerved with weak nerves ending before the edge of the lemma, and their short straight awns are attached to the upper half. The paleas measure about 3/5—2/3 the length of the lemmas. The Trichodium net is of type IV. In my opinion these specimens cannot represent the hybrid *A. canina × gigantea*, and must be regarded as *A. stolonifera*. *A. gigantea* was also collected from the same locality.

Neither DAVIES (1953) nor S. O. BJÖRKMAN (1954) has been able to produce *A. canina × gigantea* or *A. gigantea × stricta* experimentally.

Agrostis capillaris × mertensii

This hybrid (as »*A. borealis × tenuis*») was reported by MONTELL (1943) from Lk Muonio in Finland. The material in question is discussed on p. 129.

VII. List of specimens studied

The list includes all material from the eastern half of Fennoscandia studied, and also other material included in diagrams. In some species, whose material from part of the investigation area is large, the lists do not cite every specimen separately, but give only the number of specimens studied from every commune, and the herbaria where they are preserved. Duplicates are not counted separately in this connection. All material which is presented in abbreviated form in this work is listed completely in WIDÉN (1968), and copies may be ordered from the Library of the Department of Botany of the University of Helsinki.

The communes of Finland are in accordance with the 1968 edition of the General Atlas of Finland. Parallel names are given only when occurring on the herbarium labels and absent from the General Atlas.

Explanation of abbreviations and symbols used in the list:

Bjn	S. O. Björkman
cfr	confer, the identification considered uncertain
c.v.	church village
L.	Lake
Nrn	J. M. Norman
R.	River
r.d.	rural district
r.y.	railway yard
t.	town

Wdn K. G. Widén
″ specimen included in diagrams of floret characters (my determination slips on the herbarium sheets are marked with a reference number to the microscopical slide).
* specimen included in Table 1. (chromosome counts).
** specimen included in Fig. 1. (stoma length).
° °° specimen included in Fig. 4.(° indicates that only herbarium material from the original locality is included, °° includes both material from the original locality and transplanted material from the Botanical Garden).

The herbarium abbreviations are according to INDEX HERBARIORUM (1964; see pp. 9—10).

Agrostis canina

Finland

Alandia. *Brändö:* 3 (H). — *Eckerö:* 1 (H). — *Finström:* 1 (H). — *Geta:* 2 (H, HFR); Bolstaholms träsk, 1946 Bjn, 2 n = 14 (UPS). — *Hammarland:* 1 (H). — *Jomala:* between Västansunda and Norrsunda, 1946 Bjn, 2 n = 14+2 (UPS). — *Kökar:* 1 (H). — *Lemland:* 3 (H). — *Mariehamn:* 1 (H.) — *Saltvik:* 2 (H, TURA). — *Sund:* 2 (H).

Regio aboënsis. *Askainen:* 1 (TUR). — *Bromarv:* 3 (H). — *Dragsfjärd:* 1 (H). — *Finby:* 2 (H, TUR). — *Iniö:* 1 (H). — *Kaarina:* 2 (H, TUR). — *Kalanti* (Uusikirkko): 1 (H). — *Karjalohja:* 1 (H). — *Korpo:* 4 (H). — *Kustavi:* 1 (TUR). — *Lohja:* 18 (H, TURA). — *Mynämäki:* 1 (H). — *Nagu:* 4 (H, HSI). — *Paimio:* 2 (TUR). — *Pargas:* 3 (H, TUR). — *Piikkiö:* 3 (H, TUR). — *Pojo:* 2 (H, TUR). — *Pusula:* 1 (TUR). — *Raisio:* 1 (TUR). — *Sauvo:* 2 (H). — *Suomusjärvi:* 3 (H). — *Turku:* 5 (OULU, TUR, TURA). — *Uusikaupunki:* 7 (H, HEL, TUR). — *Vihti* (Vichtis): 2 (H).

Nylandia, *Borgå:* 17 (H**, TURA, VOA). — *Ekenäs:* 13 (H**, UPS), two chrom. counts (2 n = 14) by Bjn (UPS). — *Espoo:* 4 (H, TURA). — *Helsinki* (r.d.): 2 (H**, OULU). — *Helsinki* (t.): 4 (H, OULU). — *Ingå:* 3 (H). — *Mäntsälä:* 2 (H, HFR). — *Nurmijärvi:* 1 (H). — *Orimattila:* 1(H). — *Pernå:* 3 (H, UPS). — *Ruotsinpyhtää:* 2 (H, TURA). — *Sibbo:* 1 (H). — *Tuusula:* Gammelby, 1871 H. B. Åström (H; sub nom. *A. planifolia* in M. BRENNER 1871: 463 and HJELT 1895: 362).

Karelia australis. *Haapasaari:* 1 (H). — *Miehikkälä:* 1 (H). — *Sippola:* 1 (H). — *Vehkalahti* (Veckelax): 3 (H).

Satakunta. *Eura:* 3 (H, TUR). — *Eurajoki:* 1 (TUR). — *Huittinen:* 1 (TUR). — *Ikaalinen:* 1 (TUR). — *Kankaanpää:* 2 (TUR). — *Karkku:* 5 (H, TURA). — *Kiukainen:* 1 (TUR). — *Köyliö:* 1 (H). — *Lappi:* 2 (OULU, TUR). — *Luvia:* 1 (TUR). — *Pori:* 1 (H). — *Punkalaidun:* 1 (TUR). — *Rauma:* 4 (TUR). — *Siikainen:* 2 (H). — *Tyrvää:* 1 (H). — *Yläne:* 1 (H).

Tavastia australis. *Hartola* (Gustav Adolfs): 2 (TURA). — *Hauho:* 1 (H). — *Hollola:* 1 (TUR). — *Humppila:* 1 (H). — *Hämeenlinna:* 2 (OULU, TURA). — *Iitti:* 1 (H). — *Jokioinen:* 2 (H). — *Jämsä:* 1 (H). — *Kalvola:* 2 (TUR, TURA). — *Korpilahti:* 1 (H). — *Kuru:* 1 (H). — *Lammi:* 6 (H, HSI). — *Loppi:* 1 (H). — *Luhanka:* 2 (H, TUR). — *Luopioinen:* 1 (H). — *Orivesi:* 2 (H). — *Padasjoki:* 1 (H).— *Riihimäki:* 1 (H). — *Ruovesi:* 1 (H). — *Somerniemi:* 2 (H, TUR). — *Sysmä:* 2 (H). — *Sääksmäki:* 2 (H). — *Tammela:* 4 (H, TUR). — *Teisko:* 3 (H). — *Tyrväntö:* 2 (H). — *Urjala:* 2 (H, TUR). — *Vesilahti:* 1 (H, OULU). — *Ylöjärvi:* 1 (H). — *Ypäjä:* 3 (H, TUR).

Savonia australis. *Hirvensalmi:* 2 (H, TUR). — *Juva:* 1 (TUR). — *Kouvola:* 1 (H). — *Lappeenranta:* 5 (H, OULU). — *Luumäki:* 2 (H). — *Mäntyharju:* 2 (H, OULU). — *Mikkeli:* 2 (H). — *Ruokolahti:* 1 (H). — *Savitaipale:* 1 (H). — *Taipalsaari:* 2 (H). — *Valkeala:* 4 (H, TUR).

Karelia ladogensis. *Kitee:* 2 (S, UPS). — *Uukuniemi:* 1 (H).

Ostrobottnia australis. *Alavus:* 1 (OULU, TUR). — *Bergö:* 1 (H). — *Kaskö:* 1 (TUR). — *Kauhajoki:* 1 (H). — *Korsholm:* 1 (TUR). — *Korsnäs:* 1 (H). — *Kurikka:* 1 (H). — *Lappfjärd:* 6 (H**, TUR). — *Replot:* 3 (H, VOA). — *Teuva:* 1 (OULU). — *Tjöck:* 1 (H). — *Vaasa:* 3 (VOA).

Tavastia borealis. *Jyväskylä:* 2 (H). — *Konnevesi:* 2 (H). — *Muurame:* 1 (TUR). — *Pihtipudas:* 1 (H). (H). — *Virrat:* 1 (H).

Savonia borealis. *Iisalmi:* 3 (H, HSI, OULU). — *Kiuruvesi:* 1 (H). — *Kuopio:* 4 (H, KUO, S, UPS). — *Leppävirta:* 1 (TUR). — *Maaninka:* 2 (H). — *Nilsiä:* 2 (H). — *Pielavesi:* 2 (H). — *Pieksämäki:* 1 (H). — *Siilinjärvi:* 3 (HFR, TUR). — *Suonenjoki:* 1 (H).

Karelia borealis. *Eno:* 1 (TUR). — *Kontiolahti:* 1 (HEL, OULU, TUR). — *Liperi* (Libelits): 1 (H). — *Pielisjärvi:* 2 (H). — *Valtimo:* 2 (H).

Ostrobottnia media. *Alajärvi:* 1 (HSI). — *Haapajärvi:* 3 (OULU, TUR). — *Jakobstad:* 1 (TURA). — *Kokkola:* 1 (H). — *Lappajärvi:* 2 (H). — *Nykarleby:* 1 (H). — *Oulainen:* 1 (OULU). — *Paavola:* 1 (H). — *Pedersöre:* 2 (H, TURA). — *Pulkkila:* 1 (OULU). — *Rantsila:* 1 (OULU). — *Revonlahti:* 1 (H). — *Siikajoki:* 1 (OULU). — *Ylivieska:* 1 (H).

Ostrobottnia kajanensis. *Hyrynsalmi:* c.v., railway bank W of Mustajärvi, 1954 L. Fagerström (H); Paljakka, 1946 V. Kujala (HFR), 1946 N. Söyrinki (H), 1960 T. Ulvinen (H, OULU). — *Kajaani:* 1905 K. Gutzén (OULU); Kiehimä, Likolampi, 1937 H. Roivainen (H); Mustalahti, 1959 L. Heikkinen (TURA). — *Paltamo:* 1925 O. Lönnbohm (S); Kontiomäki, Pitkänperä, 1959 Y. Mäkinen (TUR); Mieslahti, Saviranta, 1920 O. Kyyhkynen (H); Saviranta, Koppila, 1920 O. Kyyhkynen (TUR). — *Puolanka:* Suolijärvi district, near farm of Poukka, 1952 K. H. Mattisson 4312 (LD, TURA). — *Ristijärvi:* between the stations of Vaarala and Ristijärvi, 1958 Y. Vasari (H); Hiisijärvi, roadside ditch N of Tuomaanvara, 64°27′ N, 1963 L. Heikkinen (BG, H, OULU). — *Suomussalmi:* c.v.: Myllypuro 1938, and shore of Siikalahti 1908, both O. Kyyhkynen (H). Vääkiö, 1963 J. Suominen (H). — *Vaala* (Säräisniemi): Rokua, 8 specc., 1947, 1949 J. Jalas (H); Veneheitto, 1948 E. Leinonen (H). — *Vuolijoki:* Otanmäki, Otansuo, 1955 L. Heikkinen (H).

Ostrobottnia borealis. *Alatornio:* Ylivojakkala, Savikuja, 1960 A. Railonsala (H). — *Haukipudas:* Kello, Kraaseli, 1930 O. Seppänen (OULU). — *Ii:* 1932, A. Ahmavaara (OULU); Asemakylä, 1954 M. Malvari (OULU, TUR); Ulkokrunni, 1948 T. Vartiainen (OULU), 1951 H. Roivainen (H), 1951 O. Roivainen (H), 1951 M. Rovoinen (H). — *Kemi:* F. Hellström (H), 1897 A. Rantaniemi (OULU); Niemelä, 1864 M. Brenner (H). — *Kemijärvi:* Kostamo, shore of Kostamojärvi, 1969 Wdn (H); Kuusivaara, r.y., 1964 J. Suominen (H); N Teljonsaari, N of the borough, 1965 M. Lähdeoja (H); Tohmo, Lahnasaari, 1959 P. Havas (OULU). — *Kiiminki:* 1957 P. S.

Jokela (OULU); W border of Jolosmäki, 1955 V. Törnroos (OULU); side of road to Yli-Ii about 4.5 km from Ii, 1964 O. Mäntyvaara (OULU). — *Liminka:* 1961 P. S. Jokela (OULU). — *Muhos:* 1941 I. Panelius (OULU); loam pit by brick factory, 1960 K. Siivonen (OULU). — *Oulu:* 5 specc. (HSI, OULU, TUR). — *Oulujoki:* Saranpää, 1943 E. Pallari (OULU). — *Pello:* 1902 A. K. Cajander (HSI); Turtola, r.y., 1965 J. Suominen (H). — *Pudasjärvi:* roadside ditch by Oulu—Kuusamo highway 71 km E of Oulu, 1959 P. S. Jokela (OULU); roadside 6 km from Kurenala towards Kuusamo, 1959 T. Ahti 1466 (H). — *Ranua:* near church, 1952 P. S. Jokela (OULU), 1959 T. Ahti 1464 (H). — *Rovaniemi:* 1932 H. Warén (TUR); Meltaus, 1955 T. Ahti (H); r.y. of Jaatila, Nivavaara and Vika, all three 1964 J. Suominen (H). — *Simo:* Simonkylä, Eskola, 1960 L. Räsänen (OULU). — *Utajärvi:* Niska, 1936 V. Niinimäki (H); Särkijärvi, roadside about 100 km from Oulu, 1951 P. S. Jokela (OULU). — *Yli-Kiiminki:* Rekikylä, Ahmasjärvi, 1961 T. Rintanen (OULU). — *Ylitornio:* by Eholammi lumber road joining Kopanmäki village road, 1961 P. Pudas (OULU).

Regio kuusamoënsis. *Kuusamo:* c.v., 6 specc., 1957—1966 T. Ahti, R.-L. Hämet-Ahti and T. Ulvinen (H, OULU); Jyrkänkoski, 1966 T. Ahti & L. Hämet-Ahti (H); Kesäniemi, Rönnynniemi, 1966 T. Ahti & L. Hämet-Ahti (H); Käylä, 1949 E. Pallari (OULU); Penttilänvaara, SE corner, 1966 T. Ahti & L. Hämet-Ahti (H); Särkelä, 1966 T. Ahti & L. Hämet-Ahti 22175 (H); Vasaraperä, near Ojala, 1966 T. Ahti & L. Hämet-Ahti (H); Vuotunki, shore of Kuusinki-joki, 1952 R.-L. Hämet (OULU). — *Posio:* by the lumber transport office at Kitka-Livojärvi, 1916 E. af Hällström (H). — *Taivalkoski:* Jurmu, shore of Iijoki by the bridge, 1963 T. Ulvinen (OULU).

Lapponia kemensis. *Kittilä:* Alakylä, shore of Ounasjoki, 1966 Wdn (H); *Kolari:* mouth of Ylläsjoki, 1964 T. Ulvinen (H, OULU). — *Pelkosenniemi:* side of road to Pyhäjärvi, about 1/2 km from the crossroads, 1959 T. Ahti 1228 (H). — *Sodankylä:* Korvanen, 3 specc., 1958, 1959, J. Poijärvi, K. Laaksonen and T. Ulvinen (H); Laiti, W of the mouth of Järvijoki, 1959 T. Ulvinen (H); Petkula, W shore of Kitinen about 1 km from Torpan Paavo towards Sodankylä, 1960 K. Laaksonen (H**); Peurasuvanto, near the bridge, 1959 K. Laaksonen (H); Ylikitinen, mouth of the Tankajoki, 1959 T. Ulvinen (H**); Raja-Jooseppi, roadside 1966 Wdn (H).

Lapponia enontekiensis. *Enontekiö:* Palojoensuu, riverside 1966 Wdn (H).

Lapponia inarensis. *Inari:* Ivalo, 1937 N. Herlin (H); camping place on shore of Luttojoki about 20 km from border of U.S.S.R., 1967 Wdn (H).

Leningrad Region

Karelia australis. *Kamennogorsk* (Antrea, St. André): 1901 H. Lunelund (TURA). — *O. Gogland* (Suursaari, Hogland): 1856 Saelan & Strömborg (H). — *Svobodnoje* (Kirvu): Inkilä, 1888 J. Lindén (H).

Isthmus karelicus. *Gromovo* (Sakkola): 1897 H. Lindberg (H), G. Lång (H, HSI, TUR). — *Polyany* (Uusikirkko, Nykyrka): Sykiälä, 1902 O. A. Gröndahl (TURA). — *Priozersk* (Käkisalmi): Kivisalmi, 1905 J. S. W. Koponen (H). — *Pyukhyarvi* (Pyhäjärvi): Salitsuranta, 1894 H. Lindberg (H). — *Zaporozhskoye* (Metsäpirtti): 1866 A. J. Malmberg (H).

Karelia olonetsensis. *Sr. Mandrogi* (Mandroga): 1875 Fr. Elfving (H).

Karelian A.S.S.R.

Karelia ladogensis. *Impilakhti:* Sumeria, 1914 V. Pesola (HFR). — *Pyalkyarvi* (Pälkjärvi): Anoniemi, 1876 Hj. Hjelt & V. F. Brotherus (H); Puikkola, 1902 J. M. Vartiainen (HEL). — *Salmi:* Leppälä, 1914, 1915 V. Pesola (H, HFR). — *Sortavala* (Serdobol): 1927 F. R. Tanner (VOA); Kotiluoto, 1926 O. Hulkkonen (H); Melloinen, Vuorlahti, 1929 K. Linkola (H); Rauskee, 1922 Anon. (TUR); Sammatsaari, 1899 I. M. Vartiainen (H); Tulolansaari, 1900 A. Palmgren (H). — *Suistamo:* Leppäsyrjä, 1915 V. Pesola & A. Virtanen (H).

Karelia olonetsensis. *Jashesero:* 1898 J. I. Lindroth & A. K. Cajander (H). — *Ladva:* 1898 J. I. Lindroth & A. K. Cajander (H). — *Petrozavodsk:* 1863 Th. Simming (H). — *Rzhanoye ozero:* 1899 J. I. Liro & A. K. Cajander (HSI). — *Suurimäki:* Keidoja, 1942 N. Söyrinki (H). — *Vedlo-ozero* (Vieljärvi): Joensuunkylä, 1943 L. Fagerström (H); S of Mushjärvi, 1943 L. Fagerström (H).

Karelia borealis. *Suoyarvi:* Liete, 1914 K. Linkola (H).

Karelia onegensis. *Kuzaranda:* 1888 A. O. Kihlman (H). — *Sunskiy* (Suunu): Kivach (Kivatscho), 1850 W. Nylander (H).

Karelia pomorica occidentalis. *Kello Gora* (Kellovaara): 1894 J. O. Bergroth (H). — *Reboly* (Repola): 1942 L. Lehtonen (H); Grimoinniemi, 1942 J. Jalas (H). — *Vygozero:* W shore of Vygozero, 1920 V. P. Savich 274 (LE).

Karelia keretina. *Kesten'ga* (Kiestinki): 1942 N. Herlin (H). — *Pya-ozero* (Pääjärvi): NE of Kostovaara, 1942 N. Söyrinki (H).

Murmansk Region

Lapponia petsamoënsis. *Pechenga* (Petsamo): roadside by R. Lota about 25 km from Finnish border, 1967 Wdn (H).

Lapponia tulomensis. *Dashbokaya:* Monche-Tundra, Dashbokaya, by the mines, 1939 A. N. Egorov 102 (LE). — *Lotta:* by Lotta—Ylä-Tuloma road about 88 km from Finnish border, 1967 Wdn (H). — *Murmansk:* 1927 E. Hultén (S).

Sweden

Ångermanland. *Härnösand:* Härnön, Gånsvik, 1947 Bjn, 2 n = 14+1 (UPS). — *Nätra:* Köpmanholmen, Alviken, 1947 Bjn 1640 (UPS). — *Säbrå:* 1867 H. W. Arnell (S); Framnäs, 1877 K. Arnell (UPS); Lungö, 1906 V. Arnell (UPS); Norrstig, 1873 H. W. Arnell (UPS). — *Ullånger:* Äskja, 1857 R. Fristedt (S).

Västerbotten. *Bygdeå:* near Legdeå village, 1914 S. Grapengiesser (LD); Stora Fågelvattnet, 1942 G. R. Cedergren (S); Near Åkroken, 1914 S. Grapengiesser (LD). — *Byske:* Ostviksbodarna, 1944 G. R. Cedergren (S, UPS); Skogfors, 1947 Bjn (UPS). — *Jörn:* Kaxliden, Kallhälla, 1940 G. R. Cedergren (S). — *Lövånger:* Broträsk, shore of Yttre Broträsk, 1939 Bjn, 2 n = 14+3, 14+2 (UPS); shore of S. Broträsk, 1947 Bjn, 2 n = 14 (UPS); Gärdefjärden, Saltudden, 1949 Bjn, 2 n = 14 (UPS); between Toresviken and Gårdsfjärden, 1907 O. Holm (UPS); Önnesmark, 1936 O. Holm (S). — *Norsjö:* Myrbäcken N of Kläppen, 1944 G. R. Cedergren (S); shore of Vajsjön, 1940 G. R. Cedergren (S, UPS). — *Skellefteå:* 1887 C. Melander (S); Furunäs, Hartjärn, 1937 G. R. Cedergren (S, UPS); Fälbäcken, 1942 G. R. Cedergren (S); Kyrkobordet, 1905 G. Samuelsson (S). — *Umeå:* 1912 L. Trafvenfeldt (UPS).

Norrbotten. *Luleå:* Långnäs, Bränntjärn, 1923 H. Svenonius (S). — *Nederluleå:* Kallax, 1940 P. Svenonius (UPS). — *Nederkalix:* Storön, near Blomsjön, 1956 E. Julin (UPS). — *Piteå:* Gjobyn, Gustavsbo, 1907 E. Marklund (UPS). — *Älvsby:* c.v. 1917 C. G. Alm (S, UPS).

Pite Lappmark. *Arvidsjaur:* brook 2 km N of Lappträsk, 1937 G. Wistrand (S); by Grundselån near Åkroken, 1938 G. Wistrand (S).

Lule Lappmark. *Jokkmokk:* Suobbaträsk near Sudok, 1907 O. Vesterlund (TURA); between Gällivare and Jokkmokk, Luspebryggan, 1922 G. Björkman (S, UPS, UPSV).

Torne Lappmark. *Karesuando:* 1845 L. L. Laestadius (UPS), 1928 O. R. Holmberg (UPS). — *Kiruna:* 1907 M. Sondén (S); Abisko, 1913 N. Sylvén (LD); by highway between Kiruna and Jänkänalusta 11—13 km SW of Kiruna, 1939 C. G. Alm & H. Smith (S, UPS).

Norway

Troms. *Karlsöy:* Renö near Tromsö, M. N. Blytt (O).

Agrostis stricta and *A. syreistschikowii*

Finland

Alandia. *Eckerö:* 1931, U. Saxén (H); Långviken, 1892 H. Lindberg (H); Storby, 1935 E. Häyrén (H); Storby, Västerö, 1958 H. Törnroth (H°). — *Finström:* Bergö, 1913 K. Metsävainio (OULU), 1946 J. Montell (TURA); Torrbolstad, 1912 H. Kuukkanen (H). — *Föglö:* Horsholm, 1907 C. A. Knabe (TURA); Överö, 1962 H. Toppari (H). — *Geta:* Dånö, 1912 V. Pesola (HFR); Vestergeta, Getaberget, 1962 J. Suominen (H). — *Hammarland:* 1865 Anon. (H); Skarpnåtö, 1912 V. Pesola (HFR). — *Jomala:* Möckelö, 1904 Br. Florström (HSI); Torpgrundet between Ramsholmen and Brändö, 1898 A. Palmgren (H). — *Kökar:* Finnö, Stenskär; Hellsö, Knarskär; Karlby, Vidskär; Vikarskär, all 4 1957 H. Skult (H). — *Lemland:* Bergö, 1906 A. Palmgren (H); Idholm, 1937 H. Roivainen (H°); Lemböte, 1923 L. E. Kari (TUR); Nåtö, 1932 U. Bärlund (H°). — *Lumparland:* Norrboda, 1962 H. Toppari (H). — *Mariehamn:* 1905 H. Buch, 1945 J. Montell (TURA); Svinö, 1946 Bjn, 2 n = 28 (UPS). — *Saltvik:* Saggö, 1892 K. E. Hirn (H). — *Sund:* Kungsholm and Svinö, both 1948 Bjn (UPS). — *Vårdö:* Vargata, 1922 K. Linkola (H).

Regio aboënsis. *Aura:* Lahto, 1964 J. Nurmi (TUR). — *Bromarv:* Solböle, Tjurberget, 1928 K. Linkola (H); Vättlax, Björkholm, 1966 Wdn (H°°). — *Dragsfjärd:* Ekhamn, 1961 Wdn (H°). — *Finby:* Pettulandet, 1963 B. Söderström (H). — *Halikko:* 3 km ENE of Nummi, 1960 A. Parnela & J. Suominen (TUR). — *Hitis:* Bolax, Äppelö, 1960 L. & H. Roivainen (H, OULU); Stor Ängskär, 1962 H. Roivainen (H); Vänö, Stubbö, 1955 H. Skult (H). — *Houtskär:* Baggesövde, Immaskär, Rönnören, Träskholm, Vändklobb, Äpplö, all 6 1966 B. Federley (H). — *Karjalohja:* 1925 K. Kaila (HEL). — *Kimito:* Bogsböle, 1960 P. Isoviita (H, OULU, TUR); Vreta, 1948 E. af Hällström (H). — *Korpo:* Aspö, 3 specc., 1955, 1957 H. Skult (H); Brunskär, 6 specc., 1948, 1955, 1957 H. Skult (H); Kälö, Kråkskär, 1957 H. Skult (H); Lohm, 1962 L. Seppälä (TUR); Marsö, 1946 H. Skult (H). — *Kustavi:* Isokari (Enskär), 1965 U. Laine (H, TUR). — *Lohja:* Biskopsnäs, 1913 Ch. E. Boldt (H); Isoteutari, 1952 M. J. Kotilainen (H), 1961 H. Toppari (H); Jalassaari, 1913 Ch. E. Boldt (H); Karstu, 1957 O. Hiidensalo (H); Kittfall, 1952 M. J. Kotilainen (H); Koski 3 specc., 1958 M. J. Kotilainen (H); Osuniemi, 1962 H. Toppari (H); Vähä-Teutari, 1927 T. Airas (H). — *Nagu:* Berghamn, Brännskär, 1955 H. Skult (H); Strandby, 1962, 1966 Wdn (H*°°). — *Nummi:* Hyvelä, Myllimäki; Järvenpää, Katajamäki; Ketlahti, Kirkkoinmäki; Lintukiimanmäki; Raati, Kukkumäki; Sierla, Pakkala, all 6 1957, O. Hiidensalo (H). — *Paimio:* Kevola, 1956 I. Kukkonen (TUR); Kurki, Sorkka, 1946, 1947 O. K. Sikkilä (OULU, TUR); Meltola, Pitkäketo, 26. 7. 1956 I. Kukkonen (TUR); Pakurla, 1945 O. K. Sikkilä (H, TUR). — *Pargas:* Attu, 1960 J. Suominen, P. Bagge (TUR). — *Pojo:* Spakarnäs, 1927 T. Nybergh (H, TURA). — *Pusula:* N — Pusula: Ahonpää and Hyrkkylä, 1956 T. Toivonen (H). — *Rymättylä:* Pähkinäinen 1931 I. Vieras (TUR). — *Salo:* Uskela, Karlberg, 1852 V. E. von Bonsdorff (H). — *Sauvo:* Ruonlahti, Eräniemi, 1949 A. E. Koskimies (H). — *Suomusjärvi:* Sallittu, 1957 P. Isoviita (H, TUR). — *Tenala:* Seuko, 1951 G. Marklund (H); Trollshovda, 1960 P. Isoviita (H, TUR). — *Västanfjärd:* Billböle, 1962 H. Roivainen (H); Bredvik, Grundsund, 1959; Västerillo, Östergård, 1962, both L. & H. Roivainen (H). — *Vihti* (Vichtis): Härtsilä, Koikkala and Pääkslahti, all 3 1941 K. Linkola (H); Ollila 1950 and Pääkslahti 1941, both G. Marklund (H).

Nylandia. *Borgå:* Emsalö, Havsudden, 1919 Ch. E. Boldt, Plantae finlandiae exsiccatae 1810 (H, etc.); Emsalö, A. Panelius (OULU); Kokon, 1960 Wdn (H°**); Åby, Falkholm, 1962 Wdn (H°). — *Ekenäs:* Tvärminne, 11 specc. (BG, H°**, KUO, O, S, TUR, TURA, UPS). — *Espoo:* Bodom, 1961 C. Cedercreutz (H); Jänissaari, 1930 T. Ailas (H); Lansabäckbacken, 1953 T. Ahti (H); Nouks, Rombergen, 1941 G. Marklund (H); Siikajärvi, 1965 P. Borg (H); Tapiola, 1961 H. Scholz (B°); Vällskog/Velskola, 1949 R. E. Ruotsalo, 1950 G. Marklund (H). — *Grankulla:* 1951 R. Bäck (VOA). — *Helsinki* (r.d.): Between Bockas and Brutuby, 1918 K. Linkola (H); Brutuby, 1950 G. Marklund (H); Vestersundom, Mustavuori, 1951 R. Tuomikoski (H). — *Helsinki* (t): 1901 O. Lönnbohm (KUO), 1925 K. Kaila (HEL); Brunnsparken, 1928 B. Widén, 1963 Wdn (H°**); Haaga, 1948 V. Erkamo (H); Meilahti/Mejlans, 1923 O. Fortelius (TURA), 1944 V. Kujala (HFR), 1961 R. Kalliola (H, OULU, TUR); Sörnäinen, 1963 E. Ojanen (H); Töölö, 1933 I. Hiitonen (H); Vallisaari, 1962 V. J. Oinonen (OULU). — *Ingå:* Brennebo 1910, and Svartbäck 1898, both M. Brenner (H); Gummarböle, Gårdsböle, Lågnäs och Österralberg, all 4 1958 M. J. Kotilainen (H). — *Kyrkslätt:* 2 km E of church, 1963 N. Niinimäki (H); Getberg, 1962 Å. Niemi (H); Gunnarsby, 1963 J. Suominen (H); Obbnäs, 1890 M. Brenner (H), 1959 A. Turunen (OULU); Obbnäs, Hila, 4 specc., 1959, 1961, 1962 A. Turunen (OULU); Porkkala, Tullandet, 1932 K. Linkola (H); Porkkalanniemi, Ådbäck, 1961 T. Ulvinen (OULU); Vitträsk, Båtstad, 1905 Th. Saelan (H). Överby, 1962 A. Niemi (H). — *Mäntsälä:* c.v., 1953 L. Korhonen (H); Kaukalampi, 1953 L. Laine & M. Kaasinen (H); Ohkola: Mäenpää, 1959 L. Laine (H), and Ullanmäki, 1953 M. Kaasinen & L. Laine (H). border between villages Sääksjärvi and Onkimaa, 1952 L. Korhonen (H); W of Onkimaanjärvi, 1951 L. Korhonen (H). — *Pornainen:* Halkia: Horsmankallio and Hevonselkä, Kukkuruikallio, both 1959 A. Valta (H). Laukkakoski, G. Marklund (H); Nummistenkylä, Horsmankallio, 1950 L. Korhonen (H, TUR). *Sibbo:* Gumböle, 1954 R. E. Ruotsalo (H); Löparö, Svartholm, 1965 Wdn (H°); Massby 2 specc. 1952, Norrkullalandet 1952, Paipis 1951, Östersundom 2 specc. 1951, 1952 all 6 G. Marklund (H). — *Sjundeå:* Bocks, 3 specc. 1952, 1957, 1958; Myrans 1958; Pölans 1958; Störsby, Gällberg 1958, all 6 M. J. Kotilainen (H); — *Tenala:* Lappohja, 1907 J. Koponen (H).

Karelia australis. *Sippola:* Liikkala, Kajasuo, 1945 V. Kujala (HFR); Mämmälä, Teerimäki, V. Kujala & A. Ulvinen (HFR°).

Tavastia australis. *Hausjärvi:* Lavinto, Mieluankallio, 1963 T. Koponen (H). — *Loppi:* c.v., Ojajärvi, Talkkinummi; Salo: Sylkiö and Kaartjärvi, Pirunkallio, all 3 1954, E. Vilpa (H). — *Riihimäki:* Paljaskallio, and Herajoki, Myllybacka, both 1954 E. Vilpa (H). — *Teisko:* Kapee, Kulhanvuori, 1969 T. Ulvinen (OULU). — *Ypäjä:* Vähäsuo, Kalliomäki, 1962 J. Kantee (H, TUR).

Lapponia kemensis. *Muonio:* roadside between the c.v. and Ylikylä, 1920 J. Montell (TURA); Visanto rapids, 1942 J. Montell (TURA**).

Lapponia enontekiensis. *Enontekiö:* L. L. Laestadius (LD, S); Localities arranged NW→SE: Kilpisjärvi: Kitsijohka, 1939 J. I. Liro & H. Roivainen (H**), 1966 Wdn (H°), Iso-Malla, S slope, rock in the oroarctic region at about 700 m, 1966 Wdn (H°), Saana, SW slope 600 m, rock in the oroarctic region, 1966 Wdn (H°), and shore of Kilpisjärvi by the Biological Station, 1966 Wdn (H°°). Shore of R. Könkämäeno 1 km SE of Ropinsalmi, 1966 Wdn (H°); Hietajoki, 1835 L. L. Laestadius (S); Kaaresuvanto: opposite the Karesuando church, 1859 C. P. Laestadius (LD, UPS), and near Alasaari, L. L. Laestadius (S), Gunnarin Korva, 1846 L. L. Laestadius (S, UPS), 1950 Bjn (UPS). Palojoensuu. 1965 M. Lähdeoja (H), 1966 Wdn (H); Muonionjoki at mouth of Lassinoja, 1936 J. Montell (TURA), 1966 Wdn (H*°°).

Lapponia inarensis. *Inari:* localities arranged SW→NE: Kultala, 1878 E. Wainio (TUR); Thule, 1904 A. Torckell (LD, UPS); Ivalo, shore of Ivalojoki, 1960 V. Kujala (HFR), 1961 P. Kallio (TUR), 1964 M. Lähdeoja (H), 1965 Wdn (H°°); shore of Inarinjoki, 1965 Y. Mäkinen (TUR), 1966 Wdn (H); Muddosjauri, 1802 G. Wahlenberg (UPS); Kyrö, river shore, 1903 A. Torckell (H); Partakonlahti, mouth of brook entering Turvejärvi, 1959 Y. Mäkinen & L. Häkkinen (TUR); mouth of brook entering Postpeljärvi, NE of Nitsjärvi, 1960 E. Antikainen (TUR); mouth of brook entering Mihkaljärvi, NE of Nitsjärvi, 1960 J. Suominen (TUR); NE corner of Iijärvi, 1960 J. Poijärvi (H); Iijärvi, bog 2 km NE of Njidsjärvi, 1960 E. Antikainen (TUR**); Sevettijärvi, Solmolompolo, riverside, 1960 T. Valanne (TUR). — *Utsjoki:* shore localities along R. Tana (SW→NE): Karigasniemi, 1965 Wdn (H°), Karigasniemi, field 7 km towards Rovisuvanto, 1960 T. Ahti (H**), ferry shore at Utsjoki, 1965 T. Ulvinen (OULU), Nuorgam, 1956 P. Isoviita (H), 1963 P. Vanhatalo (TUR). Localities along R. Utsjoki (S→N): shore of Raudinaggijärvi, SW of Mierasjärvi, 1961 Y. Mäkinen (TUR), shore of Kevojärvi opposite Puksala, 1969 Wdn (H), Kevojärvi, Tereskula Bay, 1961 L. & Y. Mäkinen (TUR), shore of Tsharsjoki in Kevojoki valley, 1960 U. Laine (TUR**), N corner of Jorbajärvi, 1961 L. & Y. Mäkinen (TUR), shore of Mantojärvi, 1966 Wdn (H°), near the rectory, 1963 P. Vanhatalo (TUR). Varskjoki, E corner of Varskjägg, 1961 L. & Y. Mäkinen (TUR).

Murmansk Region

Lapponia petsamoënsis. *Pechenga* (Petsamo): shore of R. Lota (Luttojoki) 25 km from Finnish boundary, 1967 Wdn (H*°°).

Sweden

Norrbotten. *Muonionalusta:* Parkajoki, shore of R. Muonio, 1966 Wdn (H°) — *Pajala:* Areavaara, shore of R. Muonio, 1966 Wdn (H°).

Pite Lappmark. *Arjeplog:* Hällbacken, shore of Stenudden in Storlaisan, 1959 J. Lundquist (UPSV); Fjällfors in Laisdalen, 1961 J. Lundquist (UPSV); Shore of Rebnisjaure, 1963 J. Lundquist (UPSV); Vuolvojaure: S shore and by Varrasviken, both 1963 J. Lundquist (UPSV); E shore of Vuossejaure, 1962 J. Lundquist & G. Wistrand (UPSV); Tjeggelvas, Kebneluokte, shore, 1963 J. Lundquist (UPSV); shore of R. Pite 5 km below Gilton, 1963 J. Lundquist (UPSV). — *Arvidsjaur:* Benbrytesforsen, 1962 J. Lundquist & G. Wistrand (UPSV).

Lule Lappmark. *Gällivare:* Suorva region, E of Ritsimjokk, Nikkojaurga, *Cal. purpurea* birch forest about 20 m above the lake, 1923 G. Björkman (S, UPS, UPSV; sub nom. *A. canina* in G. BJÖRKMAN 1939: 12). — *Jokkmokk:* Near Kvikkjokk (Quickjokk), and Vallebacken, both 1821 L. L. Laestadius (UPS, S); valley between Ruonas and Sautsasvare, dry valley in reg. alp., 1947 G. Björkman (UPS); Ruonas, 1948 Bjn, 2 n = 28 (UPS); Virihaure, shore of Staloluokta, 1949 L. Holm (UPS); shore localities along R. Lule and its lakes (SE→NW), all 6 collected by G. Björkman, and sub nom. *A. canina* in G. BJÖRKMAN 1939: 12: Harsprånget, 1946 (S, UPS), between Porjus and Harsprånget, 1946, Bjn 2 n = 28 (UPS), Jaurekaska, 1928 (S), Järtajaure, 1929 (S, UPS), Ruotjajaure: Jorfakuoika and Suollakajokk (Rautojokk), 1922 (S, UPS, UPSV).

Torne Lappmark. *Kiruna:* Pesinnenjokk, rocks in birch forest, at about 600 m, 1925 H. Smith (UPS); Pesisjokk, rocky slope at about 500 m, 1929 G. Samuelsson (LD, S); Vassijaure, shore near Lapplandia tourist station, 1950 Bjn, 2 n = 28 (UPS). — *Karesuando:* 1840, 1841, 1842, 1845, 1846, 1849 L. L. Laestadius (LD, S, UPS), 1859 C. P. Laestadius (LD, UPS, UPSV), 1967 Wdn (H); Alasaari L. L. Laestadius (LD, UPS), 1859 C. P. Laestadius (H, LD, O, S, UPS, UPSV); Gunnarin Korva, 1950 Bjn, 2 n = 28 (UPS); Maunu, 1859 C. P. Laestadius (S, UPS).

Norway

Nordland. *Andöy:* Andenes, Andöen, 1873 Nrn (BG); Andenes between Röyken and Beuk, 1941 P. Benum & J. Reiersen (O, TROM); Dverberg, Stave, 1946 J. Reiersen (TROM). — *Ankenes:* Rombaksbotn: dry sandy ground, 1950 Bjn, 2 n = 28 (UPS), and the path up to Hundalen, 1946 Bjn (UPS). Veggen, 1881 Nrn (O). — *Hamaröy:* Tranö, 1877 Nrn (O). — *Sörfold:* Lappfjället above Hellarvik, at 600—950 m, 1953 Bjn, 2 n = 28 (UPS). — *Tysfjord:* Bekkenesholmen, 1936 P. Benum (O, TROM); Storaagvand, 1848 Nrn (O). — *Öksnes:* Rödhammeren on Sommerö, 1878 Nrn (O); Skogsöy, between Nordsand and Sörsand, 1947 J. Reiersen (O).

Troms. *Berg:* Havn, Hellandstind, 1884 Nrn (TROM); Hesten Bergsfjordbotn, 1930 P. Benum (TROM). — *Harstad:* Hindö, Elgsnaes, 1884 Nrn (O). — *Karlsöy:* Fuglöy, Indre Gamvik, 1931 P. Benum (TROM). — *Kvaefjord:* Gullesfjordbotn, 1946 J. Reiersen (TROM); Gullesfjorden, bog near Löbergvatn, 1946 J. Reiersen (O); Melåfjellene near Övre Melåvatn, 1946 J. Reiersen (TROM). — *Kvaenangen:* Kvaenangsbotn, riverside in the village, 1966 Wdn (H*). — *Målselv:* Alapen, 1872 Nrn (TROM); Fosshöyda by Barduelva, 1951 O. Skifte (TROM). — *Nordreisa:* Bilto, 1932 Y. Mejland (TRH); Ravelseidsbotten, 1905 Ehn, Peters & Selander (S); bog by the road between Sokkelvig and Raveleidsbotten, 1905 S. Selander (S). — *Torsken:* Senjenö, W side, 1884 Nrn (BG); Teistevik, 1884 Nrn (O). — *Tromsö:* Hillesöy, Björnöy, rock at top of island, 1934 P. Benum (O, OULU, TROM); Rystraumen, Hamn, rocks on shore about 15 km from Tromsö, 1953 O. Rune (UPS), O. Rune & O. Rönning (TROM).

Finnmark. *Alta:* rock crevice in mountain just W of the town, 1965 Wdn (H°); Stjernö, Semavik, 1885 Nrn (O). — *Hasvik:* Sörö, Hasvik, 1886 Nrn (O). — *Karasjok:* Nrn (O); Jesjavre, 1883 Nrn (O); Lavkavatn, brook by Karasjok—Lakselv road, 1965 Wdn (H°); Tanaelven, Seylnes, 1872 Nrn (O). — *Kautokeino:* Masijokka, by bridge on road to Alta, 1966 T. Ulvinen (OULU). — *Kvalsund:* Breidalen, river shore about 20 km from Skaidi, 1966 Wdn (H°). — *Måsöy:* by the church, 1863 Nrn (O); Havö, Havösund, N. Lund (O); Snefjord, near Snefjordvand, 1920 O. Dahl (O). — *Porsanger:* Börselven, Nrn (O); between Launasjaure and Jotkajaure, Nrn (BG). — *Sör-Varanger:* Neiden, 1965 M. Lähdeoja (H). — *Söröysund:* Gamvikfjellene, 1934 R. Nordhagen (BG, O, TROM); Hammerfestöen, Storvik, Nrn (BG). — *Tana:* Bonakas, 1901 O. Dahl (O); R. Tana at mouth of Laevvajokka, 1965 T. Ahti (H), T. Ulvinen (OULU); Sirma, shore of R. Tana, 1966 Wdn (H°); R. Tana, Maskjok, 1852 Chr. Sommerfelt (UPS); Övre Fingervandet, 1858 Chr. Sommerfelt (O, S, UPS); R. Tana, Holmen, 1864 Nrn (O); Smalfjord, by a brook, 1966 Wdn (H°).

South Sweden

Skåne. *Förlöf:* 1911 P. Tufvesson (H°).

Göteborg. *Göteborg:* Västra Frölund, Kaverös, 1967 C. Blom (H°). — *Öckerö:* Grötö, 1913 C. T. Holmström (H°).

Östergötland. *Gryt:* Säterön, 1957 J. Ax. Nannfeldt 14901 (H°).

Närke. *Svennevad:* Norrgård, 1950 G. Kjellmert (H°).

Uppland. *Stockholm:* Vaxholm, 1889 H. Lindberg (H°).

Denmark

Jylland, Distr. 20, Horsens, Vrads, 1965 J. Suominen (H°).

U.S.S.R.

Estonian S.S.R. 3.VII.1969 Elaane (TU°). — *Harju rayon:* 2 km NW of L. Harku, on sand, 1956 J. Kaasik (LE°). — *Koiva:* park meadow on shore of R. Koiva, 1965 L. Viljasoo (H°). — *Muhu:* village Koguva, 1966 L. Viljasoo (H°). — *Tallinn:* 10 km S of t., 1946 K. N. Igoshina (LE°); roadside 5 km W of t., 1956 J. Kaasik (H°). — *Tartu:* 1965 L. Viljasoo (H°).

Pskov Region. *Pskov:* V. D. Andreev, Herbarium Florae Rossicae 2680 (LE°); shore of R. Velikaya, 1916 L. Sokolova 16 (LE°).

Leningrad Region. *Kingisepp rayon:* W of Izvoz on R. Luga, 1963 N. Cvelev (LE°).

Vologda Region. *Sol'vychegodsk:* Afanasevskayo volost', 1896 A. G. Kolmakov 268 (LE°).

Arkhangel Region. *Kotlas:* W shore of Malaya Dvina, Shipitzyno, alluvium, 1927 E. A. Selivanova & S. M. Tozba (LE°).

White Russia. *Nemen:* sandy alluvium of R. Nemen, 1959 I. N. Byrtys (LE°).

Ukraine. *Chernigov:* alluvium of R. Desna, 1936 D. Afanas'ev (LE°). — *Harkov Region:* On R. Donetz between Zadonietskiy and the station Zamki-Dom, 1957 N. Cvelev (LE°).

South R.S.F.S.R. *R. Tanaicum:* R. Goluboy, near Teplyy, 1939 P. Smirnov (LE°). — *Kursk:* steppum pratosum »Streletzkaya» prope urbem Kursk, 1932 P. Smirnov (MW°). — *Voronez:* Bobrov district, stony steppe, 1923 E. E. Ditmer (LE°). — *Ufa Region:* Apykova, I. Korzhimskiy (LE°); Sterlitamak district, Sterlitamak, 1915 M. M. Il'in (LE°). — *Orenburg Region:* Troitzsk district, W of Berlinskoye steppe, 1916 I. M. Krasheninnikov 58 (LE°), and between Velikaya Uvel'skaya and Kabanovskiy, steppe, 1916 I. M. Krasheninnikov 50 (LE°).

Bashkir A.S.S.R. Alluvium of R. Sokmar, near Novo-Sakmarskoe, 1931 K. S. Akhranasyv 46 (LE°).

Agrostis mertensii

Finland

Karelia borealis. *Nurmes:* Höljäkkä, r.y., 1965 J. Suominen (H). — *Valtimo:* r.y., 1965 J. Suominen (H).

Ostrobottnia kajanensis. *Hyrynsalmi:* Paljakanvaara, roadside and moist spruce forest, 1946 N. Söyrinki (H, OULU); Paljakka: Märkölä and Mustanrinnanpuro, 1955, 1962 L. Heikkinen (OULU). — *Puolanka:* Joukolankylä, 1957 P. Havas (H); Paljakka, 1920 O. Kyyhkynen (H); Suolijärvi, Siikajärvi, Komettopuro, 1952 Y. Vasari & T. Ulvinen (OULU), 1952 T. Ulvinen (H), 1952 S. Eurola (OULU); Uutelanharju, 1952 P. Havas (H). — *Suomussalmi:* c.v.: Alanne 1909, Myllypuro 1911 and Siikalahti 1938, O. Kyyhkynen (H). S of Hiltusenvaara, 1952 K. Takala (H); Hossa, 1877 E. Wainio (TUR); Jumaliskylä, Rajala, 1962 L. & Y. Mäkinen (TUR); Kiannankylä: Keträ 1938 and Käpylä 1911, O. Kyyhkynen (H). Shore of Somerjoki near border of Kuusamo, 1908 W. Brenner (H, HEL); Ylinäljänkä, Juunujarvi, 1911 O. Kyyhkynen (H); Yliruhtinaansalmi, Rytys near Saarijärvi, 1911 O. Kyyhkynen (H**).

Ostrobottnia borealis. *Alatornio:* between Sorva- and Varajärvi, 1937 A. V. Auer (H, TUR); *Kemijärvi:* Joutsijärvi, r.y., 1964 J. Suominen (H); Juujärvi, 1878 E. Wainio (TUR); Pyhäjoki, Vuostimovaara, 1878 E. Wainio (TUR). — *Pudasjärvi:* Kortejärvi, Lintumo, 1955 Y. Vasari (H); roadside 3 km from Kurenala towards Kuusamo, 1959 T. Ahti 1460 (H); Siurua, Asmuntijoki, 1963 L. Heikkinen (OULU); Siurua, Siuruanjoki at border of Yli-Ii, 1953 T. Ahti (H); rivulet Välipuro between Kouvanjärvi and Latvakouvanjärvi, 1957 W. Weriö & P. S. Jokela (OULU). — *Ranua:* Nikkilä near Simojärvi, 1963 P. S. Jokela (OULU); Pohjaslahti, Näskänjärvi, 1955 T. Ahti (H); Pohjaslahti, 1 km W of Simojärvi, Pyöriäaho, 1955 T. Ahti (H); Repopaljakka, 3 km NW of church, 1943 A. V. Auer (H, TUR); Simojoki, Sääskikoski, 1943 A. V. Auer (H, TUR); Ylimaa, W shore of Saukkojärvi, Raappana, 1955 T. Ahti (H**, HFR); Yli-Simo, between Sääskikoskenniska and Nuuppaa, 1943 A. V. Auer (H, TUR). — *Rovaniemi:* Muurola r.y., 1964 J. Suominen (H); Narkaus, 1954 R.-L. Hämet (H); Nivavaara, r.y., 1964 J. Suominen (H); shore of Olkkajärvi, 1965 Wdn (H); Pekkala, Kaihuanvaara, SW slope, 1966 Wdn (H*). — *Ylitornio:* Kauliranta, r.y., 1965 J. Suominen (H).

Regio kuusamoënsis. *Kuusamo:* 31 specc. (H, HEL, HFR, OULU, VOA, TUR). — *Posio:* 17 specc., including Plantae finlandiae exsiccatae 453 and 1046 (H, OULU, TUR, TURA). — *Salla:* Kelloselkä, r.y., 1964 J. Suominen (H); shore of Naruskajoki, 1917 A. Rantaniemi (H); Salmivaara, r.y., 1964 J. Suominen (H); shore of Sallanjoki, 1898 A. Rantaniemi (OULU), W. Borg & A. Rantaniemi (H). — *Taivalkoski:* c.v., Maijalampi, 1941 N. Söyrinki (H, OULU); Loukusa, 1 km N of Silta-aho, 1960 T. Ahti 1061 (H).

Lapponia kemensis. *Kittilä:* 13 specc. (H, OULU, TUR). — *Kolari:* Kuervaara, 1935 R. Sarvas (HSI); Sieppijärvi, 1903 K. H. Enwald (HSI, S, TURA); Äkäslompolo, 1877 Hj. Hjelt & R. Hult (H, TURA). — *Muonio:* 29 specc. (H**, HEL, HFR, HSI, LD, O, OULU, S, UPS, TUR, TURA). — *Pelkosenniemi:* by road to Sodankylä, 1 km from border, 1959 R.-L. Hämet (H); Aapajärvi, 2 km W of Huhta, 1959 R.-L. Hämet (H); Kairala: by bridge and on shore 3.2 km towards Suvanto, 1960 K. Laaksonen (H). Suvanto, Mukkakoski, 1960 K. Laaksonen (H). — *Savukoski:* Arajärvi, 1878 E. Wainio (TUR); Maltio Nature Reserve, Solkiahaara, 1963 T. Rintanen & S. Vuokko (H); Martti 1 km up Värriöjoki from Koltsankoski, 1962 P. Havas (OULU); Sotajoki (»Såtajoki»), 1802 Anon. (? G. Wahlenberg) (UPS). — *Sodankylä:* 51 specc. (H**, OULU, TUR, TURA, UPS).

Lapponia enontekiensis. *Enontekiö:* 58 specc. (BG, H**, LD, O, OULU, S, TUR, TURA, UPS). One chrom. count (2 n = 56) by Bjn (UPS).

Lapponia inarensis. *Inari:* 60 specc. (H**, HFR, HSI, LD, O, OULU, S, TUR, TURA, UPS, VOA). — *Utsjoki:* 27 specc. (BG, H, OULU, TUR, UPS).

Karelian A.S.S.R.

Karelia pomorica occidentalis. *Ukhta* (Uhtua): 1897 J. O. Bergroth & K. W. Fontell (H).

Regio kuusamoënsis. *Kuusamo:* L. Olanga (Paanajärvi): Muikuintunturi, 1933 O. Fortelius (TURA), Rajala, 1937 J. Montell (LD, TRH, TURA, UPS), by road to Sovojärvi, 1917 V. Pesola (HFR).

Karelia keretina. *Mal'viaynen* (Malviaisperä): 1897 J. O. Bergroth & K. W. Fontell (H). — *Olanga:* shore of Pya-ozero (Pääjärvi), 1942 N. Söyrinki (H); R. Olanga, Kuivakkokoski, 1942 N. Söyrinki (H). — *Pista-yarvi:* Suvanto, shore in the village, 1941 N. Söyrinki (H).

Murmansk Region

Regio kuusamoënsis. *Kuolayarvi* (Salla): 20 specc. (H**, OULU, TUR, TURA).

Lapponia Imandrae. *Imandra:* L. Imandra, 1911 R. Pohle, Herbarium Florae Rossicae 2685 (H, etc.). — *Kandalaksha:* F. Nylander (H); mountain near Kandalaksha, 1913 H. Lindberg (H); shore of Niva near village, 1913 H. Lindberg (H). — *Khibina:* Khibina station, 1921 N. Prokhorov & O. Kuzeneva 387 (LE); Khibinogorsk, NE slope of Mt. Takhtsuvum, 1934 O. S. Polyanskaya & A. M. Semenova-Tyanshanskaya (LE); Kukisvum valley, Kukisiok, 1927 V. Golubkova & S. Yuzepzuk 121 (LE); Poagvum valley 1930 S. S. Ganeshin 1083 (LE). — *Tepsi* (Tupujoki): shore of Tepsi, 1901 W. M. Axelson & V. Borg (HEL).

Lapponia Varsugae. *Kamensk:* shore of R. Ponoy, 1887 J. A. Palmén (H). — *Kanevka:* shore of R. Ponoy near Kanevka, 1928 G. D. Zinserling 604 (LE).

Lapponia ponojensis. *Chapoma:* 1872 A. H. & V. F. Brotherus (H, LD, O, S, TUR, TURA, UPS). — *M. Korabel'nyy* (Karabelnijnos): 4 verst N of M. Korabel'nyy, 1863 M. Brenner (H, UPS). — *Pyalitsa:* 1889 A. O. Kihlman (H). — *Ponoy:* 1899 J. Montell (H, LD, TURA), 1927 E. Hultén (S). — *Svyatov Nos* (Svjatoinos): 1880 R. Enwald & C. A. Knabe (H, LD).

Lapponia petsamoënsis. *Pechenga* (Petsamo): 32 specc. (H, HEL, OULU, S, TUR, TURA).

Lapponia tulomensis. *Kola:* 1844 F. Nylander (H), 1861, 1863 N. J. Fellman, Pl. Arct. 106, 306 (H); valley of R. Kola 10 verst S of Kola t., 1921 N. Savicz 310 (LE). — *Notozero* (Nuotjaur): shore of the lake, 1883 H. Hollmén (HSI), 1891 J. Lindén (H). — *Polyarnyy* (Alexandrovsk): 1927 E. Hultén (S). — *Srednaya* Guba (Srednij): 1885 V. F. Brotherus (H).

Lapponia murmanica. *Drozdovka:* 1927 E. Hultén (S). — *Iokanga:* 1880 R. Enwald & C. A. Knabe (H). — *Porchnikha:* 1927 E. Hultén (S). — *Porrjaur:* 1887 A. O. Kihlman (H). — *Semiostrovskoye* (Semiostroff, Semostrow): 1887 V. F. Brotherus (H, S); by R. Kharlovka (Harloffka), 1887 V. F. Brotherus (H). — *Voron'ye* (Voroninsk): shore of R. Voron'ya (Voronje) 10 km S of village Voron'ye, 1887 A. O. Kihlman (H, S).

Sweden

Ångermanland. *Anundsjö:* Solberget, 1926 G. Samuelsson (S).

Västerbotten. *Degerfors:* Rosinedal, 1937 E. Asplund (S, LD); Åmsele, Abborrträsket, 1926 S. Nordenstam (S).

Norrbotten. *Harads:* Edefors, 1891 O. Westerlund (TURA); Edefors, Klösâ, 1924 A. Frisendahl (S); Edefors, Åminne, 1899, 1900 E. Frisendahl (BG, H, LD, S, TRH, UPS), 1901 A. Frisendahl (H). — *Hietaniemi:* Kukkasjokki, 1910 Fr. E. Alfvengren (S); Niemis, 1892 A. N. Lundström (UPS). — *Junosuando:* by road 395 at bridge over R. Tärendö, 1966 Wdn (H). — *Luleå:* 1821 L. L. Laestadius (S). — *Muonionalusta:* 1902 J. A. Z. Brundin (S), 1918 J. Montell (TURA); Muoniovaara, 1915 J. Montell (TURA), 1925 O. Fortelius (TURA); Taipaleensuu, 1902 S. Birger (S). — *Nederkalix:* 1912, E. Marklund (UPS). — *Nederluleå:* Roadside between Hålfjärden and Långvik, 1911 E. Marklund (UPS). — *Pajala:* 1858 L. L. Laestadius (S, UPS), 1889 H. Lamzelius (S); between Kengis and Pajala church, 1800 Herb. Wahlenberg (UPS); Kengis, 1860 L. L. Laestadius (S); towards Liviöjärvi, 1859 L. L. Laestadius (S); shore of R. Torne, 1902 S. Birger (S).

Lycksele Lappmark. *Lycksele:* Lycksaberg, 1934 S. Nordenstam (LD); Norräng, 1937 E. Asplund (S); Öretorp, 1938 E. Asplund (S). — *Stensele:* Skarvsjö, 1940 S. Nordenstam (S); Sorsele, Rankbäckstjärn, 1921 D. Gaunitz (UPS).

Pite Lappmark. *Arjeplog:* Akkelis, 1936 G. Wistrand (S); Dellaure 1932 E. Wistrand (S); Hällbacken, 1955 J. Lundquist (LD, UPSV); S slope of Lul. Istjakk, 1918 N. Johansson (S); W slope of Lul. Istjakk 800 m N of Strömnäs, 1918 N. Johansson (S); Mavasjaure region, Arjevardo, 1925 Th. Arwidsson (S); Peljekaise National Park, N shore of Luotjajaure, 1925 Th. Arwidsson (S); Pieskejaure S of Sulitelma, 1924 Th. Arwidsson (S); E slope of Raska, 1947 G. Wistrand (S); Rebnisjaure, 1963 J. Lundquist (UPSV); Rebnitskaja and Tjidtjik, 1856 Fr. & H. Björnström & S. O. Lindberg (UPS); Stuor Suattetjåkko, near border of LL Vaimaka region, 1924 Th. Arwidsson (S); Vuoggatjålmejaure: slope W of lake opposite to the mountain shelter, 1935 Th. Arwidsson (S), and N of that, 1932 Th. & A. Arwidsson (S). — *Arvidsjaur:* Grundträsket, 1934 G. Wistrand (S); Liueualokte, 1943 G. Wistrand (S); Tjappsåive, 1946 E. Wistrand (S)

Lule Lappmark. *Gällivare:* 1859 M. G. Brandelius (S), 1908 H. G. Simmons (H), 1909 F. E. A. Block (UPS), 1928 O. R. Holmberg (LD, S, UPS); Dundret, 1928 O. R. Holmberg (LD); Lappeasuvanto, 1966 Wdn (H); Muddus National Park, W shore of Lake Muddusjaure, 1946 Bjn 975 (UPS); Moskojärvi, 1966 Wdn (H); Sakajärvi, shore of R. Lina, 1966 Wdn (H); Sitasjaure region, Måkkolis, 1924 B. Bohlin (UPS); Skaulo 1928 O. R. Holmberg (UPS), 1966 Wdn (H); shore of R. Skrövån between Skröven and Mäntyvaara by bridge on road 98, 1966 Wdn (H); Suorva region, Suorva, 1934 G. Björkman (S). — *Jokkmokk:* 51 specc. (H, HSI, LD, O, OULU, S, TURA, UPS, UPSV). 5 chrom. counts (2 n = 56) by Bjn (UPS).

Torne Lappmark. *Karesuando:* 35 specc. (H, LD, S, UPS, UPSV, TURA). 6 chrom. counts (2 n = 56) by Bjn (UPS). — *Kiruna:* 93 specc. (H, HEL, LD, O, S, TRH, TUR, TURA, UPS, UPSV, VOA).

Norway

Nordland. *Ankenes:* Björnfjeld, 1928 A. Levan (LD, UPS); Hundalen, 1926 O. R. Holmberg (LG, UPS); Norddalen, E of Beisfjord, 1937 R. Jörgensen (TRH); valley connected with Bukkedalen, W of Naeverfjell, 1937 R. Jörgensen (TRH); Skjomen, Rundtind, W of Fjellbu, 1937 R. Jörgensen (TRH). — *Ballangen:* Börsvatn, 1955 S. Sivertsen & O. Skifte (TROM); Rogndalfjeld, 1881 Nrn (O). — *Fauske:* Furulund, 1907 O. R. Holmberg (H, LD, S, UPS, TURA), T. Sjövall (HSI). — *Hamaröy:* S of Cokkuljaurre, 1949 W. Apold & G. Brodal (O, TRH). — *Saltdal:* Balvand, 1869 Schlegel & Arnell (UPS); between Saltdalen and Sulitjelma, 1925 A. Notö (O). — *Sortland:* Hinnöy, Osvolldalen, 1947 J. Reiersen (TROM). — *Sörfold:* between Melkedalen and Swedish boundary, N of Langvatn, 1955 S. Sievertsen & O. Skifte (TROM). — *Tjeldsund:* Kongsviktinn, 1945 J. Reiersen (O). — *Tysfjord:* Mannfjord, Musken, 1955 S. Sivertsen & O. Skifte (TROM); mountains near Storaagvand, 1878 Nrn (O).

Troms. *Balsfjord:* 13 (O, TRH, TROM). — *Bardu:* 9 (BG, O, TRH, TROM). — *Dyröy:* 1 (BG). — *Gratangen:* 3 (O, TROM). — *Harstad:* 3 (O, TRH, TROM). — *Karlsöy:* 3 (TROM). — *Kvaefjord:* 3 (O, TROM). — *Kvaenangen:* 15 (BG, H, O, TROM). — *Kåfjord:* 1 (BG). — *Lenvik:* 1 (TROM). — *Målselv:* 16 (BG, O, TRH, TROM). — *Nordreisa:* 34 (BG, O, S, TRH, TROM, UPS). — *Salangen:* 4 (BG, O, TROM). — *Skjervöy:* 12 (H, O, TRH, TROM). — *Storfjord:* 14 (BG, S, O, TROM, TURA). — *Tranöy:* 2 (O, TROM). — *Tromsö:* 27, including A. Kneucker, Gramineae exsiccatae, VIII Lieferung, 1902, No. 214 (BG, H, LD, O, S, TRH, TROM).

Finnmark. *Alta:* 23 (BG, LD, O, S, TRH, TROM, UPS). — *Berlevåg:* 3 (H, O, UPS). — *Båtsfjord:* 3 (BG, LD, O, S, UPS). — *Gamvik:* 1 (O, S). — *Hammerfest:* 3 (O, UPS). — *Hasvik:* 1 (O). — *Karasjok:* 5 (BG, H, O, TROM). — *Kautokeino:* 7 (BG, H, O, TRH). — *Kvalsund:* 3 (BG, H, O). — *Lebesby:* 7 (O). — *Loppa:* 3 (O). — *Måsöy:* 5 (O, UPS). — *Nesseby:* 8 (H, O, S, UPS). — *Nordkapp:* 6 (O, S, UPS). — *Porsanger:* 5 (O, TRH). — *Sör-Varanger:* 15 (H, O, TROM, UPS). — *Söröysund:* — *Tana:* 13 (H, HSI, O, TRH, UPS). — *Vadsö:* 4 (O, UPS). — *Vardö:* 2 (O).

Agrostis clavata

Finland

Tavastia borealis. *Pihtipudas:* Muurasjärvi, 1962 A. Kosonen (OULU).

Savonia borealis. *Iisalmi:* Peltosalmi, 1916 V. Pallari (OULU). — *Kuopio:* Neulaniemi, S of Neulalampi, 1963 I. Kause (TUR). — *Maaninka:* Tuovilanlahti, Korkeakoski, 27 specc. (BG, H, HEL, HSI, KUO, LD, O, S, TUR, TURA, UPS), including Plantae finlandiae esxiccatae 48, 454 (H, etc.). — *Pieksämäki:* Venetmäki, r.y., 1966 J. Suominen (H) — *Tuusniemi:* Loukeinen, 1935 Y. Pitkänen (KUO).

Karelia borealis. *Ilomantsi:* Meskenvaara, 1932 A. Koskimies (H).

Ostrobottnia kajanensis. *Kajaani:* cultivated in t., 1965 L. Heikkinen (OULU); Kuluntalahti, Takkaranta, Takkasuo, 1959 L. Heikkinen (H, OULU); Kyntölä, 1920 Y. E. Rainio (H); Leihu, 1933 L. Lehtonen (H, HEL, O, TUR, TURA, UPS, VOA); Lintauskylä, Vihtaniemi, 1960 L. Heikkinen (H, OULU); Mustalahti, 1960 L. Heikkinen (H); Savikko, 1959 L. Heikkinen (H); between Savikko and Mustalahti, 1959 L. Heikkinen (H, OULU, TUR); Teppana, near Ämmäkoski, 1934 L. Lehtonen (H). — *Paltamo:* Kontiomäki, along Kylmäpuro, 1952 L. Heikkinen (OULU), 1952 M. J. Kotilainen & L. Heikkinen (H), 1953 L. Heikkinen (H), 1954 L. Heikkinen & M. J. Kotilainen (OULU); Kontiomäki, Pitkänperä, 1955 L. Heikkinen (H, OULU), 1957 L. Heikkinen (OULU), 1959 Y. Mäkinen (TUR); Melalahti, Näsäsenpuro, 1964 L. Heikkinen (OULU). — *Suomussalmi:* shore near rectory, 1908 O. Kyyhkynen (H); Kianniemi, Pahanlammi, 1909 O. Kyyhkynen (H).

Ostrobottnia borealis. *Rovaniemi:* Pekkala, SW slope of Kaihuanvaara, 1956 M. J. Kotailainen (H).

Karelian A.S.S.R.

Kuusamo: Myantyuniemi (Mäntyniemi) by L. Olanga (Paanajärvi), 1898 J. Montell (TURA). — *Sokolozero* (Soukelo): N. J. Fellman (H).

Sweden

Ångermanland. *Anundsjö:* Högtjäl, Kamptjärnemyren, 1919 H. Hesselman (S); Solberg, 1926 G. Samuelsson (LD, S, UPS). — *Örnsköldsvik:* r.y., 1922 S. Almquist (S). — *Överlännäs:* Paraberget, 1949 J. Westerlund (S).

Västerbotten. *Degerfors:* Kulbäcksliden, Gransjöberget, 1907 N. Sylvén (LD); R. Ume at mouth of Rackbäcken, 1929 G. Fridner (S). — *Vännäs:* near Kolksele, 1925 S. Nordenstam (S).

Norrbotten. *Harads:* Åminne, 1900 (LD), 1901 (BG, HSI, LD, S, TURA, UPS, UPSV), 1902 (S, TROM, TURA), 1902 Herbarium Normale, I. Dörfler 4394 (H, etc.), all 4 A. Frisendahl, 1901 E. Frisendahl (S); Kallså, 1924 A. Frisendahl (S). — *Älfsberg:* Getberg, 1919 H. Hesselman (S)

Lycksele Lappmark. *Lycksele:* Lomfors, near Öreälv, 1926 S. Nordenstam (S).

Agrostis scabra

Finland

Nylandia. *Helsinki:* r.y. on S shore of Töölönlahti, 1931 I. Hiitonen (H; sub nom. *A. hiemalis* in Hiitonen 1947), 1950 E.-V. Hintikka (H).

Tavastia borealis. *Hankasalmi:* Hankasalmi r.y., 1966 J. Suominen (H).

Agrostis pourretii

Finland

Nylandia. *Helsinki:* Lauttasaari/Drumsö; storing place for cork bark imported from Morocco, 1940 B. Pettersson (H; sub nom. *A. pallida* in Pettersson 1952).

Agrostis capillaris

Finland

Alandia. *Brändö:* 1 (TURA). — *Eckerö:* 3 (H, TUR, TURA). — *Finström:* 8 (H, OULU, TURA"). — *Föglö:* 3 (H, TUR, TURA). — *Geta:* 1 (TUR). — *Jomala:* 3 (HFR, TURA). — *Kumlinge:* 1 (TURA). — *Kökar:* 1 (H). — *Lemland:* 3 (H"). — *Lumparland:* 3 (H, TUR). — *Mariehamn:* 3 (H"). — *Saltvik:* 2 (H", TUR). — *Sund:* 2 (H). — *Vårdö:* 1 (H").

Regio aboënsis. *Bromarv:* 4 (H). — *Finby:* 1 (H). — *Hitis:* 3 (H). — *Houtskär:* 2 (H). — *Iniö:* 2 (H", TUR). — *Kaarina:* 3 (H, HSI, TUR). — *Karjalohja:* 4 (H, HEL). — *Karuna:* 1 (TUR). — *Kimito:* 2 (H"). — *Korpo:* 8 (H"). — *Laitila:* 2 (H, TUR). — *Lohja:* 17 (H", HSI, TURA). — *Merimasku:* 1 (TUR). — *Nagu:* 4 (H, TURA). — *Naantali:* 2 (H). — *Paimio:* 3 (H, TUR). — *Pargas:* 9 (H, HFR, HSI, TUR, TURA). — *Piikkiö:* 5 (H", TUR). — *Pojo:* 2 (TUR). — *Pöytyä:* 1 (TUR). — *Raisio:* 2 (TUR). — *Salo:* 1 (H). — *Sauvo:* 2 (H, TUR). — *Turku:* 9 (H", TUR, TURA). — *Uusikaupunki:* 6 (H", HEL, TUR). — *Velkua:* 1 (TUR). — *Vihti* (Vichtis): 4 (H", HSI, TUR).

Nylandia. *Borgå:* 19 (H"**, HFR, TURA). — *Ekenäs:* 11 (H, HSI, S, TURA, UPS", VOA), 1 chrom. count (2 n = 28) by Bjn 2188 (UPS). — *Espoo:* 4 (H, HSI, TURA). — *Hangö:* 5 (H", TUR). — *Helsinki* (r.d.): 4 (H, TUR). — *Helsinki* (t.): 18 (H"**, HFR, TUR, TURA). — *Hyvinkää:* 2 (H", UPS). — *Ingå:* 4 (H"). — *Kerava:* 1 (H). — *Kyrkslätt:* 3 (H, OULU). — *Lovisa:* 1 (H"). — *Mäntsälä:* 8 (H", HFR). — *Orimattila:* 1 (H"). — *Pernå:* 14 (H**). — *Pornainen:* 3 (H", S). — *Pyhtää:* 2 (H). — *Ruotsinpyhtää:* 1 (H"). — *Sibbo:* 9 (H, TURA, UPS). — *Snappertuna:* 1 (H). — *Tuusula:* 1 (H).

Karelia australis. *Haapasaari:* 1 (H"). — *Hamina:* 1 (TURA). — *Kotka:* Mussalo, 1958 T. Ulvinen (HFR; sub nom. *A. hyperborea* in ULVINEN 1959: 122). — *Miehikkälä:* 2 (H). — *Sippola:* 2 (H). — *Vehkalahti* (Veckelax): 5 (H). — *Virolahti:* 1 (H).

Satakunta. *Ahlainen* (Vittisbofjärd): 3 (H"). — *Alastaro:* 1 (TUR). — *Eura:* 1 (H). — *Eurajoki* (Euraåminne): 4 (H, TUR, TURA). — *Huittinen:* 1 (TUR). — *Hämeenkyrö:* 2 (H, HSI). — *Ikaalinen:* 1 (TUR). — *Karkku:* 8 (H, TUR). — *Karvia:* 2 (TUR). — *Kihniö:* 1 (H). — *Kiukainen:* 1 (TUR). — *Kokemäki:* 1 (H). — *Köyliö:* 2 (H, OULU). — *Lappi:* 3 (OULU, TUR). — *Lavia:* 1 (H). — *Loimaa:* 1 (H). — *Luvia:* 1 (TUR). — *Merikarvia:* 1 (OULU). — *Noormarkku:* 1 (H). — *Parkano:* 3 (H). — *Punkalaidun:* 2 (TUR). — *Rauma:* 5 (OULU, TUR). — *Säkylä:* 2 (H, TUR). — *Yläne:* 2 (H, HSI).

Tavastia australis. *Asikkala:* 2 (H, TUR). — *Hartola* (Gustav Adolfs): 1 (TURA). — *Hattula:* 1 (H). — *Hauho:* 1 (H"). — *Hausjärvi:* 1 (H). — *Hollola:* 1 (TUR). — *Humppila:* 1 (H). — *Iitti:* 1 (H). — *Jokioinen:* 3 (H", TUR). — *Juupajoki:* 1 (H). — *Jämsä:* 3 (H, OULU, TUR). — *Jämsänkoski:* 1 (TUR). — *Kalvola:* 3 (H, TUR). — *Kangasala:* 3 (H, TUR). — *Korpilahti:* 4 (H", TUR). — *Koski:* 1 (H). — *Kuusankoski:* 1 (H). — *Lammi* (Lampis): 12 (H, HSI, TUR). — *Lempäälä:* 2 (H.) — *Loppi:* 1 (H). — *Luhanka:* 1 (S). — *Luopioinen:* 3 (H, OULU). — *Längelmäki:* 1 (H). — *Muurame:* 1 (TUR). — *Mänttä:* 1 (TUR). — *Nastola:* 1 (TUR). — *Orivesi:* 4 (H). — *Padasjoki:* 1 (H). — *Ruovesi:* 2 (H", OULU). — *Somero:* 1 (H). — *Somerniemi:* 1 (H). — *Sysmä:* 3 (H). — *Sääksmäki:* 2 (H, TURA). — *Tammela:* 4 (H). — *Tampere:* 1 (TUR). — *Teisko:* 2 (H). — *Tyrväntö:* 4 (H", OULU, TUR). — *Urjala:* 2 (H"). — *Vesilahti:* 1 (H, OULU). — *Vilppula:* 1 (TUR). — *Ypäjä:* 2 (H, OULU, TUR).

Savonia australis. *Enonkoski:* 1 (H). — *Hirvensalmi:* 1 (H). — *Imatra:* 1 (H). — *Joutseno:* 1 (H). — *Juva:* 3 (H, TUR). — *Kouvola:* 3 (H", TUR). — *Lappeenranta:* 19 (H"). — *Mikkeli:* 4 (H, TUR). — *Mäntyharju:* 1 (H). — *Punkaharju:* 2 (H). — *Rantasalmi:* 2 (H, TUR). — *Rautjärvi:* 1 (H). — *Sääminki:* 1 (TUR). — *Taipalsaari:* 2 (H). — *Valkeala:* 4 (H"). — *Virtasalmi:* 1 (H).

Karelia ladogensis. *Parikkala:* 1 (H). — *Saari:* 1 (H). — *Uukuniemi:* 1 (H, HSI).

Ostrobottnia australis. *Alavus:* 1 (H). — *Bergö:* 1 (H). — *Kaskö:* 1 (TUR). — *Kauhajoki:* 1 (H). — *Korsnäs:* 1 (H, HFR, TUR). — *Kristinestad:* 5 (H", TUR). — *Lappfjärd:* 2 (H, TUR). — *Närpes:* 2 (H, VOA). — *Replot:* 2 (VOA). — *Solf:* 1 (VOA). — *Teuva:* 2 (H, OULU). — *Vaasa:* 8 (H, VOA).

Tavastia borealis. *Jyväskylä:* 4 (H", TUR). — *Karstula:* 1 (H"). — *Keitele:* 3 (H", OULU). — *Konnevesi:* 4 (H). — *Petäjävesi:* 1 (TUR). — *Pihtipudas:* 4 (H, OULU). — *Suolahti:* 1 (TUR). — *Viitasaari:* 3 (H). — *Virrat:* 6 (H).

Savonia borealis. *Iisalmi:* 4 (H", HSI). — *Joroinen:* 1 (H). — *Kiuruvesi:* 2 (H). — *Kuopio:* 18 (H", KUO, LD, O, OULU, S ,TROM, TUR, TURA, UPS). — *Leppävirta:* 1 (TUR). — *Maaninka:* 16 (H"). — *Nilsiä:* 4 (H"). — *Pieksämäki:* 1 (H). — *Pielavesi:* 6 (H). — *Siilinjärvi:* 4 (HFR). — *Suonenjoki:* 2 (H). — *Vieremä:* 1 (VOA).

Karelia borealis. *Eno:* 1 (H). — *Ilomantsi:* 5 (H", TUR). — *Joensuu:* 3 (H, OULU, TUR). — *Juuka:* 1 (H). — *Kaavi:* 1 (H). — *Kitee* (Kides): 1 (H). — *Kontiolahti:* 2 (H, OULU). — *Lieksa:* 1 (H). — *Liperi* (Libelits): 4 (H). — *Nurmes:* 1 (H). — *Pielisjärvi:* 6 (H). — *Rautavaara:* 1 (H). — *Tohmajärvi:* 2 (H, TUR). — *Tuupovaara:* 1 (H). — *Valtimo:* 1 (H). — *Värtsilä:* 1 (H).

Ostrobottnia media. *Alajärvi:* 1 (H). — *Esse:* 1 (H). — *Haapajärvi:* 1 (H, OULU, TUR). — *Kokkola:* 2 (H). — *Lappajärvi:* 5 (H). — *Larsmo:* 2 (H"). — *Nivala:* 2 (H, OULU). — *Nykarleby:* 2 (H). — *Oulainen:* 1 (OULU). — *Paavola:* 1 (H). — *Pattijoki:* 1 (H). — *Pedersöre:* 2 (H, TURA). — *Pyhäjärvi:* 2 (H). — *Raahe:* 1. (H"). — *Rantsila:* 1 (OULU). — *Siikajoki:* 1 (OULU). — *Vihanti:* 2 (H). — *Vimpeli:* 1 (H).

Ostrobottnia kajanensis. *Kajaani:* 6 (BG, H, OULU, TUR). — *Paltamo:* 6 (H, TUR). — *Puolanka:* 1 (H). — *Ristijärvi:* 3 (H", TUR). — *Sotkamo:* 3 (H, OULU). — *Suomussalmi:* 6 (H"). — *Vaala* (Säräisniemi): 3 (H). — *Vuolijoki:* 1 (H).

Ostrobottnia borealis. *Alatornio:* 2 (H, OULU). — *Hailuoto* (Karlö): 4 (H, TUR). — *Haukipudas:* 2 (H, OULU). — *Ii* (Ijo): 5 (H, OULU, TUR). — *Kemi:* 9 (H, OULU, TUR). — *Kemijärvi:* 4 (H). — *Kiiminki:* 1 (OULU). — *Kuivaniemi:* 3 (H, OULU). — *Liminka:* 1 (H). — *Muhos:* 2 (OULU). — *Oulu:* 13 (H, HSI, OULU, TUR). — *Oulujoki:* 3 (OULU). — *Oulunsalo:* 1 (OULU). — *Pello:* 4 (H, HSI). — *Pudasjärvi:* 4 (BG, OULU, TUR, TURA). — *Ranua:* 1 (H, TUR). — *Rovaniemi:* Pekkala, Kaihuanvaara, spring on SW slope, 1966 Wdn (H*); Karvo, 1864 M. Brenner (H"; sub nom. *A. stolonifera* × *vulgaris* in H. LINDBERG 1900: 153); 12 (H"). — *Simo:* 3 (H, OULU). — *Temmes:* 1 (OULU). — *Tervola:* 3 (H). — *Tornio:* 1 (OULU). — *Yli-Ii:* 1 (OULU). — *Yli-kiiminki:* 1 (H). — *Ylitornio:* 5 (H, HSL, OULU).

Regio kuusamoënsis. *Kuusamo:* 34 specc., 1864—1967 (H", OULU, TUR). — *Posio:* Akanlahti, Kuorikkilampi, 1916 E. af Hällström, Plantae finlandiae esxiccatae 1044, 1045 (H, etc.); Hietaniemi, 1948 O. Rune (UPS); Iso Riisitunturi, reg. alp., 1937 R. Kalliola (H); Kesojoki, 1958 Y. Vasari (H); Tolva, Riisitunturi, 1966 H. Vänskä (H). — *Salla:* r.y. of Salla and Salmivaara, both 1964 J. Suominen (H). — *Taivalkoski:* Jukee, Tyni, 1958 Y. Vasari (H).

Lapponia kemensis. *Kittilä:* N part, 1908 G. Lång (HSI); shores of Ounasjoki in Helppi and Alakylä, 1966 Wdn (H); Kaukonen, 1877 Hj. Hjelt & R. Hult (H"); Kaukonen, Venejoki, 1959 R.-L. Hämet (H); Kurkkionvaara, 1925 K. Linkola (H); Tiukujärvi, 1966 Wdn (H). — *Kolari:* c.v., 1925 O. Fortelius (TURA); Teuravuoma, 1939 E. Valleala (H); Äkäsjoki, 1933 H. Roivainen (H"). — *Muonio:* c.v., 1903 K. H. Enwald (H", TURA), 1915, 1917, 1931, 1941 J. Montell (H", O, TURA"); Tapojärvi, 1922, 1925 J. Montell (TURA", UPS); Valkiajärvi, 1922 J. Montell (TURA); Ylikylä, Onnela. 1933, 1940, 1942 J. Montell (TURA"). — *Pelkosenniemi:* Aapajärvi, shore of Kitinen, 1959 P. Havas (OULU); roadside (Pelkosenniemi—Sodankylä road) 1 km from border of Sodankylä, 1959 R.-L. Hämet (H); Kairala, 1959 R.-L. Hämet (H); Saunavaara, shore of Kitinen, 1967 Wdn (H); shores of Kitinen near Suvanto, 3 specc., 1960 K. Laaksonen (H). — *Savukoski:* c.v., river shore, 1966 Wdn (H); camping place, 1960 P. Havas (OULU); Hihnavaara, river shore, 1966 Wdn (H). — *Sodankylä:* localities along Kitinen (S→N): Aska, 1959, 1960 K. Laaksonen (H), 1965 Wdn (H), c.v., 1965 Wdn (H), Sattanen, 1965 Wdn (H), Kersilö, 1959 K. Laaksonen (H"), 1965 Wdn (H), Peurasuvanto, 1959 K. Laaksonen (H"**), Ylikitinen, Laiti, 1959 T. Ulvinen (H). Allemalehto, 1960 T. Rintanen (H); Korvanen, 1958 K. Laaksonen (H"), T. Ulvinen & J. Poijärvi (H"); roadside of highway No. 4 95 km S of Ivalo, 1965 Wdn (H); Raja-Jooseppi, valley of Suomujoki, Suomujärvet, 1959 T. Ahti (H); Saariselkä, Vuomaselkä, 1959 T. Ahti (H).

Lapponia eneontekiensis. *Enontekiö* (localities arranged SE→NW): Ylikyrö, Saajontalo, 1966 P. Borg (H"); Ketomella, 1966 P. Borg (H"); Palojoensuu, 1966 Wdn (H); Hetta, 1965 Wdn (H); Leppäjärvi, 1965 Wdn (H); Markkina, 1959 R.-L. Hämet (H); Rappaskoski, 1959 R.-L. Hämet (H); Luspa, Mäntyraja, 1966 Wdn (H); Kilpisluspa, 1936 H. Roivainen (H); Naimakkajärvi, Kenttä, 1939 J. I. Liro & H. Roivainen (S); N.W.-Naimakkajärvi, 1959 L. & H. Roivainen (H); Iitto, 1960 L. & H. Roivainen (H"); Saukkokoski, 1959 P. S. Jokela (OULU); S end of Ala-Kilpisjärvi, 1959 R.-L. Hämet (H); Kilpisjärvi: Salmivaara 1936, and Siilastupa 1947, both H. Roivainen (H"), Mallajoki, path. 1964 B. Federley (H").

Lapponia inarensis. *Inari:* by rapids in the c.v., 1966 Wdn (H); roadside 18 km S of Ivalo (highway No. 4), 1965 Wdn (H), and 14 km S of Ivalo, 1965 Y. Mäkinen (TUR); Kaamanen, 1959 T.Ahti (H), 1961, E. Koivistoinen (TUR); Kaunispää, 1933 R. Kalliola (H, OULU, TUR); shore of Luttojoki about 15 km from border of U.S.S.R., 1966 Wdn (H); Mihkaljärvi, 2 km S of Aarniniemi, 1960 E. Antikainen (TUR); Partakko, 1959 I. Kukkonen (TUR). — *Utsjoki:* c.v., 1964 Y. Mäkinen (TUR"); Kevojärvi, N of Tshieskula, 1964 Y. Mäkinen (TUR"); Kevonsuu, 1956 U. Laine (TUR); shore of Utsjoki opposite Kurula, 1961 L. & Y. Mäkinen (TUR"); roadside near Mierasjärvi, 1966 Wdn (H); Nuorgam, Suomenrinne, 1961 P. Vanhatalo (TUR"); Petsikkotunturi, 1959 A. Kosonen (OULU); Puksala, Sujala, 1958 Y. Mäkinen (TUR).

Leningrad Region

Karelia australis. *Kamennogorsk* (Antrea, St Andree): 1900 H. Lunelund (TURA); Talikkala, 1923 O. H. Porkka (H). — *Lesogorskiy* (Jääski): 1917 M. Kangasniemi (TUR). — *Melnikovo* (Räisälä): Sirlaks, 1888 J. Lindén (H). — *O. B. Tyutyarsari* (Tytärsaari, Tyterskär): 1868 M. Brenner (H). — *Ozerskoye* (Vuoksenranta): Oravankytö, 1923 O. H. Porkka (H). — *Syakkiyarvi:* 1878 E. W. Blom (H"); Nurmela, 1878 E. W. Blom (H). — *Vyborg* (Viipuri): Ykspää, 1926 O. Kannisto (H"), T. Kannisto (TUR).

Isthmus karelicus. *Michurinskoye* (Valkjärvi): Veikkola, 1927 Y. Puolanne (H"). — *Pervomayskoye* (Kivennapa, Kivinebb): Kuuritsansus, by Systerbäck, 1911 A. L. Backman (HSI). — *Polyany* (Uusikirkko, Nykyrka): Sykiälä, 1902 O. A. Gröndahl (TURA). — *Zelenogorsk* (Terijoki): 1936 L. Fagerström (H"). — *Zaporozhskoye* (Metsäpirtti): 1866 A. J. Malmberg (H).

Karelia olonetsensis. *Gumbaritzy:* shore of Ladoga, 1942 I. Hustich (H"). — *Iivina:* 1898 J. J. Lindroth & A. K. Cajander (H). — *Voznesen'ye:* 1875 Fr. Elfving (H). — *Zubetsa:* 1942 I. Hustich (H).

Karelian A.S.S.R.

Karelia ladogensis. *Impilakhti:* Mäkisalo, 1905 J. S. W. Koponen (H). — *Kurkiyoki* (Kronoborg): Atsanlaks, 1874 E. Juslin (H); Rahola, 1936 S. Räsänen (H). — *Lahdenpokha:* Sorelansaari, 1961 E. Pobedimova & V. Gladkova 79 (LE). — *Ruskeala:* 1904 O. Lönnbohm (S); Leppäkoski, 1903 C. A. Knabe (TURA). — *Sortavala:* 16 specc. (H", HSI, S, TUR). — *Suistamo:* Uuksujärvi, Roikonkoski, 1914 K. Linkola (H).

Karelia olonetsensis. *Kuuttilahti:* 1942 I. Hustich (H"). — *Peda-Sel'ga* (Petäjäselkä): 1899 J. I. Liro & A. K. Cajander (HSI). — *Petrozavodsk:* 1896 N. A. Ivanitsky (H). — *Suurimäki:* Keidoja, 1942 N. Söyrinki (H). — *Vedlo-ozero* (Vieljärvi): Pihtilahti, 1943 A. Railonsala (TUR).

Karelia borealis. *Korpisel'kya:* 1900 J. Montell (H", TROM, TURA, UPS), 1901 A. Torckell (H). — *Suoyarvi:* Kotajärvi, Moisseinvaara and Savinisto, all 3 1914 K. Linkola (H); Pöpörisaari, 1912 J. S. W. Koponen (H).

Karelia onegensis. *Kivach:* 3 km from Kivach station towards Sopokhi, 1929 M. N. Avramchik & A. A. Komov (LE). — *Munjärvi:* between Kuntjärvi and Munjärvi N of Kaapjärvi, 1942 M. J. Kotilainen (H). — *Shomba:* right shore of R. Shomba, 1928 K. Solonevich 89 (LE). — *Sivodo:* N shore of L. Onega, 1907 Bezoys & Verdi (LE). — *Soroka:* Soroka station on Murmansk railway, 1917 A. Bulavkina, V. Komarov & V. Petrov 1113 (LE).

Karelia pomorica occidentalis. *Padany* (Paatene): Pylväsjoki, 1943 A. Toivanen (H"). — *Shuyeretskaya* (Sjuja): 1896 J. O. Bergroth & J. I. Lindroth (H).

Regio kuusamoënsis. *Kuusamo:* L. Olanga (Paanajärvi): Manninen, 1908 A. L. Backman (H), and Rajala, 1937 J. Montell (TURA").

Karelia keretina. *Kesten'ga* (Kiestinki): 1942 N. Herlin (H"). — *Olanga:* Laitasalmi and Lipsinki, both 1877 E. Wainio (H).

Murmansk Region

Lapponia Imandrae. *Kandalaksha:* shore of Kandalaksha guba, 1921 N. Savich 760 (LE); shore of R. Niva, 1913 H. Lindberg (H), 1921 N. Savich 665 (LE); *Umba:* 1861 G. Selin (H), 1892 A. O. Kihlman (H", S).

Lapponia petsamoënsis. *Pechenga* (Petsamo): Alaluostari, 1925 K. Linkola (H"); Kuvernöörinkoski, 1929 T. Kontuniemi (H"), A. A. Cajander (S); shore of R. Lota (Luttojoki) about 25 km from Finnish border, 1967 Wdn (H"); islet near Näsykkä, 1926 E. Häyrén (H); Salmijärvi, 1928 A. A. Cajander (H").

Lapponia tulomensis. *Kola:* 1861 N. J. Fellman (H), 1863 N. J. Fellman, Pl. Arct. 307 (H).— *Nota* (Nuotjok): mouth of R. Nota, 1891 J. Lindén (H").

Lapponia murmanica. *Voron'ye* (Voroninsk): 1887 A. O. Kihlman (H).

Sweden

Ångermanland. *Anundsjö:* 1 (S). — *Grundsunda:* 3 (UPS). — *Härnösand:* 2 (S, TURA), 1947 Bjn 1622, 2 n = 28 (UPS). — *Kramfors:* 1 (S). — *Nora:* Skullersta, 1947 Bjn 1647, 2 n = 28 (UPS). — *Ramvik:* 1 (S). — *Säbrå:* 4 (S, UPS, TURA).

Västerbotten. *Bygdeå:* 1 (LD″). — *Byske:* Havsbadet, 1947 Bjn 1699, 2 n = 28 (UPS″); Skogfors, 1947 Bjn 1697, 2 n = 28+2 (UPS). — *Degerfors:* 2 (BG, S). — *Holmö:* 1 (S). — *Jörn:* 3 (S, UPS). — *Lövånger:* 3 (S, UPS); Bjuröklubb, 1950 Bjn 1678, 2 n = 28 (UPS); S Broträsk, 1947 Bjn 1670, 1671, 1672, all 3 2 n = 28 (UPS); Broträsk, 1949 Bjn 2805, 2 n = 28 (UPS); Kallviken, 1949 Bjn 2800, 2 n = 28 (UPS). — *Norsjö:* 1 (S). — *Skellefteå:* 3 (S″, UPS). — *Umeå:* 2 (S, UPS). — *Vännäs:* 1 (S).

Norrbotten. *Harads:* 1 (H, S, UPS). — *Junosuando:* 2 (H). — *Luleå:* 7 (BG, S, UPS″). — *Muonionalusta:* 1 (TURA″). — *Nederkalix:* 3 (S, UPS). — *Nederluleå:* 4 (S, UPS); Hindersön, 1946 Bjn 898, 900, both 2 n = 28 (UPS″); Lappön, 1946 Bjn 906, 907, both 2 n = 28 (UPS). — *Nedertorneå:* Santasaari, 1946 Bjn 881 2 n = 28, 887 2 n = 28+2 (UPS). — *Pajala:* 20, earliest 1800, (H, LD, S″, UPS). — *Piteå:* 6 (S, UPS). — *Tärendö:* 2 (H, S, UPS). — *Älvsby:* 4, earliest 1804, (S, UPS, UPSV″). — *Överkalix:* 2 (H, S). — *Övertorneå:* 1 (UPS″).

Åsele Lappmark. *Åsele:* Lugnet, 1884 P. F. Lundquist (UPS).

Lycksele Lappmark. *Lycksele:* Grankottaliden, 1931 C. Malmström (S); between Norräng and Lyckan, 1937 E. Asplund (S); Stenhamn, 1938 E. Asplund (S); near Västra Örträsk, 1938 S. Nordenstam (S″, UPS″). — *Sorsele:* c.v., 1944 G. R. Cedergren (S); Rankbäckstjärn, 1921 D. Gaunitz (UPS).

Pite Lappmark. *Arjeplog:* c.v., 1927 C. G. Alm (S, UPS), 1932, 1937 G. Wistrand (S); Hällbacken, 1955 J. Lundquist (UPSV″); Saddjaur, S shore by Norra Bergnäs, 1963 J. Lundquist (UPSV″). — *Arvidsjaur:* Fjällbonäs, 1937 G. Wistrand (S); Törnforsen (locality 3), 1962 J. Lundquist & G. Wistrand (UPSV″).

Lule Lappmark. *Gällivare:* 1918 A. N. Lundström (UPS); Hakkas, shore of R. Skrövån by Palohuornas, 1966 Wdn (H); Lappeasuvando, 1966 Wdn (H); Liikavaara, 1966 Wdn (H); Mäntyvaara, by road 98 at bridge over R. Skrövån, 1966 Wdn (H); Moskojärvi and Skaulo, both 1966 Wdn (H); N side of Nikkojaurga, just W of mouth of Ritsimjokk, 1922 G. Björkman (S, UPSV″). — *Jokkmokk:* c.v., 1936 J. Ax. Nannfeldt (UPS); Harsprånget, shore of Stora Lule älv, 1946 G. Björkman (O, S, UPS); Kvikkjokk, 1900 T. Vestergren (S″), 1940 J. Lagerkrantz (UPS), 1943 S. Selander & N. Dahlbeck (S); Ludvigsudd, 1906 H. G. Simmons (LD, UPS), 1907 N. Sylvén (LD); Malenjarka, by Saggat, 1936 J. Ax. Nannfeldt (S, UPS), 1944 S. Selander (S); Kvarnmyren near Malenjarka, 1944 S. Selander (S); Muddus National Park, 1946 Bjn 964, 966, 968 2 n = 28, 969, 971 2 n = 28+3, 973 (UPS″); Niavve, 1901 N. Sylvén (LD); Murjek, railway bank, 1929 O. R. Holmberg (LD); opposite Njuoravuolle by Stora Lule älv, 1946 Bjn 963 (UPS); roadside between Ligga and Njuoravuolle, 1946 Bjn 961 a, 962 (UPS); Porjusfallen, 1946 G. Björkman (S, UPS), Bjn 979, 2 n = 28 (UPS); Pärlholmen, 1867 E. Widmark (S); Rapadalen, 1901 T. Vestergren (S); Skalka, 1901 N. Sylvén (LD); Snjärrak, 1859 E. Ährling (LD); Suorva region, SW bay of Meutajaure, birch forest, 1923 G. Björkman (UPS, UPSV); shore of Våtnessijaur by mouth of Tarreätno, 1943 S. Selander (S, UPS); Tarradalen, brook E of Ruotatsfallet, 1944 S. Selander & O. Rune (S, UPS); N shore of Vastenjaure, 1913 T. Å. Tengvall (S); Vuollerim, 1924 H. Svenonius (S).

Torne Lappmark. *Karesuando:* 1840, 1847 L. L. Laestadius (LD, S, UPS″); Peldsa, in birch forest by path near Peldsa-stugan, at about 500 m, 1948 H. Smith, Bjn 2 n = 28 (UPS). — *Kiruna:* 1907 M. Sondén (S), 1909 H. G. Simmons (S, UPS); Abisko, 1917 E. Asplund (BG, S, UPS), 1929 O. R. Holmberg (LD″), 1934 A. Nygren (UPS), 1936 R. Santesson (S), 1946 Bjn 849 (UPS), 1964 E. Asplund (S); railway bank between Abisko and Nuoljatundra, 1913 N. Sylvén (LD); Bergfors, by a brook in regio subalpina, at about 500 m, 1926 C. G. Alm (UPS); Björkliden, 1946 Bjn 851 2 n = 28+2, 853 2 n = 28, 854 2 n = 28+1 (UPS″); path between Jukkasjärvi and mire W of Rapakkojärvi, 1946 Bjn 869, 2 n = 28+2 (UPS); E of Kallojärvi, 1946 Bjn 869, 2 n = 28+2 (UPS); by highway between Kiruna and Jänkänalusta 11—13 km SW of Kiruna, 1939 C. G. Alm & H. Smith (UPS); Kuosakielinen, 1929 O. R. Holmberg (LD″); brook between Pålnoviken and Nuorajokk, 1949 E. Asplund (S); Njakatjavelk near Abisko, 1929 O. R. Holmberg (LD″); Reurifjäll, 1920 H. Smith (UPS); Riksgränsen, 1914 L. Trafvenfelt (UPS), 1929 O. R. Holmberg (LD), 1939 C. G. Alm & H. Smith (UPS); between Riksgränsen and Vassijokk, 1918 E. Asplund (S); Sjangeli, Kamavagge, at about 850 m, 1927 H. Smith (UPS); Tornehamnstugan, 1949 E. Asplund (S); Vittangi, Kuoksu, shore of R. Torne, 1966 Wdn (H).

Norway

Nordland. *Andöy:* 4 (BG, O, TRH, TROM). — *Ankenes:* Fagernesfjell, 440 m, 1937 R. Jörgensen (TRH″); Hundalen, 1946 Bjn 865, 2 n = 28 (UPS); Rombaksbotn, 1946 Bjn 862, 2 n = 28 (UPS″), 1950 Bjn 3110, 2 n = 28 (UPS), 1950 E. Asplund (S). — *Fauske:* 1 (O). — *Hadsel:* Eidsfjord, NE slope of fjeld N of Kjörstadvatnet, alpine belt, 1969 P. & I. Kytövuori (H). — *Hamaröy:* 1 (BG, O). — *Lödingen:* 2 (O, TROM). — *Narvik:* 1 (S); W slope of Fagernesfjell, alpine meadow, 1969 P. & I. Kytövuori (H). — *Sörfold:* 1 (O). — *Tjeldsund:* S slope of Kongsviktinden, low alpine belt, 1969 P. & I. Kytövuori (H). — *Tysfjord:* 3 (BG, O). — *Öksnes:* 2 (O, TROM); Langöya, E slope of Salvberget, low alpine meadow, 1969 P. & I. Kytövuori (H).

Troms. *Balsfjord:* 3 (H″, O, TROM″); Haugafjell, NE slope of Skredtind, low alpine belt, 1969 P. & I. Kytövuori (H). — *Bardu:* 2 (O″). — *Berg:* Medfjordvaer, heathery slope, 1930 P. Benum (TROM). — *Bjarköy:* 3 (O, TROM). — *Dyröy:* 1 (O). — *Gratangen:* Lavik, on serpentine, 1953 O. Skifte (TROM″). — *Harstad:* 2 (O, TROM); Sörvik, E slope of Sörvikfjellet, low alpine meadows, 1969 P. & I. Kytövuori (H). — *Karlsöy:* 2 (TROM″). — *Kvaefjord:* 3 (O, TRH, TROM″); Gullesfjorden, Gullesfjordbotn, S slope of Nonstind, low alpine belt, on stony meadows, 1969 P. & I. Kytövuori (H). — *Kvaenangen:* 2 (H). — *Kåfjord:* Guolasjavrri, 2 km N of bridge of Guolasjåkka, by tributary brook, alpine meadow at 730 m, 1969 P. & I. Kytövuori (H). — *Lenvik:* Hillesöy, Hekkingen, bare field, sheep path, 1930 P. Benum (TROM); Hillesöy, mountain N of Stönnesbotn, snowbed, 1930 P. Benum (TROM″); Hillesöy, Öyfjordvaer, Bredvikskaret, Höyfjell, 1930 P. Benum (TROM); Rossfjord, Sandnes, E slope of Vassbruntind, low alpine belt, on stony meadows, 1969 P. & I. Kytövuori (H); Stordalen, W slope of Reinen, alpine belt, 475 m 1969 P. & I. Kytövuori (H); Senjenö, Klövereng, 1852 Nrn (O). — *Lyngen:* Fastdalen, E foot of Rundfjellet, low alpine belt, 1969 P. & I. Kytövuori (H). — *Målselv:* 3 (BG, O″). — *Nordreisa:* 14 (O″, S, TRH″, TROM″). — *Salangen:* 1 (TRH); Rundkollen, at 732 m, 1879 Nrn (O). — *Skjervöy:* 10 (H, O″, TROM); Hamneidet, Gjövarden, S slope, low alpine belt, 1969 P. & I. Kytövuori (H). — *Skånland:* 1 (TROM″). — *Storfjord:* 2 (H) near the Kilpisjärvi highway, at ca 550 m, by a brook in subalpine zone, 1959 R.-L. Hämet (H). — *Sörreisa:* 2 (BG, O). — *Tranöy:* 6 (BG, TROM″). — *Tromsö:* 19 (H, O″, S, TROM″, UPS); Jakobnjargga, N slope of Bentsfjordtind, low alpine meadow, 1969 P. & I. Kytövuori (H); Lavangsdalen, E slope of Tverrbotnfjell, low alpine belt, stony meadows, 1969 P. & I. Kytövuori (H); Skulsfjord, Lyfjord-dalen, lofty mountain, stony grassy slope, 1930 P. Benum (TROM); Tromsdalstind, at 400 m, 1903 A. Notö (TROM); Ullsfjord, Breivikeidet, Storfjellet-Breiddalfjell, Sauskardbekken, low alpine belt, 1969 P. & I. Kytövuori (H); Ullsfjord, S slope of Sjurnestind, low alpine meadow, 1969 P. & I. Kytövuori (H).

Finnmark. *Alta:* mountain near t., 1965 Wdn (H); near Alten Elv, J. Vahl (O); Bosekopp, Nrn (O), 1949 P. Benum (TROM"); Seiland towards Rognsund, Olderock, 1919 O. Dahl (O); Skaaddavaara near Alten 1821 Zetterstedt (LD); Talvik, Nrn (O); Talvik, Vasbottendal, 1863 Nrn (BG); Tappeluft by Langfjorden, 1920 O. Dahl (O"); 20 km S of t. by road to Kautokeino, 1965 Wdn (H). — *Berlevåg:* 1864 Th. M. Fries (UPS), 1969 Wdn (H); Kongsfjord, Risfjord, 1909 H. Resvoll-Holmsen (O); Kongsfjord, 1969 Wdn (H). — *Båtsfjord:* Syltefjord, Vesterelv, 1876 Nrn (O); Vardö, Båtsfjord, 1950 H. Ruin (O"). — *Gamvik:* 1916 O. Dahl (O); Gamviknaesset, between Nordbo and Nordkyn, and Sandfjord, Nordbo, both 1884 Nrn (O"); Hop, Gamviknaesset, 1877 Nrn (O). — *Hammerfest:* J. Vahl (O). — *Hasvik:* Sörö, Hasvik, 1886 Nrn (O); Söröen, Storgalten, 1919 O. Dahl (O"). — *Karasjok:* Lavkavatn, 1965 Wdn (H). — *Kautokeino:* roadside (Alta—Kautokeino) 40 km S of Alta, 1965 Wdn (H). — *Kvalsund:* Porsa, 1920 O. Dahl (O); Reppefjorddal, 1864 Nrn (BG); roadside 20 km SW of Skaidi, 1966 Wdn (H). — *Lebesby:* Skjötningberg: Molvikdalen, Monsdalvand and Vestelven, all 3 1880 Nrn (O); Svaerholt, 1916 O. Dahl (O). — *Loppa:* Bergsfjorden, Maröen, 1919 O. Dahl (O); — *Måsöy:* c.v., 1863 Nrn (O); Havösund, N. Lund (O); Hjelmö: Kiholmen, Sortvik between Kiholmen and Russevand, Sortviksfjeld, and Sortvik Stordalen, all 4 1881 Nrn (O"); Rolfsö, Troldfjord, 1915 O. Dahl (O"). — *Nesseby:* Nyborg, J. O. Landmark (O). — *Nordkapp:* Magerö, Hornvik, 1883 Nrn (O). — *Porsanger:* Porsangerfjorden, Ytre Billefjord, Båtsnes, 1959 O. Rönning (TROM). — *Söröysund:* Seiland, Hönsebyfjord, Skakkebak, 1869 Nrn (BG, O"); Hammerfest, Tyven Fjeldene, 1885 Nrn (O). — *Tana:* Smalfjord, 1966 Wdn (H).

Agrostis stolonifera

Finland

Alandia. *Brändö:* 1 (H). — *Eckerö:* 6 (H", TURA). — *Finström:* 6 (H, HEL, OULU, TURA, VOA). — *Föglö:* 2 (TURA). — *Geta:* 3 (H", TURA). — *Jomala:* 7 (H, HFR, HSI, OULU, S, TURA). — *Kumlinge:* 2 (TURA). — *Kökar:* Idö, 1948 Bjn 2184, $2 n = 28$ (UPS); Österbygge, 1948 Bjn 2185, $2 n = 28$ (UPS); Öland, 1948 Bjn 2207—2211, 2215, all $2 n = 28$ (UPS"). — *Lemland:* 2 (H"). — *Lumparland:* 2 (H, OULU, TUR). — *Mariehamn:* 6 (H", HEL, HFR, TUR, TURA). — *Saltvik:* 2 (H", TURA). — *Sund:* 2 (H"); Kungsholm, 1948 Bjn 2181 $2 n = 42$, 2178 (UPS). — *Vårdö:* 1 (H).

Regio aboënsis. *Askainen:* 1 (TUR). — *Bromarv:* 4 (H, HEL, HSI). — *Finby:* 8 (H", TUR). — *Hitis:* 3 (H, TURA). — *Iniö:* 3 (H", TUR). — *Kaarina:* 1 (TURA). — *Karjalohja:* Tavia by Långviken, 1898 E. af Hällström (H"). — *Karuna:* 1 (H). — *Kimito:* 2 (H). — *Korpo:* 5 (H", OULU, TURA). — *Kustavi:* 2 (H"). — *Lohja:* Biskopsnäs, Kauria, 1913 Ch. E. Boldt (H); Gerknäs, Jönsböle, 1894 Ch. E. Boldt (H); Hermala, 1960 H. Toppari (H); Hiitinen, 1916 V. A. Pesola (H); Laakspohja, Pirunniemi, 1965 H. Toppari (H); Lillojamo, 1916 M. Aschan (H); Storön, Askola, Ylitalo, 1913 Ch. E. Boldt (H). — *Lokalahti:* 1 (TUR). — *Naantali:* 2 (H). — *Nagu:* 4 (H). — *Paimio:* 1 (TUR). — *Pargas:* 4 (H, HFR, TUR). — *Piikkiö:* 2 (TUR). — *Pyhäranta:* 1 (TUR). — *Pöytyä:* shore of Aurajoki 1 km from border of Oripää, 1958 J. Suominen (TUR). — *Raisio:* Kuloinen, 1961 T. Laine (TUR). — *Rymättylä:* 3 (H, TUR). — *Salo:* 1 (H). — *Sauvo:* 4 (H"). — *Tenala:* 1 (H). — *Turku:* 13 (H", HEL, TUR, TURA). — *Uusikaupunki:* 9 (H, HEL, TUR); Sorvakko, Vakka-Suomen Hippos, 1960 U. Laine (TUR). — *Velkua:* 3 (H, TUR). — *Vihti:* Irjala, 1941 K. Linkola (H"); Koikkala, 1941 K. Linkola (H", KUO); Niemenkylä, 1964 J. Suominen (H). — *Västanfjärd:* 1 (H).

Nylandia. *Askola:* Monninkylä, 1933 T. Tynni (H"). — *Borgå:* 35 (H"*,**, OULU, TURA, VOA); r.y., 1964 J. Suominen (H); Drägsby, roadside, 1966 Wdn (H*). — *Ekenäs:* 17 (H", OULU, TUR, UPS, VOA), 5 chrom. counts by Bjn, 1781, 2196, 2197, 2201, all $2 n = 28$, and 2200 $2 n = 35$ (UPS). — *Espoo:* 3 (H, VOA); Kauklahti, r.y., 1965 J. Suominen (H); Tuomarila, 1851 L. Sipilä (TUR). — *Hangö:* 1 (H). — *Helsinki:* (r.d.): Tammisto, 1918 K. Linkola (H). — *Helsinki* (t.): 19 (H", OULU, TUR, TURA). — *Ingå:* 2 (H); Kulla å near the church, 1874 R. Hult (TURA). — *Järvenpää:* r.y., 1964 J. Suominen (H). — *Lovisa:* 1 (H). — *Pernå:* 8 (H"**). — *Sibbo:* 3 (H). — *Snappertuna:* 1 (H).

Karelia australis. *Haapasaari:* 1 (H"). — *Hamina:* E. Malmberg (TURA). — *Kouvola:* 1958 T. Ulvinen HFR). — *Sippola:* c.v., Suurjärvi, 1947 V. Kujala & A. Ulvinen (HFR). — *Vehkalahti* (Veckelax): Onkamaa, Onkamaanjärvi, 1964 L. Fagerström (H). — *Virolahti* (Vederlax): 3 (H).

Satakunta. *Ahlainen:* 1 (H); Pohjajoki, 1947 H. Olander (H). — *Hämeenkyrö:* Manni, 1960 A. Kytöniemi (H). — *Karkku:* Palviala, loamy shore meadow of Rautavesi, 1954 J. Suominen (H); Prihti, 1883 Hj. Hjelt (H", TURA). — *Lavia:* Kalliola, Karhijärvi, 1962 J. Suominen (H). — *Loimaa:* Pappinen, Isolähde, 1957 T. Ulvinen (H.) — *Luvia:* 3 (H, TUR). — *Pori:* 8 (H", TUR, TURA). — *Rauma:* 4 (TUR). — *Siikainen:* Otamo, Niemijärvi, 1961 J. Suominen (H).

Tavastia australis. *Asikkala:* 1854 E. Niklander (H); Viitaila, Kailanranta, lake shore, 1964 T. Eloranta (H). — *Forssa:* Vieremä, Kullan lampi, lake shore, 1955 T. Toivonen (H). — *Hattula:* Nikkilä, meadow and lake shore meadow, 1960 R. Kalliola (H); Tenhola, shore of Vanajavesi, 1963 R. Kalliola (H, TUR). — *Hollola:* Lahdenpohja, shore of Vesijärvi, 1964 H. Kovakosti (H). — *Jokioinen:* shore of Jänkijoki 2 km SW of Minkiö station, 1957 T. Toivonen (H). — *Juupajoki:* Hulinas, Liesjärvi, roadside, 1965 R. Mikkola (H). — *Kalvola:* Saviniemi, moist forest path, 1963 R. Kalliola (H). — *Koski:* Karhustensuo, lake shore, 1963 E. Sirjola (H). — *Lahti:* roadside, 1917 K. Linkola (H). — *Lammi:* shore of Pääjärvi, 1954 J. Puro (TUR), 1959 P. Isoviita (TUR), 1963 A. Airaksinen (H), 1964 T.-M. Tilus (H); shore of Ormajärvi, 1958 A. Jaatinen (OULU), 1961 M. Haapasaari (H), 1961 T. Koponen (H), 1961 A. Reinikainen (H). — *Luhanka:* Tientaali, 1873 E. Wainio (TUR). — *Längelmäki:* Länkipohja, meadow near the lake, 1933 T. Kontuniemi (H"). — *Padasjoki:* Kalainsaari, 1934 K. Björklund (H"). — *Pirkkala:* shore, 1903 R. Frey (H"); Naistenmatka, deciduous forest, 1905 E. Graeffe (H). — *Riihimäki:* Arolampi, lake shore, 1952 E. Vilpa (H"). — *Sääksmäki:* Lahinen, sandy shore NW of Pyhäjoki, 1934 K. Linkola (H"). — *Tammela:* Kallio, Ryhtä shore of Kalliojärvi, 1955 T. Toivonen (H); Mansikkaniemi, meadow by pond, 1955 T. Toivonen (H); Porras, shore of Kuivajärvi, 1954 T. Toivonen (H"); shore of Pyhäjärvi, 1956 T. Toivonen (TUR). — *Teisko:* moist meadow, 1905 G. Idman (HSI). — *Tyrväntö:* Lepaa, shore, 1952 K. H. Pankakakoski (H).

Ostrobottnia australis. *Kaskö:* 1 (H). — *Korsholm:* 1 (VOA). — *Korsnäs:* 2 (H, HFR, O, TUR, UPS). — *Kristinestad:* 1 (H). — *Lappfjärd:* 2 (H", TUR). — *Replot:* 1 (VOA). — *Tjöck:* 2 (H"). — *Vaasa:* 7 (H", TUR, VOA).

Tavastia borealis. *Jyväskylä:* r.y., 1966 J. Suominen (H); shore of Jyväsjärvi, 1931 E. Vaheri (H). — *Kuopio:* gravel pit by road to Likolahti, 1965 R. Sorsa (H). — *Laukaa:* Lievestuoreenkylä, sandy shore of Hietaniemi, 1965 M. Laapotti (H). — *Virrat:* peninsula of Toisvesi, lake shores, 4 specc., I. Kytövuori, J. Suominen (H).

Savonia borealis. *Maaninka:* Käärmelahti, Varpaniemi, shore, 1934 O. Kyyhkynen (H").

Karelia borealis. *Joensuu:* Penttilä, shore, 1961 A. Aro (H). — *Juuka:* Ahmovaara, shore of Höytiäinen, 1898 W. M. Axelson (HEL). — *Kontiolahti:* Romppala, shore of Höytiäinen, 1898 W. M. Axelson (HEL). — *Lieksa:* Kevätlahti, sandy shore, 1959 E. Lappi (H). — *Pielisjärvi:* Pankakoski, Rasivaara, road ditch, 1965 H. Vänskä (H).

Ostrobottnia media. *Haapajärvi:* Harju and Harjunniemi, lake shores, both 1962 A. Kosonen (H, OULU, TUR). — *Jakobstad:* 1 (VOA). — *Kokkola:* 3 (H"). — *Kälviä:* 3 (H, TUR). — *Lappajärvi:* Kärnä, Ahvenniemenlahti, lake shore, 1905 A. L. Backman (H"). — *Larsmo:* 1 (H). — *Liminka:* 1 (UPS). — *Nykarleby:* 1 (H"). — *Pulkkila:* shore of Siikajoki, 1961 R. Ruotsalo (OULU); Vorna, by a rapid, 1961 R. Ruotsalo (OULU). — *Siikajoki:* 3 (H, OULU). — *Öja:* 1 (H).

Ostrobottnia kajanensis. *Sotkamo:* c.v., sandy lake shore, submerged, 1966 Wdn (H). — *Suomussalmi:* Hossa, Kettulampi, 1911 O. Kyyhkynen (H); Kerälänkylä, Pörhölä, 1909 O. Kyyhykynen (H").

Ostrobottnia borealis. *Alatornio:* 1 (H). — *Hailuoto* (Karlö): 4 (H", OULU). — *Haukipudas:* 2 (H); Keiska, Alakoski in Kiiminkijoki, 1961 T. Ulvinen (H, OULU, TUR). — *Ii* (Ijo): 5 (H, HFR, OULU, TUR). — *Kemi:* 8 (H, OULU, TUR); Ala-Paakkola, shore of Kemijoki, 1965 Wdn (H).— *Kiiminki:* Ylikylä, shore of Kiiminkijoki below Koitelinkoski, 1963 T. Ulvinen (H, OULU). — *Kuivaniemi:* 3 (TUR). — *Lumijoki:* 1 (H, OULU). — *Muhos:* Honkala, Ukkola, rivershore, 1960 M. Ohenoja (H, OULU). — *Oulu:* 9 (H", OULU, TUR, TURA). — *Oulunsalo:* 2 (LD, OULU, TURA). — *Rovaniemi:* Narkaus, roadside ditch, 1954 R.-L. Hämet (H).— *Simo:* 4 (H, OULU, TUR). — *Tornio:* 1 (H).

Regio kuusamoënsis. *Kuusamo:* 1864 B. A. Nyberg (H); Ala-Kitkajärvi, small eutrophic fen on S shore, 1967 Wdn (H); shores of Ala- and Ylä-Juumanjärvi: 1948 O. Rune (UPS"), 1948 O. Lehtonen (H"), 1963 J. Suominen (H), 1967 Wdn (H). Jyrävänjoki, below Jyrävän köngäs, 1966 Wdn (H"); shores of Kuusinkijoki at Vuotunki, 1952 R.-L. Hämet (OULU), 1962 T. Ulvinen (OULU"**); Kurvinen, Korpijärvi, moist depressions on serpentine rock, 1965 T. Ahti & L. Hämet-Ahti 20266 (H"), 1964 T. Ulvinen (H, OULU); Liikanen, eutrophic mires, 1936 M. J. Kotilainen (HEL), 1937 A. V. Auer (TUR), 1937 L. Lehtonen & A. Pankakoski (H), 1956 R. Ruuhijärvi (H"), 1958 Y. Vasari (H"), 1959 Y. Mäkinen & L. Häkkinen (TUR), 1962 T. Ulvinen (OULU"); shores of Oulankajoki between Kiutaköngäs and border of U.S.S.R., 1908 A. L. Backman (H), 1929 U. Saxén (H, HEL), 1937 J. Montell (TURA"), 1949 H. Såltin (TUR), 1957 J. Taarna (H"**), 1957 Y. Vasari (H), 1963 H. Toppari (H), 1966 Wdn (H"). — *Salla:* Liikasenvaara, Korvasvaara, eutrophic mire, 1962 T. Ulvinen (OULU").

Lapponia kemensis. *Kittilä:* Kuivasalmi, Turpomapää, serpentine rocks, 1966 J. Suvanto (OULU). — *Savukoski:* moist serpentine ground N of confluence of Tulppiojoki and Nuortijoki, 1961 T. Ulvinen (H, OULU", TUR); Tulppio, Tulppion koriste, mire below serpentine rocks, 1965 T. Rintanen (H); Ylikemi, serpentine rock NE of Kuttusvaara, 1961 T. Ulvinen (H, OULU", TUR).

Lapponia inarensis. *Inari:* shores of Inarinjärvi (Enare träsk): near c.v., 1880 A. Arrhenius & A.O . Kihlman (H, UPS), 1937 E. Häyrén (H"**), 1961 E. Tourunen (TUR), 1969 Wdn (H), Paavali, 1880 A. O. Kihlman (KUO), Partakonlahti, Kettuniemi, 1959 Y. Mäkinen & L. Häkkinen (TUR), W of Ruohovaara, 1961 L. & Y. Mäkinen (TUR), Tscharmivjarga, 1899 B. Poppius (H), Tschuolisvuono, 1960 M.-L. Wallenius (TUR), Tsitsavjarga, 1897 A. W. Granit & B. R. Poppius (H). Kaamanen, roadside by the river, 1961 L. & Y. Mäkinen (TUR); Kyrö, 1903 A. Renvall (H); sandy shore of Luttojoki about 15 km from border of U.S.S.R., 1966 Wdn (H.); Paadari, Vaskojoki—Marastotunturit, 1960 U. Laine (TUR); Paatsjoki, 1878 E. Wainio (TUR), 1897 A. W, Granit & B. Poppius (H**), 1899 C. W. Fontell (H"**); Vaskojoki, 1897 B. Poppius (H). — *Utsjoki:* localities all shores, arranged S→N: Puksaljärvi, Puksala, 1961 Y. Mäkinen (TUR); opposite Jaakkola, 1961 L. & Y. Mäkinen (TUR); Kevojärvi, Kevonsuu, 1961 L. & Y. Mäkinen (TIR); Kutuniemi, 1958 Y. Mäkinen & P. Kallio (TUR); opposite Jomppala, 1961 Y. Mäkinen (TUR); N corner of Jorbajärvi, 1961 L. & Y. Mäkinen (TUR); Suobbajärvi, 1961 L. &. Y. Mäkinen (TUR); Pulmanki, Niemelä, 1962 P. Vanhatalo (TUR).

Leningrad Region

Karelia australis. *O. Gogland* (Suursaari, Hogland): Hirskallionhälli, 1868 M. Brenner (H). — *Lesogorskiy* (Jääski): Haikola, 1917 M. Kangasniemi (TUR).

Isthmus karelicus. *Gromovo* (Sakkola): Kyurelya (Taipale), shore of Ladoga, 1895 H. Lindberg (H); shore of L. Varto (Suvanto), 1897 H. Lindberg (H), 1897 G. Lång (H, HSI, TUR). — *Michurinskoye* (Valkjärvi): shore of Punnusjärvi, 1895 H. Lindberg (H"). — *Primorsk* (Koivisto, Björkö): 1936 E. Laitakari (HSI); Muurila, 1933 Lingonblad (VOA). — *Pyukhyarvi* (Pyhäjärvi): shore of Ladoga near Riiska, 1894 H. Lindberg (H); Yläjärvi, 1894 H. Lindberg (H"). — *Zelenogorsk* (Terijoki): Käkösenpää, 1933 L. Fagerström (H).

Karelia olonetsensis. *Gak-rutschei:* shore of Svir (Syväri), 1898 J. I. Lindroth & A. K. Cajander (H). — *Gumbaritzy:* by Gumbaritzy, and between Gumbaritzy and Zubetsa, both I. Hustich (H). — *Sermaks:* 1875 Fr. Elfving (H).

Karelian A.S.S.R.

Karelia ladogensis. *Impilakhti:* Kurenlahti, 1876 V. F. Brotherus & Hj. Hjelt (H, TURA); Ristisaari, 1914 K. Linkola & V. Pesola (HFR). — *Kurkiyoki:* 1930 E. Räsänen (H). — *Pyalk'yarvi* (Pälkjärvi): Anonniemi, 1914 K. Linkola (H). — *Sortavala* (Serdobol): Kirjavalahti, 1898 B. Poppius (H), 1922 H. Warén (TUR); Kotiluoto, 1927 E. Wainio (TUR); Orjatsaari, 1914 V. Pesola & K. Linkola (H); Suur-Heposaari, 1931 K. Linkola (H"); Tuhkola, J. S. W. Koponen (H). — *O. Valaam* (Valamo): 1850 W. Nylander (H), 1923 O. Hulkkonen (H"); Niikana, 1939 V. Räsänen (H).

Karelia olonetsensis. *Petrozavodsk:* 1863 Th. Simming (H), 1896 N. A. Iwanitski (H).

Karelia borealis. *Suoyarvi:* Savinisto, islet in Lumianlahti, 1914 K. Linkola (H).

Karelia onegensis. *Berichevo* (Suoju): in village (H"), and on shore of Suojujoki (H", OULU, UPS), both 1942 R. Tuomikoski. — *Gorka* (Gorskij): 1863 A. Kullhem (H). — *Porosozero* (Porajärvi): c.v., 1942 R. Kalliola & J. Soveri (H). — *Shun'ga:* 1888 A. O. Kihlman (H). — *Spasskaya guba* (Mundjärvi): Lahti, 1942 R. Tuomikoski (H).

Karelia pomorica occidentalis. *Kello Gora* (Kellovaara): 1894 J. O. Bergroth (H). — *Niittoniemi:* shore of L. Ondozero, 1896 J. O. Bergroth & J. I. Lindroth (H).

Karelia pomorica orientalis. *Koykintsa:* Belaya gora near Koykintsa, shore of L. Vygozero, 1921 A. V. Vrublevskiy 252 (LE).

Regio kuusamoensis. *Kuusamo:* confluence of Kuusinkijoki and R. Olanga, 1877 E. Wainio (H); Rajala by L. Olanga (Paanajärvi), 1898 J. Montell (TURA); L. Olanga by mouth of R. Olanga, 1898 J. Montell (TURA), 1908 A. L. Backman (H", HSI), 1929 U. Saxén (H); L. Olanga by mouth of Tervajoki, 1898 J. Montell (TURA). — *Kuolayarvi* (Salla): shore of Käsijärvi, 1898 V. Borg (H).

Karelia keretina. *Keret':* F. Nylander (H).

Murmansk Region

Regio kuusamoënsis. *Kuolayarvi* (Salla): Kutsajoki region, shore of Niluttijärvi, 1925 K. Linkola (H).

Lapponia Imandrae. *Lake Girvas* (Hirvasjärvi): shores of L. Girvas, 4 specc., all 1901 W. M. Axelson & V. Borg (H", HEL, TURA). — *Imandra:* 1861 N. J. Fellman, 1863 N. J. Fellman, Pl. Arct. 308 (H); Saschiuk, 1862 N. J. Fellman (H); shore of L. Imandra near Tik-guba, 1957 T. Egorova (LE"). — *Kandalaksha:* (Kantalahti): F. Nylander (H); N. J. Fellman, Pl. Arct. 309 (H); shore of small lake near Kandalaksha Bay, 1917 A. Bulavkina, V. Komarov & V. Petrov (LE"); shore of Kandalaksha Bay, 1921 N. Savich 757, 792 (LE); shore of R. Niva near village, 1913 H. Lindberg (H). — *Khibina:* shore of L. Imandra near Khibina station, 1920 D. Litvinov (LE). — *Notozero* (Nuotjaur): 1891 J. Lindén (H). — *Umba:* 1892 A. O. Kihlman (H).

Lapponia Varsugae. *Marjok:* shore of R. Marjok, 1887 J. A. Palmén (H).

Lapponia ponojensis. *Chapoma:* sea shore E of Chapoma, 1927 G. D. Zinserling 578 (LE). — *Lumbovka:* Letnee Lumbovskoe, mouth of R. Kamenka, 1928 G. D. Zinserling 853 (LE"); mouth of R. Lumbovka, 1928 G. D. Zinserling 913 (LE").

Lapponia petsamoensis. *Pechenga* (Petsamo): Boris Gleb (Köngäs), 1878 E. Wainio (TUR); Lutto, Köngäs, 1939 H. Krogerus (H); shore of R. Lota (Luttojoki) about 25 km from Finnish border, 1967 Wdn (H"); Pummanki, 1927, 1928 A. A. Cajander (H, S"), 1935 J. Montell (TURA"); Salmiyarvi, Kolttakylä, 1926 H. Roivainen (H); Vaitolahti, 1938 V. Kujala (HFR).

Lapponia tulomensis. *Kola:* 1861 N. J. Fellman (H), 1911 S. J. Enander (S). — *Murmansk:* 1927 E. Hultén (S"), 1967 Wdn (H). — *Sayda-Guba:* 1924 T. Krepe (LE).

Lapponia murmanica. *Drozdovka:* 1927 E. Hultén (S). — *Teriberka:* shore of Yarinskaja Bay, 3 km SW of L. Zelenuva, 1930 Cvelev 189 (LE). — *Varzina:* river shore, 1887 V. F. Brotherus (H, TUR).

Sweden

Ångermanland. *Härnösand:* 4 (S, UPS). — *Högsjö:* Veda, 1947 Bjn 1620, 1621 2 n = 28 (UPS). — *Nora:* 6 (LD, OULU, S, UPS"). — *Nordingrå:* 1 (LD, OULU, VOA). — *Nordmaling:* 1 (S); Järnäsklubb, 1947 Bjn 2 n = 28, 28+2 (UPS). — *Nätra:* Köpmansholmen, Alviken, 1947 Bjn 1645, 2 n = 28 (UPS). — *Sollefteå:* 1910 G. Johansson (H). — *Säbrå:* 5 (BG, LD, S, UPS). — *Ullånger:* S Knappa by Ullångersfjärden, 1947 Bjn 2 n = 28 (UPS). — *Vibbygerå:* N shore of Norrfjärden, 1947 Bjn, 2 n = 28, 42 (UPS").

Västerbotten. *Bygdeå:* 4 (LD, S). — *Byske:* 1 (S); Havsbadet, 1947 Bjn 1698, 1700, both 2 n = 28 (UPS); Kolviken, 1947 Bjn 1682—83 2 n = 28, 1684 2 n = 28+3, 1685 (UPS); Svinö, 1947 Bjn 1689, 1693 both 2 n = 28, 1690 (UPS). — *Holmsund:* 1 (S). — *Hörnefors:* 1 (UPS). — *Kåge:* 1 (S). — *Lövånger:* 1 (UPS); Bjuröhamn, 1947 Bjn 1681—83, all 2 n = 28 (UPS); Bjuröklubb, 1947 Bjn 1677, 2 n = 28 (UPS"); Gärdefjärden, Saltudden, 1949 G. Lohammar, Bjn 2878 (UPS), 1949 Bjn 1788—89, both 2 n = 28 (UPS); Kallviken, 1949 Bjn 2791—94, 2796, 2798—99, 2801 all 2 n = 28, 2795 2 n = 28+5, 2802 2 n = 28+2 (UPS); Kräkångersfjärden, 1947 Bjn 1673, 1675, both 2 n = 28 (UPS"). — *Nysätra:* Gumboda hamn, 1947 Bjn 1703, 1705, both 2 n = 28 (UPS"); Ratan, 1947 Bjn 1701—02, both 2 n = 28 (UPS). — *Skellefte:* 1 (S, UPS). — *Skellefteå:* 1 (S). — *Umeå:* 1899 P. Söderlund (S).

Norrbotten. *Haparanda:* 1 (S). — *Junosuando:* by road 305 at bridge over R. Tärendö, 1966 Wdn (H). — *Luleå:* 5 (S, UPS). — *Nederkalix:* 2 (S, UPS). — *Nederluleå:* 2 (UPS); Hindersön, 1946 Bjn 889, 891, both 2 n = 28, 890 2 n = 28+1 (UPS), 1947 B. H. Svenonius, Bjn 1772, 2 n = 28 (UPS). — *Nedertorneå:* 2 (TROM, UPS); Seskarö, 1950 O. Lönnquist, Bjn 3257 2 n = 28 (UPS). — *Pajala:* N shore of R. Torne, 1902 S. Birger (S"). — *Piteå:* 8 (LD, S, UPS). — *Töre:* 1 (UPS). — *Öjeby:* 2 (UPS). — *Överkalix:* by road 391 at bridge over R. Kalix, 1966 Wdn (H); shore of Tvärån near road 98, 1966 Wdn (H).

Åsele Lappmark. *Åsele:* 1909 Th. Wolf (S); shore of Ångermanälven in Åsele, 1948 O. Rune, Bjn 2259 2 n = 28 (UPS), 1951 Bjn 2806 (UPS).

Pite Lappmark. *Arjeplog:* Storlaisan, N side, mouth of Sågbäcken by Hällbacken, 1959 J. Lundquist (UPSV"); Gautojaure, by Vejenäs, 1961 J. Lundquist (UPSV"); Vuossejaure, E shore (locality 21), 1962 J. Lundquist & G. Wistrand (UPSV); Västerholm by Vuossesundet (locality 22), 1962 J. Lundquist & G. Wistrand (UPSV); Simselet in Skellefteälven, 1963 J. Lundquist (UPSV").

Lule Lappmark. *Jokkmokk:* Jalkokjaure S of Virihaure, sandy lake shore below snow bed, at about 1000 m, 1941 S. Selander (S); Kåbdesjaure, 1953 Bjn 3981—82a, both 2 n = 28 (UPS); summit of Ruopsok, 3 km W of Vuoka, on serpentine, at about 1000 m, 1949 O. Rune, Bjn 2874—76, all 2 n = 28 (UPS); Sirkaluokta, shore of Virihaure, 1941 S. Selander (S), 1954 Bjn 3940 (UPS); Tuckiluokta, 1941 S. Selander (S), 1953 Bjn 3945, 2 n = 28 (UPS); Unna Tukil, 1953 Bjn 3946, 2 n = 28 (UPS"); shore of Virihaure near Staloluokta, 1946 S. Selander (S", UPS).

Torne Lappmark. *Kiruna:* shore of L. Torne by Abisko, G. Erdtman (S), 1908 M. Sondén (S"), 1909 T. Erdmann (S), 1919, 1921, 1953 C. G. Alm (H, S, UPS, UPSV), 1920 H. Smith (UPSV), 1926 H. Smith (UPS), 1927 R. Sernander (UPSV), 1928 A. Levan (LD), 1931 H. Winkler (S), 1946 Bjn 850, 2 n = 28, 1950 Bjn 3135—46, all 2 n = 28 (UPS"); Abisko railway station, 1921 C. G. Alm (UPS); Björkliden, mire below the railway station, at 400 m, 1939 C. G. Alm (UPS); mire 1 km NW of Jebrenjåkkstugan in Abisko, 1957 S. Snogerup (LD); by highway between Kiruna and Jänkänalusta 11—13 km SW of Kiruna, at 550 m, 1939 C. G. Alm & H. Smith (UPS); mouth of Miellejokk in L. Torne, 1922 C. G. Alm (UPS); Njuorjevare, reg. alp., 1920 H. Smith (UPSV); mouth of Ortojokk (Vakkejokk) in Torneträsk, 1910 H. Dahlstedt (S"), 1913 N. Sylvén (LD), 1923 C. G. Alm (UPS), 1926 H. Smith, Plantae suecicae exsiccatae 136 (H, etc.), 1954 K.-G. Bringer (UPSV); Ortovare, mire at about 650 m, 1926 H. Smith (UPS); mire between Ortovare and L. Torne, 1948 Bjn 3086—90, all 2 n = 28 (UPS); Vakketjåkko, 1950 Å. Persson (LD); mouth of Pesinnenjokk, 1925 H. Smith (UPS); mouth of Snuorajokk, 1919 Th. C. E. Fries (H, UPS); Mt. Vittjåtjåkko, on shore of Rautasjaure, at 563 m, 1947 H. Smith (UPS).

Norway

Nordland. *Andöy:* Andenes (O), and Björnskinn (TROM), both 1941 P. Benum & J. Reiersen; Buksnes, 1878 Nrn (BG, O); Dverberg, 2 specc., both 1941 P. Benum & J. Reiersen (O, TROM); between Myre and Sellevold, 1873 Nrn (O). — *Ankenes:* Elvegaard, Skjomen, 1925 C. G. Alm (O, S, UPS); Riksgrensen, 1908 A. Notö (O); Rombaksbotn, 1946, 1950 Bjn, 2 n = 28 (UPS"). — *Evenes:* between Liland and Leirosen, and Liland, Ungsmalö, both Nrn (O). — *Hamaröy:* Tranö, 1878 Nrn (BG, O); Kaldvågsvatnet, 1947 H. Hanssen (TROM). — *Lödingen:* Hinnöya, Kanstadbotn, 1946 J. Reiersen (O, TRH, TROM). — *Sörfold:* Tölden, Törfjord, Nerigaard, 1876 Nrn (O); Torfjordvatnet, Steinbakk-Andkilfossen, 1954 N. Apold, G. Brodal & O. Skifte (TROM). — *Tysfjord:* Bogen, Korsnaes, 1878 Nrn (BG). — *Öksnes:* Langöen, Alfsvaag, 1878 Nrn (O).

Troms. *Balsfjord:* Storbukt, 1946 P. Benum (TROM); Storsteinnes, 1903 B. Ström (TROM); Tennes, 1936 J. Devold (O"). — *Bardu:* Salangsdalen, at top of Stordalen, 1933 P. Benum (TROM); Sördalen, Lunde, near

Tribotntjönna, 1933 P. Benum (TROM). — *Bjarköy:* Flatöy, 1934 P. Benum (TROM"). — *Dyröy:* Djupvik, 1870 Nrn (O"); Kastneshamn, 1938 P. Benum (TROM). — *Gratangen:* 68° 50', 1887 R. E. Fridtz (BG, TRH). — *Harstad:* Nrn (O). — *Karlsöy:* Helgöy, Vannöy, 1925 A. M. Grönlie (TROM); Ringvattsöy, 1894 A. Notö (TROM). — *Kvaefjord:* Botnelva, Strömsbotten, 1910 J. Reiersen (TROM); Gullesfjorden, Löbergbugt, 1946 J. Reiersen (TROM); Kvaeö, 1863, and Vik, both Nrn (O). — *Kvaenangen:* Badderen, 1910 H. Resvoll-Holmsen (O); Burfjord, 1963 Y. Mejland (TROM). — *Lenvik:* Hekkingen 1930, and Kvanna 1949, both P. Benum (TROM); Senjenö, Gibborstad, Nrn (O), and Vangsvik, 1910 A. Notö (O). — *Lyngen:* 1875 C. Reuterman (UPS); Kitdalen, mouth of Kitelven, 1902 R. E. Fridtz (O). — *Målselv:* 1841 N. Lund (TRH), 1912 H. Resvoll-Holmsen (O); Bakkehaug, 1907 E. Taylor (BG, O), 1948 C. M. Norman (S); Maalselvdalen, 1841 N. Lund (TRH), 1912 H. Resvoll-Holmsen (O); Skjeggernes, Nrn (O); Överbygd, Ruostafjell, 1907 E. Taylor (TROM"). — *Nordreisa:* Bakkeby 1937 (TRH), Bihkahihtama 1931 (TRH), Lerbukt 1934 (BG, O"), Nordlejos 1934 (BG, O), Stuora Skaitte 1933 (TRH), Tretten 1932 (TRH), Övre Kildal 1928 (TRH), all 8 Y. Mejland. — *Salangen:* Indregaard, 1914 R. E. Fridtz (O"); Nedre Salangsvatn (O), and Salangsverket (TROM), both 1939 J. Reiersen. — *Skjervöy:* Arnö Grundfjord, 1900 R. E. Fridtz (O); Strömfjorden, 1960 Y. Mejland (TRH); Ulrybugt, 1937 (O). — *Storfjord:* Lyngenfjord, Kvesmenes, 1933 H. Smith (UPS); mouths of Signaldalselva and Skibotnelva, both 1969 Wdn (H). — *Sörreisa:* Reisenvand, Nrn (O). — *Tranöy:* Senja, Dragöy, 1930 P. Benum (O", TROM); Senja, Vangsvik, 1910 A. Notö (O", TROM); Senjenö, Tranöbotten, Nrn (O). — *Tromsö:* Bentsjorda, 1934 and Kattfjord, Nordfjord 1930, both P. Benum (TROM); Tromsöy, 1872, 1902 A. Notö (TROM), 1907, 1915 B. Ström (TROM); Tromsödalen, 1861 Nrn (O); Tromvik, 1930 P. Benum (O", TROM).

Finnmark. *Alta:* 1841 M. N. Blytt (O); Altenelven, Elvestrand, 1884 R. E. Fridtz (O), 1898 Th. Krok (S), 1900 Fl. Behm (S); islet in Altenelven, 1859 A. Landmark (O"); Altenelven near Raipas, 1868 J. E. Zetterstedt (LD), 1897 J. Dahl & R. E. Fridtz (O"); mouth of Altenelven, 1868 J. E. Zetterstedt (UPS); Bosekop, Nrn (O"); Törfossen bru, 1966 Wdn (H). — *Berlevåg:* Kongsfjord, 1864 Th. M. Fries (UPS); Sandfjord and Straumen, Vesterbotn, both 1969 Wdn (H). — *Hasvik:* Sörö, Hasvig, 1880 C. Lindman (O", S", UPS). — *Kautokeino:* Ladnejaure, 1883 Nrn (O). — *Kvalsund:* Reppe, Nrn (O). — *Nesseby:* between Maeskelven and Nyborg, 1935 J. Ax. Nannfeldt (UPS); Nyborg, 1858 Chr. Sommerfelt (O, UPS); E of mouth of Sjåbuselven, 1935 J. Ax. Nannfeldt (UPS); Veinesbugta, Digerneset, 1969 Wdn (H); W of Vesterelven, 1859 Chr. Sommerfelt (O). — *Porsanger:* mouth of Börselv, 1864 Nrn (O), 1952 O. Gjaerevoll (TRH), 1953 O. Rune & O. I. Rönning (TROM). — *Sör-Varanger:* between Boris Gleb and Nedre Klostervand, Nrn (O); Elvenes, 1864 Th. M. Fries (O, S, UPS), 1864 Nrn (O); rapids below Goalsejaure, 1864 Nrn (O); Jarfjordbotten, 1857 Th. M. Fries (UPS); Karpedalen, Jarfjord 1877 Nrn (O); Kirkenes, Prestön, 1919 Th. Poulsson (O), 1923 A. Hafström (S); Nedre Klostervand, Nrn (BG, O); Skogerö, 1871 Nrn (O), 1917 A. B. Wessel (O); Skrukkebugt, 1927 Wessel (TROM"), 1950 P. Benum (TROM). — *Söröysund:* Söröya, Husfjord, 1962 O. Skifte (TROM). — *Tana:* Benjaminbugten and Fjelmanes, both 1935 J. Ax. Nannfeldt (UPS); Höiholmen, 1852 Chr. Sommerfelt (O, UPS); Leirpoll 1969, and Smalfjord 1966, both Wdn (H); 10 km N of Tana bru, shore of R. Tana 1969 Wdn (H).

Agrostis gigantea var. *gigantea*

Finland

Nylandia. *Helsinki:* 1879 Hj. Hjelt (TURA).

Agrostis gigantea var. *repens*

Finland

Tavastia australis. *Asikkala:* N shore of Hopeaselkä, 1962 P. Pakarinen (H); Myllyniemi, E shore of Päijänne, 1958 A. Valta (H); Vääksy, shore of Päijänne, 1951 E. Häyrén (H", S). — *Hartola* (Gustav Adolfs): Ohransaari, 1897 C. A. Knabe (TURA). — *Hartola:* Tenhola, shore of Vanajavesi, 1963 R. Kalliola (H, TUR). — *Heinola:* Taipale, 1917 V. Kujala (HFR). — *Hollola:* Sarva, 1914 T. Levander (H); Vaania, Vehkasaari, 1967 H. Harmaja & O. Kärki (H); island in Vesijärvi, 1869 E. Wainio (TUR). — *Jämsä:* 1853 Th. Saelan (H), 1854 E. Niklander (H). — *Korpilahti:* Heinosniemi, Vikeri, 1964 M.-L. Kinari (H); Rutalahti, 1873 E. A. Lang (H). — *Kuhmoinen:* islet Varpusenlinna N of Virmailansaari in Päijänne, 1914 Ch. E. Boldt (H"). — *Kuru:* 1880 J. O. Bergroth (H). — *Sääksmäki:* Rapola, 1873 J. Tikkanen (H). — *Teisko:* Iso-Taulaniemi, 1969 Wdn (H). — *Tyrväntö:* Lepaa, shore of Vanajavesi, 1963 R. Kalliola (H); Mälkiäinen: Horkansaari 1928 and Kariniemi 1934, both K. Linkola (H").

Savonia australis. *Imatra:* Kuusikkosaari in Saimaa, 1965 E. Kotanen (H). — *Joutsa:* Nurmaa, W shore of Unikanselkä, 1939 O. Lehtonen (H). — *Joutseno:* Jänhiälä, shore of Saimaa, 1967 Wdn (H). — *Lappeenranta:* Barkarila, shore of Saimaa, 1881 (H, TUR), 1883 (H, HSI) all Th. Saelan; island in Saimaa, 1901 H. Buch (H); Männikkö, shore of Saimaa, 1910 Th. Saelan (H). — *Punkaharju:* Punkasalmi, shore of Puruvesi, 1967 Wdn (H). — *Rantasalmi:* Vaahersalo, Linnansaari National Park, islet, 1958 M. & P. Isoviita (H, TUR). — *Valkeala:* Lappalanjärvi, Saarento, 1939 A. Ulvinen (H), 1957 V. Kivisalmi (H); shore of Lappalanjärvi in c.v., 1939 A. Ulvinen (H).

Tavastia borealis. *Konnevesi:* Kärkkäälä, shore of Matolahti, 1939 V. Häkkinen (H"). — *Toivakka:* Haukanmaa, Väharanta, 1948 E. Häyrén (H). — *Viitasaari:* shore of c.v. island, 1969 Wdn (H).

Savonia borealis. *Kuopio:* shore of Kallavesi near t., 1966 Wdn (H*). — *Leppävirta:* Konnus, Hartikansalo, 1932 A. Vaarama (TUR). — *Maaninka:* Keskisaari, 1957 M. Salminen (H); Mömmölärisaari, 1910 O. Kyyhkynen (H).

Karelia borealis, *Juuka:* Paalamaa, shore of Pielisjärvi, 1942 H. Lindberg, Plantae finlandiae exsiccatæ 1809 (H, etc.). — *Pielisjärvi and Lieksa:* Hattusaari, Alapiha, shore of Pielinen, 1948 C. E. Sonck (H); Kelvä; Kelvänsaari, 1937, and Kanasaari 1948, both C. E. Sonck (H); Kinahmo, Saunalahti, 1959 E. Lappi (H); Kinahmonniemi, shore of Pielinen by Korpilahti, 1962 C. E. Sonck (H); Koli, Koiänkälampi 1948, and Likolahti 1960, both C. E. Sonck (H); Koli, shore of Pielinen by Alamaja, 1967 Wdn (H); Kylänlahti: Viekinjärvi, shore of Louhilahti 1960, Heklansaari 1962 and Toivalansaari 1962, all 3 C. E. Sonck (H). Lieksa: Heponiemi 1948, Kevätniemi Muurmanninranta 1960 and Kokkasaari 1962, all 3 C. E. Sonck (H). Ruunaa, shore in village, 1960 C. E. Sonck (H); Viensuu: Viensuunjoki by Kukkola 1936, Ristisaari 1936, Kutkutsaari 1962, all 3 C. E. Sonck

(H), and shore opposite Kutkutsaari, 1964 E. Lappi (H). Vuonislahti: shore in village, Lokkilahti, Telttiniemi, Siikalahti, all 4 1960 C. E. Sonck (H). — *Rautavaara:* shore of Keyritynjärvi, 1915 O. Kyyhkynen (H).

Ostrobottnia kajanensis. *Paltamo:* Ellinlammi near Melalahti, 1917 O. Kyyhkynen (H). — *Suomussalmi:* lake shores, c.v. (2 specc.), 1909 O. Kyyhkynen (H").

Ostrobottnia borealis. *Kemijärvi:* Kostamo, shore of Kostamojärvi, 1969 Wdn (H). — *Rovaniemi:* Oinaansaari, A. Rantaniemi (OULU); Vanttauskoski, A. Rantaniemi (H, OULU). — *Tervola:* Koivu, shore of Kemijoki, 1960 P. S. Jokela (OULU); Louejoki, 1960 E. Julin (H, OULU).

Regio kuusamoënsis. *Kuusamo:* S shore of Alakitkajärvi, 1967 Wdn (H); shores of Ala- and Ylä-Juumajärvi, 1948 O. Rune (UPS"), 1948 L. E. Kari (TUR), 1963 H. Toppari (H), 1966, 1967 Wdn (H"*); Oivanki, shore of Oivanginjärvi, 1963 T. Ahti (H); Ylikitka, S shore of Taivallahti, 1965 T. Ahti (H).

Lapponia kemensis. *Pelkosenniemi:* Luiro, 1916 A. Rantaniemi (OULU"); Suvanto, 1960 K. Laaksonen (H).

Lapponia inarensis. *Utsjoki:* NW corner of Kevojärvi, Staalolampi by Jesnalvaara, 1965 T. Ahti & U. Laine (H, TUR).

Leningrad Region

Karelia olonetsensis. *Ostrechiny:* river shore, 1898 J. I. Lindroth & A. K. Cajander (H).

Murmansk Region

Lapponia Imandrae. *Kandalaksha:* 1909 R. Pohle (LE); Rjaschkov Island, 1957 T. Jegorov (LE").

Lapponia ponojensis. *Ponoy:* 1863 N. J. Fellman, Pl. Arct. 310 (H), 1880 C. A. Knabe (TURA), R. Enwald & C. A. Knabe (H, S", UPS), 1899 J. Montell (H, TURA), 1927 E. Hultén (S").

Lapponia tulomensis. *Kildin:* Anon. (LE). — *Kola:* 1927 M. M. Hrepnikova (LE). — *Murmansk:* 1927 E. Hultén (S").

Sweden

Norrbotten. *Pajala:* 1856, 1860 L. L. Laestadius (LD", S", UPS"); Erkheikki, shore of R. Torne, 1966 Wdn (H).

Torne Lappmark. *Karesuando:* L. L. Laestadius (UPS").

Agrostis gigantea var. *glaucescens*

Finland

Alandia. *Eckerö:* Storby, 1901 A. Palmgren (H). — *Finström:* Bergö-Husö, islet near Björkö, islet E of Husö, and Hästö, all 4 1946 J. Montell (TURA). — *Föglö:* Ulfversö 1924, and Öfverö 1923, both A. Palmgren (H). — *Geta:* Isaksö, field ditch near sea-shore, 1889 Ch. E. Boldt (H). — *Jomala:* ditch by Degerbergsfjärden, 1945 J. Montell (TURA). — *Kökar:* Idö, 1948 Bjn 2183, 2 n = 42 (UPS"). — *Lemland:* Nåtö, Eskskär, 1965 C.-A. Haeggström (H). — *Mariehamn:* Ytternäs, 1945 J. Montell (TURA); Svinö, 1945 J. Montell (TURA). — *Saltvik:* 1945 J. Montell (TURA); Haraldsbyholmen, 1878 A. Arrhenius & A. O. Kihlman (KUO). — *Sund:* Kungsholm, 1948 Bjn 2179, 2180, both 2 n = 42 (UPS).

Regio aboënsis. *Korpo:* Galtby, 1966 Wdn (H). — *Nagu:* Snackeholm, 1930 O. Eklund (H). — *Perniö:* Teijo, Teijonsaari, 1959 U. Laine (H, TUR). — *Salo:* Uskela, Kärkis, 1961 A. Parnela (TUR). — *Uusikaupunki:* Hanko, 1952 U. Laine (TUR); Melsa, 1962 L. Lindgren (TUR); Sundholm, Pikku-Puutari, 1955 U. Laine (TUR).

Nylandia. *Borgå:* Pellinge: Hasselö, numerous specc., Wdn ("* **), Saltviksholm, 1957 Wdn (H"), W Sandö, 1960, 1970 Wdn (H"), Skräckisholm, 1940 Ä. Backman (H), Stor-Pellinge ön, 1926 R. Bäck (VOA). — *Ekenäs:* Danskog, N side opposite Såmesgrunden, 1964 C. Wikström (H). — *Helsinki* (t.): Drumsö, 1913 K. Linkola (H); Kulosaari, 1949 J. Ahtola & R. E. Ruotsalo (H); Marjaniemi, 1963 J. Suominen (H); Munkkiniemi, 1922 M. Puolanne (H), 1956 E. Häyrén (H). — *Kyrkslätt:* Hila, Haukipää, 1961 A. Turunen (OULU); Kantvik, 1894 K. Holmberg (TURA); Torsvik, 1911 I. Majantie (TUR); Virsalo, Tavastö, 1959 L. Kivekäs (H). — *Pernå:* W Sandholm near Påsalö, 1965 B. Lemberg (H). — *Pyhtää:* c.v., Pörtnåra, 1938 L. Fagerström (H); Mogenpörtö: Djupviken 1938, and Tuuskas 1939, both L. Fagerström (H"). — *Sibbo:* Löparö, Svartholm, 1965 Wdn (H).

Karelia australis. *Haapasaari* (Aspö): Virluodon Länsisaari, 1950 L. Fagerström (H). — *Kotka:* Mussalo, Turankylänlahti, 1937 A. Ulvinen (H).

Satakunta. *Eurajoki:* Kuivalahti, Paattinokka, 1962 I. Kause (OULU, TUR). — *Merikarvia:* 4 km S of Riispyy, 1963 E. Kotanen (H). — *Pori:* islet off Busö, 1901 E. Häyrén (H); Tahkoluoto, 1901 Th. Saelan (H); Yyteri, 1901 E. Häyrén (H).

Ostrobottnia australis. *Korsnäs:* 1912 A. Lindfors (TURA"). — *Kristinestad:* sea-shore near camping place, 1965 Wdn (H).

Ostrobottnia media. *Kokkola:* Rummelö, 1966 Wdn (H). — *Larsmo:* by bridge to Eugmo, 1965 Wdn (H*). — *Siikajoki:* Tauvo, 1959 P. S. Jokela (OULU).

Ostrobottnia borealis. *Haukipudas:* Halosenniemi, Purjekari, 1964 T. Ulvinen (OULU). — *Ii* (Ijo): Maakrunni, 1945 R. Kalliola (H); Olhava, Nyby, 1965 Wdn (H); Ristikari, 1948 T. Vartiainen (OULU). — *Kemi:* Ajos, 1965 Wdn (H); shore by camping place, 1965 Wdn (H). — *Kuivaniemi:* Taipale, 1969 Wdn (H). — *Lumijoki:* Varjakka, 1963 P. S. Jokela (OULU). — *Oulunsalo:* Kotasaari, I. Leiviskä (TUR); Salonpää, 1954 E. Berger (OULU).

Leningrad Region

Karelia australis. *Vyborg* (Viipuri): islet near Isosaari, 1916 K. W. Myrberg (H).

Isthmus karelicus. *Sovetskiy* (St. Johannes): sea-shore between Vaahtola and Tyvisaari, 1895 H. Lindberg (H).

Sweden

Ångermanland. *Nora:* Berghamn, 1947 Bjn 1629, 1630, both 2 n = 42 (UPS"); Grönsvik, 1856 C. P. Laestadius (S"), 1856 R. Fristedt (UPS"); Krången, 1957, 1959, 1960 E. Evers (BG, LD, OULU, TURA, VOA). — *Säbrå:* Ulfön, 1914 N. Johnsson (LD, UPS").

Norrbotten. *Luleå:* Hindersön, 1923 H. Svenonius (S").

Agrostis gigantea exclusive of var. *gigantea,* var. *repens* and var. *glaucescens*

Finland

Alandia. *Eckerö:* c.v., 1962 J. Suominen (H); Storby, 1900 A. Sternberg (H″), 1933 G. Lindberg (TURA″), 1962 J. Suominen (H); Överby, 1965 H. Toppari (H). — *Finström:* Bergö-Husö, 4 specc., 1946 J. Montell (TURA″). — *Hammarland:* c.v., 1962 A. Saarisalo-Taubert (H). — *Jomala:* c.v., 1962 A. Saarisalo-Taubert (H); Jomalby, 1886 W. Laurén (H″); Ingsby, 1924 O. H. Porkka (H); Möckelö, 1930 S. Grapengiesser (S); Västansunda, 1945 J. Montell (TURA), 1945 A. Palmgren (H). — *Lemland:* Järsö, 1921 T. Nybergh (TURA); Nåtö village, A. Palmgren (H). — *Mariehamn:* in t., 1945 A. Palmgren (H), 1945 J. Montell (TURA″), 1963 Ch. Krokfors (H); Svinö, 1945 J. Montell (TURA). — *Sund:* Kungsholm, 1948 Bjn 2175, 2176, both 2 n = 42 (UPS″).

Regio aboënsis. *Lohja:* in borough, 1962 H. Toppari (H). — *Paimio:* 1952 K. J. Widén (H). — *Pusula:* Ahonpää, Akeela, 1956 T. Toivonen (H″); Kärkölä, Kahilisto, 1956 T. Toivonen (H). — *Pyhäjärvi:* Järvenpää, Sanna, 1956 T. Toivonen (H). — *Raisio:* 1/2 km NW of the r.y., 1955 Y. Mäkinen (H, OULU, TUR); Metsäkulma, Myllymäki, 1964 T. Laine (TUR). — *Turku:* Iso-Heikkilä, 1932 A. V. Auer (TUR); between Kanavaniemi and Iso-Heikkilä, 1924 L. E. Kari (TUR); Kupittaa, 1937 S. Valle (TUR).

Nylandia. *Borgå:* t., 1960 Wdn (H″**); Emsalö, Havsudden, 1919 Ch. E. Boldt (H); Gäddrag, Björkstrand, 1957 Wdn (H″); Hammars, Barlastholmen, 1885 A. Gadolin (TURA). — *Espoo:* Bastvik, 1962 Å. Niemi (H); Bodom, 1965 C. Cedercreutz (H); Kauklahti, 1961 K. Pohjakallio (H″); Pakankylä, 1961 E. Kalaja (OULU).— *Helsinki* (r.d.): Tammisto, 1920 K. Linkola (H).—*Helsinki* (t.): 20 specc., earliest 1887 (H″**, O, OULU, S, TUR, TURA″, UPS), one chrom. count by Bjn, 1782, 2 n = 42. — *Ingå:* Degerby, Kocksby, 1962 Å. Niemi (H); Fagervik, 1852 E. Hisinger (H). — *Kyrkslätt:* Jolkby, Kyrkslätt railway station, Porkala Byviken, and Strömsby, all 4 1962 Å. Niemi (H). — *Pornainen:* Halkia, 1959 A. Valta (H). — *Sibbo:* Eriksnäs 1951, Hindsby 1954, Östersundom 1953, 1958, all 4 G. Marklund (H″). — *Sjundeå:* Pickala, 1962 Å. Niemi (H). — *Tuusula:* Maantiekylä, 1964 T. Ahti 17030 (H).

Karelia australis. *Kotka:* Mussalo, Etukylä, 1962 T. Ulvinen (H, OULU). — *Sippola:* Kaipiainen, 1949 V. Kujala & A. Ulvinen (HFR); Saaramaa, 1948 V. Kujala & A. Ulvinen (HFR). — *Virolahti:* Hämeenkylä, 1931 I. Taube (H).

Satakunta. *Alastaro:* Virttaa, in a spring, 1957 T. Ulvinen (H″, OULU, TUR). — *Kankaanpää:* 1 km NW of Kuninkaanlähde, spring, 1957 T. Ulvinen (H). — *Karkku:* Järventaka, 1883 Hj. Hjelt (H″, TURA); Piimäjärvi, 1 km NW of Alinen Piimäjärvi, 1957 J. Suominen (TUR). — *Kiukainen:* Laihia, 1962 I. Kause (TUR). — *Merikarvia:* Tuorila, 1962 J. Suominen (TUR). — *Pori:* Mäntyluoto, 1943 R. Savonlahti (H). — *Ulvila:* r.y., 1964 J. Suominen (H); Lattomeri, Niittymaa, 1949 P. Isoviita (H″).

Tavastia australis. *Hattula:* Lammila, 1956 T. Toivonen (H); Salo, 1957 J. Suominen (H). — *Heinola:* Rainio, 1962 U. Laine (TUR). — *Kuusankoski:* shore of Lappalanjärvi near road, 1964 J. Suominen (H). — *Lammi:* Pappilankylä, 1960 T. Ulvinen (H, OULU); by the railway station, 1965 T. Mäenpää (H). — *Sääksmäki:* Rapola, 1965 H. Vänskä (H), 1965 T. Putkinen (H). — *Tampere:* Epilä, 1957 T. Ulvinen (H).

Savonia australis. *Imatra:* Railway station, 1965 J. Suominen (H). — *Lappeenranta:* 1885 Th. Saelan (H), 1964 P. Matikainen (H). — *Mikkeli:* Liukkola, 1958 P. Kytölä (H). — *Rantasalmi:* Parkumäki, r.y., 1963 J. Suominen (H); Vaahersalo, Linnansaari, 1958 M. & P. Isoviita (H″, TUR).

Ostrobottnia australis. *Kaskö:* 1954 A. Railonsala (OULU). — *Kristinestad:* harbour railway, 1951 A. Railonsala (H). — *Kurikka:* borough, 1970 J. Sarvela (H). — *Vaasa:* Metviken and the nearby cemetery, 1948, 1952 M. Malmberg (H, VOA), 1952 R. Bäck (H″, OULU, VOA), S. Klockars (VOA); Vasklot, 1907 A. Lindfors (H. TURA), 1909 B. Jurvelius (VOA).

Tavastia borealis. *Sumiainen:* Siltosaari, Huviniemi, 1962 A. Saarisalo-Taubert (H). — *Virrat:* peninsula of Toisvesi, Ikkala, 1964 J. Suominen (H).

Savonia borealis. *Joroinen:* shore of Valvatusjärvi, 1966 Wdn (H). — *Kuopio:* 1899, 1900 O. Lönnbohm (H″, HSI, KUO, UPS, TURA); Särkimäki, 1933 E. Heikinheimo (H″); Särkisoppi and Kotkankallio, both 1963 L. Hirvonen (H). — *Maaninka:* Tuovilanlahti, 1901 H. Lindberg (H″), 1918 H. Roivainen (OULU). — *Pielavesi:* Jokijärvi, Lappi, 1933 O. Kyyhkynen (H″); Jylänki, Ansala, 1936 H. Roivainen (S); Katajanmäki, Otramäki, 1937 H. Roivainen (H), 1945 A. J. Huuskonen (H); Taipale, Tiskaharju, 1935 O. Kyyhkynen (H″). — *Suonenjoki:* Iisvesi, Kinnulanniemi, 1964 K. Korhonen (H).

Karelia borealis. *Joensuu:* 1942 E. Laine (TUR). — *Juuka:* Halivaara, 1946 R. Tuomikoski (H). — *Kontiolahti:* Jakokoski, r.y., 1965 J. Suominen (H). — *Pielisjärvi:* Koli, 1946 R. Tuomikoski (H); Vieki, Leppilä, 1963 C. E. Sonck (H). — *Tuupovaara:* shore of Kinnasjoki, 1940 R. Tuomikoski (H).

Ostrobottnia media. *Haapajärvi:* c.v., 1961, 1962 A. Kosonen (H, OULU″). — *Kokkola:* Yxpila, 1945 U. Widlund (VOA). — *Lappajärvi:* Ojala, 1907 A. Nyström (H″). — *Nykarleby:* 1965 Wdn (H). — *Oulainen:* 1928 L. Parvela (OULU). — *Rantsila:* 1926 A. Karjalainen (OULU). — *Rautio:* Typpö, 1965 T. Ulvinen (OULU″).

Ostrobottnia kajanensis. *Kuhmo:* Korpisalmi, Jyrkänkoski, 1926 O. Kyyhkynen (H″). — *Sotkamo:* c.v., 1956 J. Aho (H), 1963 Wdn (H*). — *Suomussalmi:* Ruhtinaansalmenkylä, Härkövaara, 1909 O. Kyyhkynen (H).

Ostrobottnia borealis. *Hailuoto* (Karlö): Keskikylä, Salmela, 1947 N. Hylander (H″, UPS). — *Kemijärvi:* Joutsijärvi, 1964 J. Suominen (H); Leväranta, 1967 Wdn (H). — *Muhos:* Tuppu, 1966 T. Ulvinen (OULU). — *Oulu:* 1961 O. Mäntyvaara (OULU), 1962 T. Ulvinen (H, OULU″), 1963 Ch. Krokfors (H). — *Oulujoki:* Hiironen, 1964 T. Ulvinen (OULU″). — *Oulunsalo:* Akio, 1900 I. Leiviskä (H) cfr.

Regio kuusamoënsis. *Kuusamo:* c.v., 1960 R.-L. Hämet (H), 1962, 1963 5 specc., T. Ahti (H″), 1963 T. Ulvinen (OULU″) cfr; Kuoliojärvi, 1966 T. Ahti & L. Hämet-Ahti 22163 (H″) cfr; Käsmä, 1966 T. Ahti & L. Hämet-Ahti (H); Käylä, 1967 Wdn (H); Mäkelä, 1966 T. Ahti & L. Hämet-Ahti (H); Määttälänvaara, Alitalo, 1966 T. Ahti & L. Hämet-Ahti 22166 (H″); Ruukki, 1925 K. Linkola (H″); Törmäsenvaara, Nuottalahti, T. Ahti & L. Hämet-Ahti 22163 (H″) cfr. — *Salla:* (Kuolajärvi): c.v., 1917 V. Pesola (H″); r.y., 1964 J. Suominen (H); NE of Kelloselkä r.y., 1964 J. Suominen (H). — *Taivalkoski:* Roniaho, 1947 V. Erkamo (H″).

Lapponia kemensis. *Pelkosenniemi:* c.v., 1961 T. Ulvinen (H). — *Sodankylä:* Sattanen, 1878 E. Wainio (TUR).

Lapponia inarensis. *Inari:* Ivalo, 1960 V. Kujala (HFR), 1966 Wdn (H*); Toivoniemi, 1880 A. O. Kihlman (KUO), 1880 A. Arrhenius & A. O. Kihlman (H″).

Leningrad Region

Karelia australis. *Lesogorskiy* (Jääski, Jäskis): Ahola, 1888 J. Lindén (H″); Vallinkoski, 1881 Th. Saelan (H). — *Vyborg* (Viipuri): Monrepos, 1934 T. A. Putkonen (H″) cfr.

Isthmus karelicus. *Zelenogorsk* (Terijoki): r.y., 1935 L. Fagerström (H″).

Karelian A.S.S.R.

Karelia ladogensis. *Impilakhti:* Uomaa, 1914 R. Hällfors (H"). — *Sortavala* (Serdobol): 1904 O. Lönnbohm (KUO). — *Suistamo:* Jalonvaara, 1915 K. Linkola (H").

Karelia olonetsensis. *Shoksha:* shore of L. Onega (Äänisjärvi), 1898 J. I. Lindroth & A. K. Cajander (H).

Karelia borealis. *Korpisel'kya:* 1902 A. Torckell (H"); Lehmävaara, Säynätvaara, 1914 K. Linkola (H). — *Suoyarvi:* Haukka and Moisseinvaara, both 1914 K. Linkola (H").

Regio kuusamoënsis. *Kuusamo:* Rajala by L. Olanga (Paanajärvi), 1877 E. Wainio (H), 1937 J. Montell (TURA). — *Kuolayarvi* (Salla): Ali-Kurtti, Nivala, 1917 V. Pesola (H", TURA).

Murmansk Region

Lapponia Imandrae. *Apatity:* 1930 Anon. (LE"). — *Kandalaksha:* by railway, 1917 A. Bulavkina, V. Komarov and V. Petrov (LE).

Lapponia ponojensis. *Svyatov Nos* (Svjatoi-nos): 1887 A. O. Kihlman (H).

Lapponia tulomensis. *Kola:* meadow by R. Kola, 1917 A. Bulavkina, V. Komarov & V. Petrov (LE).— *Murmansk:* 1967 Wdn (H).

Sweden

Ångermanland. *Härnösand:* Härnön, 1947 Bjn 1608, 1612, both 2 n = 42 (UPS"). — *Högsjö:* Veda, 1947 Bjn 1619, 2 n = 42 (UPS"). — *Nätra:* Köpmanholmen, 1947 Bjn 1646, 2 n = 42 (UPS). — *Sollefteå:* 1910 G. Johansson (LD).

Norrbotten. *Piteå:* by S harbour, 1912 E. Marklund (UPS).

Pite Lappmark. *Arjeplog:* shore of Hornavan by Arjeplog, Rappasundet, 1963 J. Lundquist (UPSV"); shore of R. Pite by Forsnäs, 1963 J. Lundquist (UPSV"); Vuolvojaure: S shore and by Varrasviken, both 1963 J. Lundquist (UPSV"); Saddajaure: S shore by Norra Bergnäs and by Mossamyran, both 1963 J. Lundquist (UPSV"); Västerholm by Vuossesundet, N shore of Saddajaure (locality 22), 1962 J. Lundquist & G. Wistrand (UPSV").

Norway (list of localities in southern Norway in STÖRMER 1952)

Nesseby: Fuglebjerget, 1859 Chr. Sommerfelt (O").

Agrostis mertensii × stricta

Finland

Lapponia kemensis. *Sodankylä:* Kersilö; shore of Kitinen 1 km below Hannunoja, 1965 Wdn (H).

Lapponia inarensis. *Utsjoki:* shore opposite Jaakkola near Pikku-Jussi, 1961 L. & Y. Mäkinen (TUR); riversides by Puksala and Patoniva, both 1969 Wdn (H).

Sweden

Lule Lappmark. *Gällivare:* sandy shore of Sitasjaure S of mouth of Lietejokk, 1924 G. Björkman (S, UPS; sub nom. *A. canina* in G. BJÖRKMAN 1939: 12; determined in schedis as »*A. canina* × *borealis*» by T. Vestergren in 1926).

Norway

Troms. *Kvaenangen:* Kvaenangsbotn; gravelly mouth of rivulet in village, 1966 Wdn (H*). — *Skjaervö:* Lökö, Ramberg, 1900 R. E. Fridtz (O).

Agrostis × bjoerkmanii

Finland

Alandia. *Eckerö:* Storby, 1962 A. Saarisalo-Taubert (H). — *Finström:* Bergö-Husö, 1946 J. Montell (TURA); Ämnäs, 1895 A. Rantaniemi (OULU).

Nylandia. *Borgå:* t., 1960, 1964 Wdn (H"). — *Helsinki:* Kaisaniemi, 1935 N. Herlin (H") cfr. — *Sibbo:* Löparö, Svartholm, 1965 Wdn (H).

Satakunta. *Karkku:* 1872 Hj. Hjelt (H"; sub nom. *A. stolonifera* × *vulgaris* in H. LINDBERG 1900: 135).— *Merikarvia:* Honkajärvi, 1962 J. Suominen (H).

Tavastia australis. *Asikkala:* Pulkkila ridge, 1947 J. Jalas, cult. Upsaliae, Bjn 1784 2 n = 35+3 (UPS"). — *Lammi:* Jahkola, 1961 M. Haapasaari (H); by Biological Station, 1964 Y. Ala-Paavola (H"). — *Sysmä:* Maatiais rapids, 1872 K. J. W. Unonius (H"; sub nom. *A. stolonifera* × *vulgaris* in H. LINDBERG 1900: 153). — *Tyrväntö:* 1919 K. Halkilahti (TUR).

Savonia australis. *Joutseno:* Jänhiälä, shore of Saimaa, 1967 Wdn (H). — *Punkaharju:* Punkasalmi, shore of Puruvesi, 1967 Wdn (H).

Tavastia borealis. *Sumiainen:* Jänislahti, 1962 A. Saarisalo-Taubert (H). — *Viitasaari:* shore of c.v. island, 1969 Wdn (H).

Savonia borealis. *Kuopio:* 1900 O. Lönnbohm (LD); shore near t., 1966 Wdn (H); Maljalampi, 1931 A. Toivonen (H). — *Maaninka:* Honkamäki, 1966 Wdn (H*); Tuovilanlahti, Mustalähde, 1937 H. Roivainen (H"). — *Tervo:* Talluskylä, Tiensyrjä, 1933 O. Kyyhkynen (H").

Karelia borealis. *Liperi:* Mattisenlahti, Alamylly, 1953 A. Vuorisalo (TUR). — *Pielisjärvi:* Hattuvaara, Itkiönkangas, shore of Ruunanjärvi 1961; Kinahmonniemi, Korpilahti 1962; Kontiovaara, shore of Suomusjärvi 1960; Kylänlahti: Pieni Läpsynsaari and Suuri Turakkasaari 1962; Varpanen, Karsikko, shore of Viekinjärvi 1962; Viensuu, Kutkutsaari 1962; all 7 specc. collected by C. E. Sonck (H); Koli, shore of Pielisjärvi by Alamaja, 1967 Wdn (H).

Ostrobottnia media. *Haapajärvi:* Harju, 1962 A. Kosonen (OULU"). — *Larsmo:* Finnäs, 1954 E. Häyrén (H"); shore by bridge to Eugmo, 1965 Wdn (H*). — *Nykarleby:* Fröjsön, 1917 B. Pettersson (H). — *Oulainen:* near Kilpua station, 1964 J. Suominen (H). — *Paavola:* near Tuomioja r.y., 1964 J. Suominen (H). — *Rautio:* Kärkiskylä, 1964 T. Ulvinen (H, OULU); Pöllä, 1964 T. Ulvinen (H, OULU). — *Revonlahti:* Ylipää, Kallila, 1966 T. Ulvinen (OULU).

Ostrobottnia kajanensis. *Suomussalmi:* shore near rectory, 1909 O. Kyyhkynen (H").

Ostrobottnia borealis. *Ii:* Maakrunni, 1948 T. Vartiainen (OULU); Olhava, Nyby, 1965 Wdn (H). — *Kemi:* shore by camping place, 1965 Wdn (H); Ajos, 1965 Wdn (H); Ala-Paakkola, 1965 Wdn (H). — *Kemijärvi:* shore of Kemijoki at border between Kemijärvi and Pelkosenniemi, 1915 A. Rantaniemi (H); Alakylä, Koivusaari, 1962 M. Ohenoja (H, OULU); Kemijärvi, r.y. 1964 J. Suominen (H); Kostamo, by Kostamojärvi, 1969 Wdn (H); Leväranta, 1967 Wdn (H); S. Teljonsaari, 1965 M. Lähdeoja (H); Tohmo, Lahnasaari, 1959 P. Havas (OULU). — *Kiiminki:* Martimonoja by Kiiminki — Yli-Ii road, 1960 P. S. Jokela (OULU). — *Kuivaniemi:* Taipale, seashore, 1969 Wdn (H). — *Oulunsalo:* Kylänpuoli, 1963 P. S. Jokela (OULU"). — *Rovaniemi:* Marraskoski, 1966 Wdn (H); Nuottisaari, 1961 P. Havas (OULU); Oinassaari, 1915 A. Rantaniemi (H"); Sinettä, shore of Ounasjoki, 1924 M. J. Kotilainen (H); Valajaskoski, 1864 M. Brenner (H). — *Simo:* shore of Simojoki by bridge on highway 4, 1965 Wdn (H). — *Ylitornio:* Koskenniemi, 1877 Hj. Hjelt & R. Hult (H; sub nom. *A. stolonifera × vulgaris* in H. Lindberg 1900:153).

Regio kuusamoënsis. *Kuusamo:* c.v., near Nilojärvi, 1963 T. Ulvinen (H); S shore of Ala-Kitkajärvi, 1967 Wdn (H); Juuma, in the village, 1963 J. Suominen (H), H. Toppari (H); shores of Ala-Juumajärvi, 1962 M. Tervo (OULU"), 1966 Wdn (H"); shore of Ylä-Juumajärvi, 1967 Wdn (H); Käylä, 1967 Wdn (H); Tolpanniemi, 1963 J. Suominen (H); Vallioniemi, shore of Ala-Kitkajärvi, 1967 Wdn (H). — *Salla:* near Kelloselkä, 1964 J. Suominen (H); Naruska, Saarikoski, 1961 T. Rintanen (H).

Lapponia kemensis. *Kittilä:* c.v., 1908 G. Lång (H); shores of Ounasjoki in Alakylä, Helppi and Jääskö, all 3 1966 Wdn (H*); Kaukonen, 1877 Hj. Hjelt & R. Hult (H; sub nom. *A. stolonifera × vulgaris* in H. Lindberg 1900:153); Könkäänkylä, 1933 H. Roivainen (H); SE of Pokka, by Rajalompolo at mouth of Hannukanoja, 1959 T. Ulvinen (H). — *Kolari:* river shore in c.v., 1925 O. Fortelius (TURA); Kolari towards Huuki, 1964 T. Ulvinen (OULU"); Äkäsjoki, field, 1933 H. Roivainen (H). — *Muonio:* Shores of R. Muonio at Aasakoski 1923, Aasavaara 1925, Kätkäsuvanto 1915, Visanto Rapids in Ylikylä 1942, and Ylimuonio 1915, all 5 J. Montell (TURA"); Visanto rapids, 1969 Wdn (H). — *Pelkosenniemi:* shore of Kemijoki at border between Pelkosenniemi and Sodankylä, 1916 A. Rantaniemi (OULU); shore of Luirojoki 2.5—3.1 km from Verkkojoki towards Tanhua, 1960 K. Laaksonen (H); Saunavaara, shore of Kitinen, 1967 Wdn (H); Suvanto, S shore of Kitinen about 4.3—4.6 km from the Suvanto road towards Sodankylä, 1960 K. Laaksonen (H). — *Savukoski:* shore of Kemijoki, 1915 A. Rantaniemi (H"); river shore in c.v., 1966 Wdn (H); shore of Kemijoki about 1/2 km above Arajoki, 1960 P. Havas (OULU); Hihnavaara, river shore, 1966 Wdn (H*); Kuttusvaara, 1959 P. Sorsa (H); Lattuna, riverside, 1961 T. Ulvinen (H, OULU, S, TUR); Martinkylä, shore about 1 km above Kyläsuvanto, 1960 P. Havas (OULU). — *Sodankylä:* G. Wahlenberg (UPS"; sub nom. *A. stolonifera × vulgaris* in Murbeck 1898: 5), 1878 E. Wainio (TUR), 1882 E. W. Blom (H"; sub nom. *A. stolonifera × vulgaris* in H. Lindberg 1900: 153); Niemelä, 1878 E. Wainio (TUR); localities along Kitinen N → S: Ylikitinen, confluence of Vuotsojoki and Kitinen, 1959 T. Rintanen (H); Köngäs towards Porttipahta, 1959 K. Laaksonen (H"); Köngäs, 1966 Wdn (H*); Peurasuvanto, 1958 T. Ulvinen (H), 1959 K. Laaksonen (H), 1966 Wdn (H); about 500 m from mouth of Ylä-Liesijoki towards Peurasuvanto, 1960 K. Laaksonen (H); Petkula, about 1.2—1.7 km from Matarakoski towards Sodankylä, 1960 K. Laaksonen (H); Kersilö, roadside, 1965 Wdn (H); Kersilö, about 1 km below Hannunoja, 1965, 1969 Wdn (H); Kersilö, about 2.6 km from Kersilö ferry towards Sodankylä, 1960 K. Laaksonen (H); Sattanen, 1965 Wdn (H); riverside in c.v., 1965 Wdn (H); about 1.3—1.4 km from the Sodankylä bridge towards Aska, 1960 K. Laaksonen (H); Aska, 1960 K. Laaksonen (H), 1965 Wdn (H); Vaiskojärvi, about 1.3—1.9 km from Törmänen towards Suvanto, 1960 K. Laaksonen (H); Vaiskojärvi, about 700 m from Luostonoja towards Suvanto, K. Laaksonen (H). Localities along Luirojoki N→S: Korvanen, shore of Korvasjoki by Ala-Ponku, 1958 T. Ulvinen & J. Poijärvi (H"); Korvanen, Valkeasilmävaara, 1958 T. Ulvinen & J. Poijärvi (H); shore of Luirojoki 3 km above Korvanen, 1958 T. Ulvinen & J. Poijärvi (H); shores of Luirojoki about 6, 7 and 8 km below Korvanen, all 3 1958 K. Laaksonen (H"); Riesto, mouth of Kopsusjoki, 1959 K. Laaksonen (H); Tanhua, shore of Luirojoki about 4 km above the ferry, 1959 K. Laaksonen (H).

Lapponia enontekiensis. *Enontekiö:* localities along Ounasjoki N→S: Ketomella and 1 km N. of Saajontalo, both 1966 P. Borg (H"); about 5 km N of Ylikyrö, 1930 K. Linkola (H). Localities along Lätäseno and R. Muonio N→S: Luossakoski, 1889 L. Lindén (H); between Isokurkkio and Vähäkurkkio, 1959 L. & H. Roivainen (H); between Vähäkurkkio and Markkina, 1939 J. I. Liro & H. Roivainen (H); Pahtakoski, 1949 J. I. Liro & H. Roivainen (S); Mannakoski, 1962 M. Lähdeoja (H); Gunnarin Korva, 1950 Bjn 3064 2 n = 35 (UPS"); Vähäniva, 1969 Wdn (H); Palojoensuu, 1965 M. Lähdeoja (H); mouth of Lassinoja, 1914 J. Montell (TURA"), 1966 Wdn (H"*).

Lapponia inarensis. *Inari:* Ivalo, by Ivalojoki, 1959 T. Ahti (H), 1961 P. Kallio (TUR). 1963, 1964 M. Lähdeoja (H), 1966 Wdn (H); by Ivalojoki between Törmänen and Ivalo, 1960 V. Kujala (HFR); shore of Luottojoki about 15 km from border of U.S.S.R., 1966 Wdn (H).

Karelian A.S.S.R.

Karelia onegensis. *Sopukha* (Suopohja): 1863 Th. Simming (H"; sub nom. *A. stolonifera × vulgaris* in H. Lindberg 1900: 153).

Murmansk Region

Lapponia Varsugae. *Meneba:* mouth of rivulet Meneba joining R. Ponoy, 1928 G. D. Zinserling 665 (LE").

Lapponia tulomensis. *Kildin:* Anon (LE). — *Kola:* shore of R. Tuloma, 1917 A. Bulavkina, V. Komarov & V. Petrov 770, 1007 (LE"); Murmansk, shore of R. Tuloma, 1921 N. Savich 613 (LE"); Murmansk, shore of R. Tuloma near Krivjech Peninsula, 1921 N. Savich 454 (LE).

Sweden

Ångermanland. *Härnösand:* Härnön, Gånsvik, 1947 Bjn 1611, 1613 2 n = 35 (UPS"). — *Högsjö:* Veda, 1947 Bjn 1618 2 n = 35 (UPS").

Norrbotten. *Pajala:* 1859 C. P. Laestadius (UPS"), 1856, 1860 L. L. Laestadius (S"; sub nom. *A. stolonifera*

× *vulgaris* in Murbeck 1898: 5); Areavaara, shore of R. Muonio, 1966 Wdn (H); Erkheikki, shore of R. Torne, 1966 Wdn (H); Kengis, by rapids, 1946 Bjn 871, 872 2 n = 35 (UPS″); Mertalakte, 1859 L. L. Laestadius (S″); Petäjäsalo, 1859, 1860 L. L. Laestadius (S″); shore of R. Torne about 35 km above c.v., 1966 Wdn (H). — *Muonionalusta:* Parkajoki, shore of R. Muonio, 1966 Wdn (H).

Pite Lappmark. *Arjeplog:* Vuossejaure, E shore by mouth of influent from Limsjaure (locality 21), 1962 J. Lundquist & G. Wistrand (UPSV″); Saddajaure, S shore by Mossamyran, 1963 J. Lundquist (UPSV″).

Torne lappmark. *Karesuando:* 1840, 1846, 1847 L. L. Laestadius (H, S″, UPS″; sub nom. *A. stolonifera* × *vulgaris* in Murbeck 1898: 5); Gunnarin Korva, 1950 Bjn 3016 2 n = 35 (UPS).

Norway

Finnmark. *Nesseby:* Mortensnes, 1861 A. G. Nordvi (UPS″; sub nom. *A. stolonifera* × *vulgaris* in Murbeck 1898: 5). — *Tana:* 1886 G. Balke (O″, Trom″); near Tana church, 1855 Chr. Sommerfelt (UPS″; sub nom. *A. stolonifera* × *vulgaris* in Murbeck 1898:5); Höiholmen near Tana church, 1852 Chr. Sommerfelt (O″).

Agrostis × murbeckii

Finland

Alandia. *Lemland:* Idholm, 1902 A. Renvall (H″).

Regio aboënsis. *Bromarv:* Vättlax, Björkholm, 1966 Wdn (H). — *Dragsfjärd:* Ekhamn, 1961 Wdn (H). — *Finby:* Pettulandet, 1963 B. Söderström (H). — *Nagu:* Själö, 1967 Wdn (H); Styrskobb, 1961 Wdn (H). — *Rymättylä:* cliff S of Väärämaa, 1967 Wdn (H). — *Sauvo:* Eräniemi, 1950 A. E. Koskimies (H″). — *Turku:* Hirvensalo, 1953 H. Såltin (TUR). — *Uusikaupunki:* Sorvakko, 1960 U. Laine (TUR).

Nylandia. *Borgå:* Pellinge, numerous specc. 1958—1969 Wdn (H″). — *Ekenäs:* r.d., Ängsholm, 1948 Bjn, 2 n = 28 (UPS″). — *Espoo:* Hoplax, Hagalund, 1936 N. Herlin (H″); Sommarö, Moisö, 1966 Wdn (H). — *Helsinki:* Kallviksudd, 1967 Wdn (H). — *Pernå:* Kabböle, 1966 Wdn (H). — *Sibbo:* Löparö, Sandholm, 1965 Wdn (H).

Satakunta. *Säkylä:* Pyhäjoki, 1946 H. Såltin (TUR, TURA″).

Ostrobottnia australis. *Korsnäs:* 1912 A. Lindfors (TUR). — *Kristinestad:* 1965 Wdn (H). — *Malax:* Storskär, 1950 M. Malmberg (VOA).

Savonia borealis. *Kuopio:* Hirvilahti, 1900 O. A. F. Lönnbohm (H″) cfr.

Karelia borealis. *Kontiolahti:* 1895 W. M. Axelson (HEL). — *Värtsilä:* Niirala r.y., 1965 J. Suominen (H).

Ostrobottnia media. *Kalajoki:* Hiekkasärkät, 1965 Wdn (H). — *Kokkola:* 1969 Wdn (H). — *Kronoby:* Hästö, 1959 C. Krokfors (H).

Ostrobottnia borealis. *Hailuoto:* Hanhinen, Rautaletto, 1960 A. Koponen (H) cfr; Syökari and Ulkokarvo, both 1965 T. Stjernberg (H). — *Ii:* Asemakylä, 1954 M. Malvari (OULU, TUR). — *Kemi:* Rantaniemi, 1895 K. J. Ehnberg (TUR). — *Kiiminki:* Jolosmäki, 1955 V. Törnroos (OULU). — *Utajärvi:* between Rantanen and Kukkola, 1936 V. Niinimäki (H).

Regio kuusamoënsis. *Kuusamo:* S shore of Ala-Kitkajärvi, 1967 Wdn (H); Juuma: N shore of Juumajärvi, 1948 O. Rune (UPS″), Ala-Juuma, 1965 J. Suominen (H), Niskakoski, 1965 H. Toppari (H), Jyrävän Köngäs, 1966 Wdn (H″).

Lapponia inarensis. *Inari:* lake shore near c.v., 1969 Wdn (H). — *Utsjoki:* 1.5 km N of Vetsikko, 1958 Y. Mäkinen & P. Kallio (H″, OULU, TUR″).

Leningrad Region

Isthmus karelicus. *Gromovo* (Sakkola): shore of L. Varto (Suvanto), 1897 G. Lång (HSI).

Karelia ladogensis. *Priozersk* (Käkisalmi): Kivisalmi, 1905 J. S. W. Koponen (H).

Murmansk Region

Lapponia Imandrae. *Nuotjaur:* 1891 J. Lindén (H).

Lapponia Varsugae. *Kanevka:* shore of R. Ponoy, 1928 G. D. Zinserling 603 (LE″).

Lapponia ponojensis. *Pyalitsa:* 1889 A. O. Kihlman (H″).

Lapponia tulomensis. *Murmansk:* by bridge across Kola fjord, 1967 Wdn (H).

Sweden

Ångermanland. *Nora:* Krången, 1958 E. Evers (LD″). — *Säbrå:* 1908 F. Peters (UPS″); Norrstig, 1873 H. W. Arnell (UPS″). — *Vibyggerå:* Ratan, 1951 F. Bergvall (S″).

Västerbotten. *Byske:* Rönnskär, 1915 E. Marklund (S″); Svinö, 1947 Bjn, 2 n = 28+4 (UPS″); Svinönäset, 1947 Bjn, 2 n = 28 (UPS″). — *Lövånger:* Kallviken, 1949 Bjn (UPS″). — *Nysätra:* Grovsandsudde, 1939 C. Malmström (S″).

Norrbotten. *Luleå:* Hindersön 1923 and Uddskär 1922, both H. Svenonius (S″, UPS″). — *Nederkalix:* Storön, 1950 Bjn, 2 n = 28 (UPS″). — *Nedertorneå:* Santasaari, 1946 Bjn 883 2 n = 25 (cfr), 2 n = 28+2, 28+4 (UPS″). — *Älvsby:* Holmsel (locality 2), 1962 J. Lundquist & G. Wistrand (UPSV″). — *Övertorneå:* Pullinki, 1961 O. Lönnquist (S).

Åsele Lappmark. *Åsele:* Söråsele, 1949 Bjn 2810 2 n = 28 (UPS″).

Pite Lappmark. *Arjeplog:* Gallaure, W shore, 1963 J. Lundquist (UPSV″); Lulep Istjakk, S side, 1963 J. Lundquist (UPSV″),

Norway

Nordland. *Andöy:* Andenes, 1873 Nrn (O″). — *Ankenes:* Rombaksbotn, 1950 Bjn, 2 n = 28+2 (UPS″).

Troms. *Bjarköy:* Flatöy, 1934 P. Benum (TROM″). — *Målselv:* Ruosta by Ruostenvand, 1879 Nrn (O″). — *Nordreisa:* Juusjärvi, 1910 H. Resvoll-Holmsen (O″). — *Storfjord:* Kvesmenes, 1933 H. Smith (UPS″); Skibotn and mouth of Signalelva, both 1969 Wdn (H). — *Tromsö:* Sletta, 1953 O. Rune (UPS″).

Finnmark. *Alta:* Bosekop, Nrn (O″); Törfossen bru, 1966 Wdn (H). — *Hasvik:* 1880 C. Lindman (UPS″). — *Tana:* Smalfjord, 1966 Wdn (H).

Agrostis gigantea × stolonifera

Finland

Ostrobottnia kajanensis. *Kuhmo:* Korpisalmi, W shore of Lentua, 1945 L. Fagerström (H″).

Regio kuusamoënsis. *Kuusamo:* c.v., Tatankijärvi, 1963 T. Ulvinen (H, OULU″); S shore of Ala-Kitkajärvi, 1967 Wdn (H); Juuma: Ala-Juumanjärvi, 1947 J. Jalas, Bjn 1783 2 n = 35 (UPS″), 1948 O. Rune (UPS″ , 1962 L. Tauriainen (OULU″), Kitkajoki below Jyrävän Köngäs, 1962 T. Ulvinen (OULU″), 1966 Wdn (H″), N shore of Oulankajoki opposite the mouth of Kitkajoki, 1908 W. Berner (H); Vasaraperä, eutrophic paludified shore of Yli-Kitkajärvi between Apajalahti and Mäntyniemi, 1963 T. Ulvinen (H, OULU″); Vuotunki, Kiukaankorva, shore of Kuusinkijoki, 1964 L. &. Y. Mäkinen (TUR). — *Salla:* Naruskajärvi, 1961 T. Rintanen (H).

Lapponia kemensis. *Savukoski:* Shore of Nuortijoki about 3 km from the Soviet boundary, 1961 T. Ulvinen (H, OULU″).

Lapponia inarensis. *Inari:* Lemmenjoki, by the house of Juhani Jomppanen, 1959 R. Kalliola (H); Luttojoki, sandy shores about 15 and 25 km from the Soviet boundary, both 1966 Wdn (H*); Tirro-Paadarijärvi, E shore of Vaskojoki, 1961 U. Laine (TUR). — *Utsjoki:* Kevonniemi, 1960 P. Kallio (TUR); Kevo, Jomppala, 1961 P. Vanhatalo (TUR); shore of Kevojärvi opposite Puksala, 1969 Wdn (H); shore of Mantojärvi near c.v., 1969 Wdn (H); Paksujalka, 1880 A. Arrhenius & A. O. Kihlman (H, KUO; sub nom. *A. stolonifera × vulgaris* in H. LINDBERG 1900: 153).

Murmansk Region

Pechenga (Petsamo): shore of R. Lota (Luttojoki) about 25 km from the Finnish boundary, 1967 Wdn (H″).

Lapponia tulomensis. *Notozero* (Nuortijärvi): shore of L. Notozero, 1883 H. Hollmén (H; sub nom. *A. stoonifera × vulgaris* in H. LINDBERG 1900: 153).

Sweden

Pite Lappmark. *Arjeplog:* Hornavan. Kakeludden S.W. of Stensund, 1963 L. Lundquist (UPSV″); shore of Rebnisjaure, 1963 J. Lundquist (UPSV″); shore of Storlaisan at Stenudden, 1959 J. Lundquist (UPSV″); mouth of Sadebäcken in Storlaisan, 1963 J. Lundquist (UPSV″).

Norway

Finnmark. *Tana:* Leirpoll, Nrn (O″); Polmak, sandy shore of R. Tana, 1969 Wdn (H).

Agrostis canina × stolonifera

Finland

Nylandia. *Borgå:* Pellinge, Ängsholm, damp meadow, 1970 Wdn (H).

Agrostis stolonifera × stricta

Finland

Regio kuusamoënsis. *Kuusamo:* sandy S shore of Ala-Kitkajärvi, 1967 Wdn (H″*).

Agrostis mertensii × stolonifera

Finland

Lapponia kemensis. *Muonio:* Kätkäsuvanto, spring near R. Muonio, 1968 T. Ulvinen (H, OULU); meadow near Joensuu gård, 1942 J. Montell (TURA″); Ylimuonio, sandy shore of Isosaari, 1941 J. Montell (TURA″).

Lapponia enontekiensis. *Enontekiö:* sandy shore of R. Muonio near mouth of Lassinoja, 1931 J. Montell (TURA″), 1966, 1967 Wdn (H″*).

Sweden

Norrbotten. *Pajala:* 1858 L. L. Laestadius (UPS″).

Torne Lappmark. *Karesuando:* c.v., numerous specc. collected in 1830s and 1840s by L. L. Laestadius (LD″, S″, UPS″); c.v., 1929 O. R. Holmberg, Plantae Suecicae exsiccatae 143 (H, etc.); c.v., W shore of Kaarevuopio, 1950 Bjn 3039, 3042 both 2 n = 42 (UPS″); S shore of border river 1.5 km SW of Ausskari, 1950 Bjn 3049, 3050 both 2 n = 42 (UPS″); shore of R. Muonio near church, 1967 Wdn (H″*).

Agrostis gigantea × mertensii

Murmansk Region

Lapponia petsamoënsis. *Pechenga* (Petsamo): Sandy shore of R. Lota (Luttojoki) about 25 km from Finnish border, 1967 Wdn (H″*).

Agrostis capillaris × *stricta*

Finland

Lapponia kemensis. *Sodankylä:* Kersilö, W shore of Kitinen about 0—400 m below mouth of Hannunoja, 1960 K. Laaksonen (H″), and about 1 km below mouth of Hannunoja, 1965, 1969 Wdn (H″*); Petkula, W shore of Kitinen just below Hannunoja, 1960 K. Laaksonen (H″). — *Pelkosenniemi:* Suvanto, S shore of Kitinen about 2 km from Lepola towards Suvanto, along a brook, 1960 K. Laaksonen (H″); Suvanto, Ahmaniva, erosion shore, 1960 K. Laaksonen (H″).

Lapponia enontekiensis. *Enontekiö:* Palojoensuu, riverside in village, 1966, 1967 Wdn (H″*).

Lapponia inarensis. *Inari:* by rapids in c.v., 1966 Wdn (H″*).

Murmansk Region

Pechenga (Petsamo): roadside near shore of R. Lota about 25 km from Finnish border, 1967 Wdn (H″*).

Agrostis cfr *capillaris* × *clavata*

Finland

Ostrobottnia borealis. *Rovaniemi:* Pekkala Kaihuanvaara, SW slope, 1956 M. J. Kotilainen (H″).

Summary

The present work is a study of the taxonomy, nomenclature and distribution of taxa of the genus *Agrostis* met with in the eastern half of Fennoscandia.

The typification of the genus *Agrostis* L. 1753 is discussed. Since it seems that no satisfactory typification has so far been made and that none can be made without a change in the current usage of the generic name, it is proposed that *A. canina* L. be conserved as the type species.

The various taxonomically important characters are discussed. The morphological variation encountered is described and also illustrated with the aid of photographs, pictorialized scatter diagrams and histograms. Some new chromosome counts are reported. The phenology of the different taxa is briefly treated.

The species dealt with are divided into two sections: *Agrostis*, comprising four native (*A. canina, A. clavata, A. mertensii* and *A. stricta*) and two adventitious alien (*A. pourretii* and *A. scabra*) species, and *Vilfa* (Adans.) Roem. & Schult., with three native species (*A. capillaris, A. gigantea* and *A. stolonifera*).

The nomenclature of each species is discussed, and numerous typifications are made. It is found that *A. borealis* Hartm. 1838 is a younger synonym of *A. mertensii* Trin. 1836, whose type is from Alaska. *A. stricta* J. F. Gmel. 1791 is synonymous with *A. coarctata* Ehrh. ex Hoffm. 1800 (= *A. pusilla* Dum., *A. hyperborea* Laest., *A. canina* ssp. *montana* Hartm.). The name *A. capillaris* L. 1753 can be satisfactorily lectotypified, and replaces the younger synonym *A. tenuis* Sibth. 1794.

Among the species of sect. *Agrostis*, *A. canina*, *A. clavata* and *A. mertensii* seem to be taxonomically rather homogeneous within the region studied. *A. stricta* consists of two population groups, which in the region studied are geographically widely separated from one another, but are connected through western Norway and Sweden. The two population groups differ morphologically to some extent. The southern populations appear to correspond to the populations in southern Sweden and western Europe, but deviate from the populations referred to *A. syreistschikowii* P. Smirn. in the adjacent part of the U.S.S.R.

The species of sect. *Vilfa* are all very variable. In *A. capillaris* the variation has not been found to show any definite geographical pattern. The species is common, at least in

inhabited areas, all over the region. It consists of both introduced and native populations. *A. gigantea* comprises two indigenous varieties and a heterogeneous group of introduced biotypes. *A. gigantea* var. *repens* (Laest.) Widén, comb. nova, is a Eurasian taxon widely distributed on lake and river shores in Finland, the Karelian A.S.S.R. and the Murmansk Region, but avoiding coastal areas around the Gulfs of Bothnia and Finland. Its distribution seems to extend eastwards to the Lena River in Siberia. *A. gigantea* var. *glaucescens* Widén, var. nova, is a sea-shore plant occurring on the coasts of the Gulfs of Bothnia and Finland. It is probably endemic in the Baltic area. The introduced types of *A. gigantea* are rather variable, but are combined together under the name *A. gigantea* var. *dispar* without further subdivision. Evidently only one specimen, collected in N Helsinki, is referable to *A. gigantea* var. *gigantea*. *A. stolonifera* is extremely variable within the region in respect to nearly every character. The variation, distribution and ecology of some different population groups are described.

Ten interspecific hybrids have been found in the region. Some of the hybrids are rather frequent and, owing to vegetative propagation, are also abundant in their habitats. This is especially true of *A.* × *bjoerkmanii* Widén, nom. nov. (= *A. capillaris* × *gigantea*), and *A.* × *murbeckii* (= *A. capillaris* × *stolonifera*), which occur nearly all over the region. The former hybrid also occurs over vast areas independently of one of its parent species. *A. gigantea* × *stolonifera*, *A. mertensii* × *stricta* and *A. capillaris* × *stricta* have a more restricted distribution than the first two hybrids, but occur partly independently of one of their parent species, and may be locally abundant. *A. mertensii* × *stolonifera* is recorded from several localities along the Muonio and Torne Rivers, but is elsewhere unknown. *A. canina* × *stolonifera*, *A. stolonifera* × *stricta*, *A. capillaris* × *clavata* and *A. gigantea* × *mertensii* are very rare. The two last-mentioned hybrids have never before been recorded.

A key to the species and hybrids is given.

The distribution and immigration history of the taxa are discussed and distribution maps are given. The whereabouts of the material studied is specified in separate lists. Notes on the ecology and habitat requirements of the different taxa are given.

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References

Adanson, M. 1763: Familles des Plantes II. — 640 pp. Paris.

Ahti, T. & Hämet-Ahti, L. 1971: Hemerophilous flora of the Kuusamo district, northeast Finland, and the adjacent part of Karelia, and its origin. — Ann. Bot. Fennici 8: 1—91.

Ahti, T., Hämet-Ahti, L. & Jalas, J. 1968: Vegetation zones and their sections in northwestern Europe. — Ann. Bot. Fennici 5: 169—211.

Almquist, E. 1929: Upplands vegetation och flora. — Acta Phytogeogr. Suecica 1: xii + 1—622 + 430 maps.

Almquist, S. 1898: Om Agrostis scabra och perennans. — Bot. Not. 1898: 281—282.

Andersen, S. 1931: Graes-hybrider i Danmark. — Bot. Tidsskr. 41: 424—430.

Anderson, E. 1948: Hybridization of the habitat. — Evolution 2: 1—9.

—»— 1949: Introgressive hybridization. — 109 pp. New York.

Andersson, N. J. 1852: Skandinaviens växter II. Skandinaviens Gramineer eller de i Danmark, Sverige, Norge och Finnland vildt växande Gräs. — 122 pp. + 12 pls. Stockholm.

Arcangeli, G. 1882: Compendio della Flora Italiana, ...—xx + 889 pp. Torino.

Arwidsson, Th. 1943: Studien über Gefässpflanzen in den Hochgebirgen der Pite Lappmark. — Acta Phytogeogr. Suec. 17: 1—174.

Ascherson, P. & Graebner, P. 1898—1902: Synopsis der mitteleuropäischen Flora II (1). — 795 + 86 pp. Leipzig.

Atlas of Finland 1925. 38 maps. Helsinki—Helsingfors.

Avdulov, N. P. (АВДУЛОВ, Н. П.) 1928: Систематическая кариология семейства Gramineae. — Dnevnik Vsesojuzn. S»ezda Bot. v Leningrade v janv. 1928 g.: 65—67.

—»— 1931: Карио-систематическое исследование семейства Злаков. (Karyo-systematische Untersuchungen der Familie Gramineen). — Bull. Appl. Bot. Genet. Plant Breed., (Suppl.) 43: 1—428.

Balbis, G. B. 1801: Elenco delle piante crescenti ne Contorni di Torino. — 102 pp. Torino.

Bastard, T. 1809: Essai sur la Flore du Département de Maine et Loire. — xxvi + 415 pp. Angers.

Bauhin, C. 1623: Pinax theatri botanici, ... — 522 pp. Basiliae.

—»— 1658: Theatri botanici sive Historiae plantarum ex veterum et recentiorum placitis propriaque observatione concinnatae liber primus (unicus) editus opera et cura Jo. Casp. Bauhini (Gramineae, Liliaceae). — 683 pp. Basiliae.

Bauhin, J. & Cherlerus, J. H. 1651: Historia plantarum universalis II. — 1074 pp. Ebroduni.

Benum, P. 1958: The Flora of Troms Fylke. — Tromsö Mus. Skrifter 6: 1—402 + 546 maps.

von Besser, W. S. J. G. 1809: Primitiae Florae Galiciae Austriacae utriusque I. — 399 pp. Viennae.

Björkman, G. 1939: Kärlväxtfloran inom Stora Sjöfallets Nationalpark jämte angränsande delar av norra Lule Lappmark. — Kungl. Svenska Vetenskapsakad. Avhandl. Naturskyddsärenden 2: 1—224 + 2 maps.

Björkman, S. O. 1951: Chromosome studies in Agrostis. (A preliminary report). — Hereditas 37: 465—468.

—»— 1954a: Chromosome studies in Agrostis II. — Hereditas 40: 254—258.

—»— 1964b: Observations sur la taxonomie et la caryologie des espèces Calamagrostis tenella, Agrostis rupestris, A. borealis et A. »rubra». — 8e Congr. Intern. Bot., Rapp. Comment, Sect:s 2, 4, 5 et 6: 56—58.

—»— 1960: Studies in Agrostis and related genera. — Symbolae Bot. Upsalienses 17 (1): 1—112.

Blom, C. 1961: Bidrag till kännedomen om Sveriges adventiv- och ruderatflora V. (Summary: A contribution to the knowledge on the adventive and ruderal flora of Sweden V). — Acta Horti Gotoburgensis 24: 61—133.

Blytt, M. N. 1847: Norsk Flora. Förste Heft. — 160 pp. Christiania.

—»— 1861: Norges Flora I. — 386 pp. Christiania.

Böcher, T. W., Holmen, K. & Jakobsen, K. 1968: The Flora of Greenland. — 312 pp. Copenhagen.

Böcher, T. W. & Larsen, K. 1950: Chromosome numbers of some arctic or boreal flowering plants. — Meddel. Grönland 147 (6): 1—32.

Boissier, E. 1884: Flora Orientalis, ... V. — 868 pp. Genevae.

Bolhovskih, Z. V., Grif, V. G., Zahar'eva, O. I. & Matveeva, T. S. (БОЛХОВСКИХ, З. В., ГРИФ, В. Г., ЗАХАРЬЕВА, О. И. & МАТВЕЕВА, Т. С.) 1969: Хромосомные числа цветковых растений. (Chromosome numbers of flowering plants). — 927 pp. Leningrad.

Bor, N. L. 1970: Gramineae. — In: Rechinger, K. H., (ed.), Flora Iranica 70. 573 pp + 72 pls. Graz.

Bowden, W. M. 1960: Chromosome numbers and taxonomic notes on northern grasses. III. Twentyfive genera. — Canad. J. Bot. 39: 541—557.

Bradshaw, A. D. 1952: Populations of Agrostis tenuis resistant to lead and zinc poisoning. — Nature 169: 1098.

—»— 1958: Natural hybridization of Agrostis tenuis Sibth. and A. stolonifera L. — New Phytol. 57: 66—84.

—»— 1959: Population differentiation in Agrostis tenuis Sibth. I. Morphological differentiation. — New Phytol. 58: 208—227.

—»— 1960: Population differentiation in Agrostis tenuis Sibth. III. Populations in varied environments. — New Phytol. 59: 92—103.

Brenner, M. 1871: [Agrostis planifolia C. Koch found in S Finland]. — Not. Sällskapet Fauna Flora Fennica Förhandlingar 13: 463.

Brenner, W. 1921: Växtgeografiska studier i Barösunds skärgård. I. Allmän del och floran. — Acta Soc. Fauna Flora Fennica 49 (5): 1—151 + 1 map.

Britton, N. L. & Brown, H. A. 1913: An Illustrated Flora of the northern United States, Canada and the British Possessions, ... I. 2 ed. — 680 pp. Lancaster. Pa.

Burduja, C. & Toma, C. 1964: Date orientative de anatomie sie histologie experimental — ecologica referitoare la unele graminee. I. Agrostis tenuis Sibth. (Resumé: Sur l'anatomie et l'hystologie expérimental — ecologigues de quelques graminées. I. Agrostis tenuis Sibth.) — Analele Stiintifice Ale Univ. »Al. I. Cuza» Din Iasi (Ser. Noua, Sect. II Stiinte Naturale, a. Biol.) 10: 243—256.

Cajander, A. K. 1903: Beiträge zur Kenntniss der Vegetation der Alluvionen des nördlichen Eurasiens. I. Die Alluvionen des unteren Lena-Thales. — 182 pp. + 4 maps. Diss. Helsingfors.

Calder, J. A. & Mulligan, R. L. 1968: Flora of the Queen Charlotte Islands. Part 1. Systematics of the Vascular Plants. — xiii + 659 pp. Ottawa.

Camus, A. 1958: Graminées hybrides de la flore Francaise (Genre Bromus excepté). — Bull. Jardin Bot. l'Etat Bruxelles 28: 337—374.

Čelakovsky, L. 1867: Prodromus der Flora von Böhmen I. — viii + 112 pp. Prag.

—»— 1881: Nachträge zum Prodromus der Flora von Böhmen bis zum Schlusse des Jahres 1880. — 221 pp. Prag.

Chase, A. & Niles, C. D. 1962: Index to Grass Species I. — 607 pp. Boston.

Chen, C.-C. & Hsu, C.-C. 1962: Cytological studies on Taiwan grasses (2). Chromosome numbers of some miscellaneous tribes. — J. Jap. Bot. 37: 300—313.

Church, G. L. 1936: Cytological studies in the Gramineae. — Amer. J. Bot. 23: 12—15.

Clapham, A. R., Tutin, T. G. & Warburg, E. F. 1962: Flora of the British Isles. 2 ed. —xlviii + 1269 pp. Cambridge.

Cosson, E. & Durieu de Maisonneuve 1854: Flore d'Algerie. Deuzième partie. Phanérogamie. Groupe des Glumacées. — Paris.

Curtis, W. 1787: General Observations on the Advantage which may result from the Introduction of the Seeds of our best Grasses. With An Enumeration of the British Grasses. — 4 pp. London.

—»— 1798: Practical observations on the British grasses, especially such as are best adapted to the laying down or improving of meadows and pastures: Likewise an enumeration of the British grasses. 3 ed. — 73 pp. + 6 pls. London.

CURTIS, W. 1804: Practical observations on the British grasses, especially such as are best adapted to the laying down or improving of meadows and pastures: likewise an enumeration of the British grasses. 4 ed. — 58 pp. + 6 pls. London.

CVELEV, N. N. (ЦВЕЛЕВ, Н. Н.) 1964: Agrostis L. Полевица. — In: TOLMAČEV, A. I. (ТОЛМАЧЕВ, А. И.) (ed.): Flora Arctica URSS II: 43—51. Mosquae-Leninopoli.

DAHL, O. 1934: Floraen i Finnmark fylke. — Nyt Mag. Naturv. 69: 1—430 + XVII pls.

DALIBARD, T. F. 1749: Florae Parisiensis Prodromus, ... — 403 pp. + 4 pls. Paris.

DARLINGTON, C. D. & LA COUR, L. F. 1960: The Handling of Chromosomes. — 248 pp. London.

DAVIES, W. E. 1953: The breeding affinities of some British species of Agrostis. — Brit. Agric. Bull. 5: 313—316.

DAVIS, P. H. & HEYWOOD, V. H. 1963: Principles of Angiosperm Taxonomy. — 556 pp. Edinburgh and London.

DE CANDOLLE, A. P. 1815: Flore Francaise VI. — 662 pp. Paris.

DELAY, C. 1948: Recherches sur la structure des noyaux quiescent chez les phanérogames. — Revue Cytol. Cytophys. Végèt. 10: 103—229.

DESVAUX, N. A. 1818: Observations sur les plantes des environs D'Angers. — 188 pp. Angers & Paris.

DEVOLD, J. 1939: Fra Balsfjords flora. — Nyt Mag. Naturv. 80: 1—39.

DOSTÁL, J. 1950: Květena Č.S.R. a ilustrovaný klíč k určeni všech cevnatých rostlin, na ùzemi Československa planě rostoucích nebo běžně pěstovaných. — 2269 pp. Praha.

DRUCE, G. C. 1908: List of British Plants. 1 ed. — XV + 104 pp. Oxford.

—»— 1927: The Flora of Oxfordshire, ... 2 ed. — CXXXL + 538 pp. Oxford.

—»— 1928: British Plant List. 2 ed. — XL + 154 pp. Oxford.

—»— 1932: The comital Flora of the British Isles. — XXXII + 407 pp. Arbroath.

DUBY, J. E. 1828: Aug. Pyrami De Candolle Botanicon Gallicum, seu .... 2 ed. — XII + 544 pp. Paris.

DUMORTIER, B. C. 1823: Observations sur les Graminées de la Flore belgique. — 153 pp. + 16 pls. Tournay.

DU RIETZ, G. E. 1930: The fundamental units of biological taxonomy. — Svensk Bot. Tidskr. 24: 333—428.

EHRENBERG, L. 1945: Kromosomtalen hos några kärlväxter. — Bot. Not. 1945: 430—437.

EHRENDORFER, F. (ed.) 1967: Liste der Gefässpflanzen Mitteleuropas. — 253 pp. Graz.

ERKAMO, V. 1956: Untersuchungen über die pflanzenbiologischen und einige andere Folgeerscheinungen der neuzeitlichen Klimaschwankung in Finnland. — Ann. Bot. Soc. »Vanamo» 28 (3): 1—290.

ERVI, L. O. 1956: Karpalolajien morfologiasta ja viljelymahdollisuuksista Suomessa. (Summary: On the morphology of certain species of cranberries and the possibility of cultivating them in Finland. Based on field experiments on a Sphagnum bog in Köyliö during the period 1946—1956). — Acta Agralia Fennica 92: 1—148.

EUROLA, S. 1967: Über die Vegetation der Alluvialwiesen im Gebiet der geplanten Stauseen von Lokka und Porttipahta im Finnischen Lappland. — Aquilo (Ser. Bot.) 5: 1—119.

FARWELL, O. A. 1920: Notes on the Michigan flora. II. — Rep. Michigan Acad. Sci. 21: 345—371.

FELFÖLDY, L. 1951: Természetes poliploid novények òsszehasonlílò vizsgálata. II. Természetes poliploi fiivek kémiai osszetételéről. (Summary: Comparative study on the physiology of natural polyploids. II. Chemical composition of natural polyploid grasses). — Agrokémia És Talajtan (Agrochemistry and Soil Science) 1: 181—188.

FERNALD, M. L. 1926: Botanizing in Newfoundland. — Rhodora 28: 49—63, 74—87, 89—111, 115—129, 145—156.

—»— 1933: Recent discoveries in the Newfoundland Flora. — Rhodora 35: 203—223.

FIORI, A. 1923: Nuova flora analitica d'Italia I (1). — 160 pp. Firenze.

FOUILLADE, A. 1911: Sur les Agrostis alba, castellana et vulgaris. — Bull. Soc. Bot. Deux Sèvres 1910—1911: 72—79.

FOUILLADE, M. 1932: Sur les Agrostis alba, vulgaris, castellana et leurs hybrides. — Bull. Soc. Bot. France 79: 789—804.

FREDSKILD, B. 1964: Agrostis scabra in Greenland. — Bot. Tidsskr. 60: 42—47.

FRIES, H. 1945: Göteborgs och Bohus läns fanerogamer och ormbunkar. — 480 pp. Göteborg.

Fries, Th. M. 1861: Anteckningar rörande en i Paris befintlig Linneansk växtsamling. —Öfversikt Kongl. Vetenskapsakad. Förhandl. 18: 255—272.

Gadella, Th. W. J. & Kliphuis, E. 1968: Chromosome numbers of flowering plants in the Netherlands, IV. — Proc. R. Netherlands Acad. Sci. (Ser. C.) 71: 168—183.

Gaudin, J. 1811: Agrostologia helvetica, definitionem descriptionemque graminum et plantarum eis affinium in Helvetica sponte nascentium conplectens I. — XXII + 361 pp. Parisiis et Genevae.

—»— 1828: Flora helvetica I. — 504 pp. + IV pls. Turici.

Gerarde, J. 1597: The Herball, or generall historie of plantes. — 1392 pp. London.

Gilibert, J. E. 1792: Exercitia phytologica, quibus omnes plantae europaeae, quas vivas invenit in varias herbationibus seu in Lithuania, Gallia, Alpibus, ... II: Caeterae plantae lithuanicae cum lugdunensibus comparatae. — 264 pp. Lugduni Gallorum.

Gmelin, J. F. 1791: Systema Naturae II. 13 ed. — XL + 1661 pp. Lipsiae.

Golubeva, M. M. (ГОЛУБЕВА, М. М.) 1923: Agrostis prorepens (Koch) Golub. (In Russian with French summary). — J. Soc. Bot. Russ. 8: 111—122.

Gouan, A. 1773: Illustrationes et observationes botanicae, ... — 83 pp. + 26 pls. Tiguri.

Gray, S. F. 1821: A Natural Arrangement of British Plants, .. II. — 760 pp. London.

Gregory, R. P. G. & Bradshaw, A. D. 1965: Heavy metal tolerance in populations of Agrostis tenuis Sibth. and other grasses. — New Phytol. 64: 131—143.

Grisebach, A. 1853: Gramineae Juss. — In: Ledebour, C. F., Flora Rossica, ... IV: 324—484. Stuttgartiae.

Hackel, E. & Briquet, J. 1907: Revision des Graminées de L'Herbier d'Albr. de Haller filius. — Ann. Conservatoire Jardin Bot. Geneve 10: 26—98.

van Hall, H. C. 1825: Flora Belgii Septentrionalis, ... I (1). — XX + 363 pp. Amsterdam.

von Haller, A. 1768: Historia stirpium indigenarum Helvetiae inchoata II. — LXIV + 323 pp. + 23 pls. Bernae.

Hansen, A. 1968: Agrostis coarctata, Sand-Hvene, i Danmark. — Bot. Tidsskr. 63: 372—373.

Hartman, C. J. 1819: Genera Graminum in Scandinavia Indigenorum Recognita. — 10 pp. Upsaliae.

—»— 1820: Handbok i Skandinaviens flora. 1 ed. — 32, LXIII + 488 pp. Stockholm.

—»— 1832: Handbok i Skandinaviens flora. 2 ed. — XXVIII + CLIV + 408 pp. Stockholm.

—»— 1838: Handbok i Skandinaviens flora. 3 ed. — CLXXIX + 350 pp. + 2 pls. Stockholm.

—»— 1840: Undersökning rörande några av Linnés omtvistade Svenska vextarter. 1. Agrostis rubra och A. canina L. Fl. Su. ed. 2. — Bot. Not. 1840: 81—84.

—»— 1843: Handbok i Skandinaviens Flora. 4 ed. — XXXIII + 482 + 2 pls. Stockholm.

—»— 1846: Svensk och norsk exkursionsflora. — XVI + 191 pp. Stockholm.

—»— 1849: Handbok i Skandinaviens Flora. 5 ed. — XXIV + CXX + 503 pp. Stockholm.

Hartman, C. 1864: Handbok i Skandinaviens Flora I. 9 ed. — LXIV + 322 pp. Stockholm.

Havas, P. J. 1958: Agrostis borealis Hartm. — Pohjanrölli. — In: Jalas, J. (ed.), Suuri kasvikirja I: 485—486. Helsinki.

Hedberg, I. & Hedberg, O. 1964: Documented chromosome numbers of Swedish plants. — Svensk Bot. Tidsskr. 58: 125—128.

Hedberg, O. 1967: Chromosome numbers of vascular plants from arctic and subarctic North America. — Arkiv. Bot. 6: 309—326.

Hegi, G. 1908: Illustrierte Flora von Mittel-Europa I. 1 ed. — CLVIII + 411 pp. München.

Heitz, B. 1967: Graminées. — Inf. Ann. Caryosyst. Cytogénét. 1:22. Cited according to Ornduff 1969.

Hertzsch, W. 1959: Agrostis-Arten. — In: Kappert, H. & Rudorf, W. (ed.), Handbuch der Pflanzenzüchtung (Manual of Plant Breeding) IV. Züchtung der Futterpflanzen (Breeding of Forage Plants): 474—480. Berlin und Hamburg.

Hess, H. E., Landolt, E. & Hirzel, R. 1967: Flora der Schweiz I. — 858 pp. Basel.

Heuffel, J. 1858: Enumeratio Plantarum in Banatu Tanasiensi sponte crescentium et frequentius cultarum. — Verh. Kaiserl.-Königl. Zool.-Bot. Ges. Wien 8: 39—240.

Hiitonen, I. 1947: Agrostis hiemalis (Walt.) B.S.P. satunnaiskasvina Helsingissä. — Memoranda Soc. Fauna Flora Fennica 23: 159—160.

HIITONEN, I. 1970: Dryas-kausien nimityksistä. (With German summary). — Terra 82: 120.

HINTIKKA, V. 1964: A line survey of the distribution of forest plant species on the coast and inland near Helsinki, Finland. — Ann. Bot. Fennici 1: 224—235.

HITCHCOCK, A. S. 1904: Notes on North American grasses. III. — Bot. Gaz. 38: 139—143.

—»— 1905: North American species of Agrostis. — U.S. Dept. Agric., Bull. 68: 1—64 + XXVI pls.

—»— 1920: The genera of grasses of the United States. — U.S. Dept. Agric., Bull. 772.

—»— 1923: Type species of the first 100 genera of Linnaeus's Species Plantarum. — Amer. J. Bot. 10: 510—514.

—»— 1935: Manual of the grasses of the United States. — U.S. Dept. Agric., Misc. Publ. 200.

—»— 1937: Agrostis. — In: North American Flora XVII: 515—534. Lancaster. Pa.

—»— 1951: Manual of the grasses of the United States. 2 ed., rev. A. Chase. — U.S. Dept. Agric., Misc. Publ. 200: 1—1051.

HITCHCOCK, A. S. & GREEN, M. L. 1929: Int. Bot. Congr. Cambridge (England), 1930, Nom. Prop., 111—199.

HITCHCOCK, C. L., CRONQUIST, A. & OWNBEY, M. 1969: Vascular Cryptograms, Gymnosperms and Monocytoledons. — In: HITCHCOCK, C. L., CRONQUIST, A., OWNBEY, M. & THOMPSON, J. W., Vascular plants of the pacific northwest I. Univ. Washington Publ. Biol. 17: 1—914.

HJELT, H. 1895: Conspectus florae fennicae. Pars III. Monocotyledoneae. — Acta Soc. Fauna Flora Fennica 5: 259—562.

HOFFMANN, G. F. 1800: Deutschlands Flora oder botanisches Taschenbuch I (1). 2 ed. — 273 pp. Erlangen.

HOLMBERG, O. R. 1926: Hartmans Handbok i Skandinaviens Flora I. — 160 pp. Stockholm.

HOLUB, J. 1963: Agrostis pusilla Dumort. — In: Plantae Čechoslovacae Exsiccatae. Acta Mus. Nationalis Pragae 19 B: 136—137.

HOOKER, J. D. 1884: The Students Flora of the British Islands. 3 ed. — XXIII + 563 pp. London.

HOOKER, W. J. 1831: The British Flora, comprising the phaenogamous, or flowering plants, and the ferns. — 479 pp. London.

HORNEMANN, J. W. 1813: Flora Danica XXV. — 60 pls. Hauniae.

HOST, N. T. 1809: Icones et descriptiones graminum austriacorum IV. — 58 pp. + 100 pls. Vindobonae.

HUBBARD, C. E. 1954: Grasses. 1 ed. — 428 pp. Bungay.

—»— 1968: Grasses. 2 ed. — 463 pp. Bungay

HUDSON, W. 1762: Flora anglica. 1 ed. — VIII + 506 pp. London.

—»— 1778: Flora anglica I. 2 ed. — XXXVIII + 334 pp. Londini.

HULTÉN, E. 1950: Atlas över växternas utbredning i Norden. Fanerogamer och ormbunksväxter. (Atlas of the distribution of vascular plants in N.W. Europe). — 512 pp. Stockholm.

—»— 1958: The amphi-atlantic plants and their phytogeographical connections. — Kungl. Svenska Vetenskapsakad. Handl. (4) 7 (1): 1—340.

—»— 1962: The circumpolar plants. I. Vascular cryptogams, conifers, monocotyledons. — Kungl. Svenska Vetenskapsakad. Handl. (4) 8 (5): 1—275.

—»— 1968: Flora of Alaska and Neighboring Territories. — 1008 pp. Stanford.

—»— 1971: Atlas över växternas utbredning i Norden. Fanerogamer och ormbunksväxter. (Atlas of the distribution of vascular plants in northwestern Europe). 2 ed. — 531 pp. Stockholm.

HYLANDER, N. 1941: Förteckning över Skandinaviens växter, utgiven av Lunds Botaniska Förening. 1. Kärlväxter. 3 ed. — 197 pp. Lund.

—»— 1945: Nomenklatorische und systematische Studien über nordische Gefässpflanzen. — Uppsala Univ. Årsskr. 1945 (7): 1—337.

—»— 1953a: Nordisk kärlväxtflora I. — XV + 392 pp. Uppsala.

—»— 1953b: Taxa et nomina nova in opere meo: Nordisk kärlväxtflora I. (1953) inclusa. — Bot. Not. 1953: 353—359.

—»— 1966: Nordisk kärlväxtflora II. — XI + 456 pp. Stockholm.

HÄMET-AHTI, L. 1966: Some races of Juncus articulatus L. in Finland. — Acta Bot. Fennica 72: 1—22.

HÄYRÉN, E. 1948: Skärgårdens längszoner. — In: Skärgårdsboken: 242—256. Helsingfors.

Index Herbariorum 1954: Part II. Collectors 1. — Regnum Veget. 2: 1—174.

—»— 1964: Part. I. The Herbaria of the World. 5 ed. — Regnum Veget. 31: 1—251.

International Code of Botanical Nomenclature (1966) adopted by The Tenth International Botanical Congress, Edinburgh, August 1964. — Regnum Veget. 46: 1—402.

ISOVIITA, P. 1966: Studies on Sphagnum L. I. Nomenclatural revision of the European taxa. — Ann. Bot. Fennici 3: 199—264.

IVERSEN, J. 1954: The late-glacial flora of Denmark and its relation to climate and soil. — Geological Survey of Denmark (II) 80: 87—119.

JACKSON, B. D. 1912: Index to the Linnean herbarium with indication of the types of species marked by Carl von Linné. — Proc. Linn. Soc. London 124 (suppl.): 1—152.

JALAS, J. 1950: Zur Kausalanalyse der Verbreitung einiger nordischen Os- und Sandpflanzen. — Ann. Bot. Soc. Vanamo 24 (1): 1—362.

—»— 1954: Populationsstudien an Sedum telephium L. in Finnland. — Ann. Bot. Soc. Vanamo 26 (3): 1—47.

—»— 1955: Rhacomitrium lanuginosum (Hedw.) Brid. als Klimaindikator in Ostfennoskandien. — Arch. Soc. Vanamo 9 (suppl.): 73—88.

—»— (ed.) 1958: Suuri kasvikirja I. — 851 pp. Helsingissä.

—»— 1961: Regionale Züge in der Felsenvegetation und -flora Ostfennoskandiens. — Arch. Soc. Vanamo 16 (suppl.): 38—49.

—»— (ed). 1965: Suuri kasvikirja II. — 893 pp. Helsinki.

JANCHEN, E. 1953: Beiträge zur Benennung, Verbreitung und Anordnung der Farn- und Blütenpflanzen Österreichs, IV. — Phyton 5: 55—106.

JANSEN, P. & WACHTER, W. H. 1934: Grassen langs de Zuidersee IV. — Nederlandse Kruidkundig Arch. 44: 203—218.

JANSEN, P. 1951: Gramineae. — In: Flora Neerlandica I (2). 271 pp. Amsterdam.

JONES, K. 1952: Autotetraploidy in Agrostis canina. — Nature 169: 159—160.

—»— 1953: The cytology of some British species of Agrostis and their hybrids. — Brit. Agric. Bull. 5: 312.

—»— 1956 a: Species differentiation in Agrostis. I. Cytological relationships in Agrostis canina L. — J. Genet. 54: 370—376.

—»— 1956 b: Species differentiation in Agrostis. II. The significance of chromosome pairing in the tetraploid hybrids of Agrostis canina subsp. montana Hartm., A. tenuis Sibth. and A. stolonifera L. — J. Genet. 54: 377—393.

—»— 1956 c: Species differentiation in Agrostis. III. Agrostis gigantea Roth and its hybrids with A. tenuis Sibth. and A. stolonifera L. — J. Genet. 54: 394—399.

JÖRGENSEN, C. A., SÖRENSEN, T. & WESTERGAARD, M. 1958: The flowering plants of Greenland. A taxonomical and cytological survey. — Dansk Videnskab. Selsk. Biol. Skrifter 9 (4): 1—172.

JOWETT, D. 1958: Populations of Agrostis spp. tolerant to heavy metals. — Nature 182: 816—817.

—»— 1964: Population studies on lead tolerant Agrostis tenuis. — Evolution 18: 70—80.

JUEL, H. O. 1923: Studien in Burser's Hortus siccus. — Nova Acta Reg. Soc. Scient. Upsaliensis (IV) 5 (7): 1—144.

—»— 1936: Jochim Burser's Hortus siccus mit Erklärungen herausgegeben. — Symbolae Bot. Upsalienses 2 (1): 1—187.

JUHL, H. 1952: An-Euploidie und Systematik bei Agrostis stolonifera L. und Festuca rubra L. aus Schleswig-Holstein. — Ber. Deutschen Bot. Ges. 65: 330—337.

KALELA, A. 1943: Die Ostgrenze Fennoskandiens in pflanzengeographischer Beziehung. — Veröff. Geobot. Inst. Rübel Zürich 20: 1—68.

—»— 1961a: Maamme kasviston pohjoiset ainekset. — Oma Maa IX: 306—331.

—»— 1961b: Maamme eteläinen kasvistoaines. — Oma Maa IX: 427—450.

KALLIO, P. 1954: Züge aus der Flora und Vegetation der Rapakivifelsen im südöstlichen Teil des Rapakivigebietes von Laitila in Südwestfinnland. — Ann. Univ. Turkuënsis (Ser. A) 17 (1): 1—50.

KALM, P. 1765: Florae fennicae pars prior. — 10 pp. Aboae.

KILANDER, S. 1955: Kärlväxternas övre gränser på fjäll i sydvästra Jämtland samt angränsande delar av Härjedalen och Norge. (Summary: Upper limits of vascular plants on mountains in southwestern Jämtland and adjacent parts of Härjedalen [Sweden] and Norway). — Acta Phytogeogr. Suecica 35: 1—198.

Kitunen, E. 1921: Kertomus Valtion Siementarkastuslaitoksen toiminnasta. — Maataloushallituksen Tiedonantoja 100: 1—13. Helsinki.

Klokov, M. V. (КЛОКОВ, М. В.) 1950: Новые украинские злаки. (Gramineae novae ucrainicae). — Notulae Syst. Herb. Inst. Bot. Nom. V. L. Komarovii Acad. Scient. URSS 12: 35—60.

Knaben, G. & Engelskjön, T. 1967: Chromosome numbers of scandinavian arctic-alpine plant species II. — Acta Borealia (A. Scient.) 21: 1—57.

Knoll, J. 1929: Untersuchungen über den Einfluss der künstlichen Isolierung auf die Fruchtbarkeitsverhältnisse bei Phleum pratense, Avena elatior und anderen Grasarten. — Wiss. Arch. Landwirtschaft (A. Pflanzenbau) 2: 318—364.

Koch, C. 1848: Beiträge zu einer Flora des Orientes I. — Linnaea 21: 289—443.

Koch, W. D. J. 1837: Synopsis Florae Germanicae et Helveticae, ... 1 ed. — 844 pp. Francofurti a/M.

—»— 1844: Synopsis Florae Germanicae et Helveticae, ... II. 2 ed. — 513 pp. Lipsiae.

Kujala, V. 1921: Havaintoja Kuusamon ja sen eteläpuolisten kuusimetsäalueiden suotyypeistä. (Ref.: Beobachtungen über die Wald- und Moortypen von Kuusamo und des südlich von dort gelegenen Fichtenwaldgebiete). — Commun. Inst. Quaestionum Forestalium Finlandiae 4 (5): 1—65 + 1 — 3.

Kukkonen, I. 1964: The area of Silene rupestris L. in Finland and its dependence on ecological and historical factors. — Ann. Bot. Fennici 1: 110—124.

Kunth, K. S. 1833: Enumeratio plantarum I. — 606 pp. Stutgardiae et Tubingae.

Kuntze, O. 1898: Revisio Generum Plantarum, ... III (2). — VI + 576 pp.

Kuzeneva, O. I. (КУЗЕНЕВА, О. И.) 1953: Злаки. Gramineae Juss. — In: Gorodkov, B. N. (ГОРОДКОВ, Б. Н.) (ed.): Флора Мурманской области I: 132—254. Moskva-Leningrad.

Laestadius, L. L. 1856: Anmärkningar om de nordiska arterna af slägtet Agrostis. — Bot. Not. 1856: 78—83.

Lagasca, M. 1816: Genera et species plantarum, ... — 35 pp. + 2 pls. Madrid.

de Lamarck, J. B. A. P. M. 1783: Encyclopédie Methodique: Botanique I. — XLIV + 752 pp. Paris.

Lawalree, A. 1956: Notes sur diverses plantes vasculaires indigènes en belgique. — Bull. Soc. R. Bot. Belgique 88: 49—58.

Lavrenko, E. (ЛАВРЕНКО, Э.) 1935: Agrostis L. Mitlyca, pol'ovyca. — In: Flora USRR I: 150—152. Kioviae.

—»— (ed.) 1940: Флора УРСР II. (Flora Reipublicae Sovieticae Socialisticae Ucrainicae II): 148—155. Kioviae.

Leers, J. D. 1775: Flora Herbornensis, ... — LIX + 288 pp. + 16 pls. Herbornae Nassoviorum.

Lemberg, B. 1933: Über die Vegetation der Flugsandsgebiete an den Küsten Finnlands. 1. Teil. Die Sukzession. — Acta Bot. Fennica 12: 1—143 + 8 pls.

Lewis, H. 1967: The taxonomic significance of autopolyploidy. — Taxon 16: 267—271.

von Leysser, F. W. 1783: Flora Halensis, ... 2 ed. — 305 pp. + 1 pl. Halae Salicae.

Lid, J. 1963: Norsk og svensk flora. — 800 pp. Oslo.

Lindberg, H. 1898: [Agrostis perennans new to the Finnish flora]. — Bot. Not. 1898: 187.

—»— 1900: De i Finland förekommande Agrostis-formerna. — Meddel. Soc. Fauna Flora Fennica 24: 151—157.

—»— 1906a: Växtsynonymiska meddelanden. — Meddel. Soc. Fauna Flora Fennica 32: 110.

—»— 1906b: Schedae operis quod inscribitur Plantae Finlandiae Exsiccatae e Museo Botanico Universitatis Helsingforsiensis distributae. Fasc. I—VIII. — 127 pp. Helsingforsiae.

—»— 1958: Växter kända från Norden i Linnés herbarium. (Plantae e septentrione cognitae in herbario Linnaei). — Acta Bot. Fennica 60: 1—133.

Lindberg, S. O. 1883: Kritisk granskning af mossorna uti Dillenii Historia Muscorum. — 59 pp. Helsingfors.

Lindberg, B. 1959: Ustilaginales of Sweden (exclusive of the Cintractias on Caricoideae). — Symbolae Bot. Upsalienses 16 (2): 1—175.

Lindman, C. A. M. 1908: A Linnaean herbarium in the Natural History Museum in Stockholm. I. Monandria — Tetrandria. — Arkiv Bot. 7 (3): 1—57.

—»— 1918: Svensk Fanerogamflora. 1 ed. — VIII + 639 pp. Stockholm.

—»— 1926: Svensk Fanerogamflora. 2 ed. — 644 pp. Stockholm.

Linnaeus, C. 1737a: Genera Plantarum. 1 ed. – 384 pp. Lugduni Batavorum.

—»— 1737b: Flora Lapponica. — 372 pp. + 12 pls. Amstelaedami.

—»— 1745: Flora Suecica. 1 ed. — xii + 419 pp. + 1 pl. Stockholmiae.

—»— 1751: Skånska Resa. — xiv + 434 pp. + 1 map + 6 pls. Stockholm.

—»— 1753: Species Plantarum I. 1 ed. — 560 pp. Holmiae.

—»— 1754: Genera Plantarum. 5 ed. — xxxii + 500 pp. Holmiae.

—»— 1755: Flora Suecica. 2 ed. — xxxx + 464 pp. Stockholmiae.

—»— 1762: Species Plantarum I. 2 ed. — 784 pp. Holmiae.

—»— 1767 Mantissa plantarum. Generum editionis VI et Specierum editionis II. — 142 pp. Holmiae.

de Litardière, R. 1950: Nombres chromosomiques de diverses Graminées. — Bol. Soc. Broteriana (2) 24: 79—87.

Ljubimova, V. F. 1962: Problems of sterility and decreased fertility in hybrid plants. — In: Cicin, N. V. (ed.), Wide Hybridization in Plants. Israel Program for Scientific Translations. Jerusalem.

de Lobel, M. 1581: Plantarum seu Stirpium Icones I. — 860 pp. Antverpiae.

Lönnrot, E. 1860: Flora Fennica — Suomen Kasvisto. —l + 376 + 3 pls. Helsingissä.

Lönnrot E. & Saelan, Th. 1866: Flora Fennica — Suomen Kasvisto. — xx + 126 pp. + 3 pls. Helsingissä.

Löve, A. 1967: IOPB chromosome number reports XII. — Taxon 16: 341—350.

Löve, A. & Löve, D. 1948: Chromosome numbers of Northern plant species. — Icel. Univ. Inst. Appl. Sci. Dept. Agric. (Rep. B) 3: 1—131.

—»— 1956: Cytotaxonomical conspectus of the Icelandic flora. — Acta Horti Gotoburgensis 20: 65—291.

—»— 1961: Chromosome numbers of central and northwest european plant species. — Opera Botanica 5: 1—581.

—»— 1966: Cytotaxonomy of the alpine vascular plants of Mount Washington. — Univ. Colorado Stud. (Ser. Biol.) 24: 1—74.

Löve, A. & Solbrig, O. T. 1964: IOPB chromosome number reports I. — Taxon 13: 99—110.

Lundqvist, J. 1970: Botaniska data om norra Sveriges vattenområden. — Bio — Data — Gruppen, Naturhistoriska Riksmuséet, Stockholm, Meddel. 1: 1—222 + 12 pls.

Malte, M. O. 1928: Commercial Bent Grasses (Agrostis) in Canada. — Ann. Rep. National Mus. Canada 1926; 50: 105—126.

Manner, R. 1970: Nurmikkoviljely ja eri kasvilajien käyttö. — Puutarha 73 (1): 22—24.

Mansfeld, R. 1959: Vorläufiges Verzeichnis landwirtschaftlich oder gärtnerisch kultivierter Pflanzenarten. — Kulturpflanze, Beih. 2:I—V, 1—659.

Marshall a Bieberstein, F. A. 1808: Flora taurico-caucasica I, ... — vi + 428 pp. Charkoviae.

Maude, P. F. 1939: The Merton catalogue. A list of the chromosome numerals of species of British flowering plants. — New Phytol. 38: 1—31.

—»— 1940: Chromosome numbers in some British plants. — New Phytol. 39: 17—32.

Mayr, E. 1958: The evolutionary significance of the systematic categories. — In: Hedberg, O. (ed.), Systematics of to-day. — Uppsala Univ. Årsskrift 1958 (6): 13—20.

McVaugh, R. 1969: Report of the Committee for Spermatophyta. Conservation of Generic Names, XI. — Taxon 18: 477—480.

McVaugh, R., Ross, R. & Stafleu, F. A. 1968: An annotated glossary of botanical nomenclature. — Regum Veget. 56: 1—31.

Mela, A. J. 1877: Lyhykäinen Kasvioppi ja Kasvio. 1 ed. — xi + 197 pp. Helsingissä.

—»— 1884: Lyhykäinen Kasvioppi ja Kasvio. 2 ed. — 240 pp. Helsingissä.

—»— 1895: Suomen Koulukasvio. 3 ed. — 572 + lxviii pp. Helsingissä.

—»— 1899: Suomen Koulukasvio. 4 ed. — 588 + lxxii pp. Helsingissä.

Mela, A. J. & Cajander, A. K. 1906: Suomen Kasvio. 5 ed. — x + 763 pp. Helsingissä.

Metcalfe, C. R. 1960: Anatomy of the Monocotyledons. I Gramineae. — lxi + 731 pp. Oxford.

Meusel, H., Jäger, E. & Weinert, E. 1965: Vergleichende Chorologie der Zentraleuropäischen Flora. — 583 pp. + 258 maps.

Meyer, G. F. W. 1823: Botanische Bestimmung des Fioringrases, nebst Bemerkungen über dessen Vorkommen im Hannoverschen und die Anräthlichkeit seines Anbaues. — Hannoversches Mag. 26.II.1823: 129—154.

MEYER, G. F. W. 1836: Chloris Hanoverana. — 744 pp. Göttingen.

—»— 1849: Flora Hanoverana Excursiora. — XLVIII + 686 pp. Göttingen.

MEYER, G. 1883: Korresp. Bl. Naturf. Ver. Riga 26: 56.

MICHAUX, A. 1803: Flora boreali-americana I. — X + 330 pp. + 22 pls. Paris.

MONTELL, J. 1943: Agrostis borealis Hn × tenuis Sibth. (A. lapponica mihi) hybrida nova. — Memoranda Soc. Fauna Flora Fennica 18: 95.

MOORE, H. E., STAFLEU, F. A. & VOSS, E. G. 1970: XI International Botanical Congress. Final mail vote and Congress action on nomenclature proposals. — Taxon 19: 43—51.

MORIYA, A. & KONDO, A. 1950: Cytological studies of forage plants, I. Grasses. — Jap. J. Genet. 25: 126—131.

MUEHLENBERG, H. L. 1813: Catalogus plantarum Americae septentrionalis hucusque cognitarum indigenarum et cicurum, ... — 8 + IV + 112 pp. Lancaster. Pa.

MUKULA, J., RAATIKAINEN, M., LALLUKKA, R. & RAATIKAINEN, T. 1969: Composition of weed flora in spring cereals in Finland. — Ann. Agric. Fenniae 8: 59—110.

MÜLLER, O. F. 1778: Flora Danica XIII. — 60 pls. Hauniae.

—»— 1782: Flora Danica XV. — 60 pls. Hauniae.

MUNRO, W. 1862: On the identification of the grasses of Linnaeus's herbarium, now in possession of the Linnean Society of London. — J. Proc. Linn. Soc., Bot. 6: 33—55.

MÜNTZING, A. 1937: Polyploidy from twin seedlings. — Cytologia, Fujii Jub. Vol.: 211—227.

MURBECK, S. 1898: Studier över kritiska kärlväxtformer II. De nordeuropeiska formerna af slägtet Agrostis. — Bot. Not. 1898: 1—14.

NEUMAN, L. M. 1901: Sveriges flora. — XXXI + 832 pp. Lund.

NIELSEN, E. L. & HUMPHREY, L. M. 1937: Grass studies. I. Chromosome numbers in certain members of the tribes Festuceae, Hordeae, Aveneae, Agrostideae, Chlorideae, Phalarideae and Tripsaceae. — Amer. J. Bot. 24: 276—279.

NORMAN, J. M. 1893: Florae arcticae Norvegiae species & formae nonnullae novae v. minus cognitae plantarum vascularium. — Christiania Vidensk.-Selsk. Forh. 1893; 16: 1—59.

—»— 1894—1900: Norges Arktiske Flora. I. Speciel Plantetopografi ([1] 1894, [2] 1900; 1487 pp; + 1 map). II. Oversigtlig fremstilling af karplanternes udbredning, forhold til omgivelserne m.m. (1895; 623 + VIII pp.). — Kristiania.

NYGRÉN, A. 1946: The genesis of some Scandinavian species of Calamagrostis. — Hereditas 32: 131—262.

OBERDORFER, E. 1962: Pflanzensoziologische Exkursionsflora für Süddeutschland und die angrenzenden Gebiete. 2 ed. — 987 pp. Stuttgart.

OEDER, G. C. (ed.) 1764: Flora Danica III. — 60 pls. Hauniae.

OLSONEN, K. 1951: Röllit (Agrostis spp.), rikkaruohojako vai hyötykasveja? (Ref.: Straussgräser [Agrostis spp.] Unkräuter oder Nutzpflanzen?). — Maataloustieteellinen Aikakauskirja (J. Scient. Agric. Soc. Finland) 1951: 44—49.

OLSONI, B. 1948: Om havsstrandsväxligheten vid sydkusten. — In: Skärgårdsboken: 305—314. Helsingfors.

ONO, H. & TATEOKA, T. 1953: Karyotaxonomy in Poaceae I. Chromosomes and taxonomic relations in some Japanese grasses. — Bot. Mag., Tokyo 66: 18—27.

ORNDUFF, R. 1969: Index to plant chromosome numbers for 1967. — Regnum Veget. 59: 1—128.

PAATELA, J. 1953: Maamme heinänurmien botaanisesta koostumuksesta. (Summary: On the botanical composition of the tamehayfields in Finland). — Acta Agralia Fennica 79 (3): 1—25.

PALISOT DE BEAUVOIS, A. M. F. J. 1812: Essai d'une nouvelle Agrostographie. — 184 pp. + XXV pls. Paris.

PARNELL, R. 1842: The Grasses of Scotland. — 152 pp. + LXVI pls. Edinburgh and London.

PAUL, H. 1921: Agrostis intermedia C. A. Weber in Bayern. — Mitt. Bayerischen Bot. Ges. 4 (1): 5—6.

PAUNERO, E. 1947: Las species españolas del género »Agrostis». — An. Jardin Bot. Madrid 7: 561—644.

—»— 1953: Las Agrostideas españolas. — An. Inst. Bot. A. J. Cavanilles 11: 319—417.

PENNELL, F. W. 1930: Genotypes of the Scrophulariaceae in the first edition of Linné's Species Plantarum. — Proc. Acad. Nat. Sci. Philadelphia 82: 9—26.

Persoon, C. H. 1805: Synopsis Plantarum seu enchiridium botanicum, ... I. — xii + 546 pp. Parisiis Lutetiorum & Tubingae.

Petiver, J. 1716: Graminum, Muscorum, Fungorum submarinorum et britannicorum concordia. — Londini.

Pettersson, B. 1952: An alien flora on Drumsö (Helsingfors) introduced by cork bark imported from Morocco and Spain. — Memoranda Soc. Fauna Flora Fennica 27: 111—117.

Philipson, W. R. 1935: Abnormal spikelets in the genus Agrostis. — J. Bot. 73: 65—75.

—»— 1937: A revision of the British species of the genus Agrostis Linn. — J. Linn. Soc. London, Bot. 51: 73—151.

Phillips, E. P. 1951: The genera of South African Flowering Plants. 2 ed. — 923 pp. Pretoria.

Piper, C. V. 1918: The agricultural species of bent grasses. Part I. — Rhode Island bent and related grasses. — U.S. Dept. Agric., 692: 3—14.

Podpěra, J. 1926: Květena Moravy ve vztazích systematických a geobotanických. — Acta Soc. Scient. Nat. Moravicae 2 (10): 271—782.

Pollich, J. A. 1776: Historia plantarum in Palatinatu electorali sponte nascentium incepta, secundum systema sexuale digesta I. — xxxii + 454 pp. Mannheimii.

Pólya, L. 1948: Chromosome numbers of certain alkali plants. — Arch. Biol. Hungarica (Ser. II) 18: 145—148.

Punt, W. (ed.). 1964: Preliminary report on the stabilization of names of plants of economic importance. — Regnum Veget. 36: 1—36.

Ramenskaja, M. L. (РАМЕНСКАЯ, М. Л.) 1960: Определитель высших растений Карелии. — 485 pp. Petrozavodsk.

Ray, J. 1688: Historia plantarum, ... II. — 959 pp. Londini.

—»— 1724: Synopsis methodica stirpium britannicarum. 3 ed. — 482 pp. + 24 pls. Londini.

Reichenbach, H. G. L. 1834: Icones florae germanicae et helveticae, ... I. — 110 pls. Leipzig.

Retzius, A. J. 1779: Florae Scandinaviae Prodromus. 1 ed. — 257 pp. Holmiae.

Reuter, G. F. 1861: Catalogue des Plantes Vasculaires qui croissent naturellement aux Environs de Genève. 2 ed. — xvi + 300 pp. Genève.

Richter, H. F. E. 1835: Codex botanicus Linnaeanus, ... 1 ed. — xxxii + 688 pp. Lipsiae.

Richter, K. 1890: Plantae Europeae. I. — vi + 378 pp. Leipzig.

Rickett, H. W. & Stafleu, F. A. 1959: Nomina generica conservanda et rejicienda spermatophytorum. — Taxon 8: 213—243.

Roemer, J. J. & Schultes, J. A. 1817: Caroli a Linné Equitis Systema vegetabilium secundum classes, ordines, genera, species, . . . II (2). — viii + 964 pp. Stuttgardiae.

Roivainen, H. 1928: Yleisimmät heinäkasvimme. Niiden tunteminen kasvullisista osista sekä nurmitaloudellinen merkitys. — Pohjois-Suomen Laidun- ja Nurmiviljelysyhdistyksen Vuosikirja 1928: 77—152.

Roth, A. W. 1788: Tentamen Florae germanicae I. — xvi + 560 pp. Lipsiae.

Rothmaler, W. 1963: Exkursionsflora von Deutschland. Kritischer Ergänzungsband. Gefässpflanzen. — xx + 622 pp. Berlin.

Rousi, A. 1965: Biosystematic studies on the species aggregate Potentilla anserina L. — Ann. Bot. Fennici 2: 47—112.

Rouy, G. 1913: Flore de France ou description des plantes qui croissent spontanément en France, en Corse et en Alsace Lorraine — viii + 562 pp. Paris.

van Royen, A. 1740: Florae Leydensis Prodromus, ... — 538 pp. Lugduni Batavorum.

Rune, O. 1953: Plant life on serpentines and related rocks in the North of Sweden. — Acta Phytogeogr. Suecica 31: 1—39.

—»— 1957: De serpentinicola elementen i Fennoskandiens flora. — Svensk Bot. Tidskr. 51: 1—63.

Runemark, H. 1961: The species and subspecies concept in sexual flowering plants. — Bot. Not. 114: 22—32.

Sanio, C. 1889: Zahlenverhältnisse der Flora Preussens. — Abh. Bot. Ver. Brandenburg. 32: 55—128.

Savage, S. 1936: Studies in Linnaean synonymy. 1. Caspar Bauhins »Pinax» and Burser's herbarium. — Proc. Linn. Soc. London, 148: 16—26.

Savage, S. 1937: Catalogue of the Manuscripts in the Library of the Linnean Society of London. II. Caroli Linnaei Determinationes in Hortum siccum Joakimi Burseri. The Text of the Manuscript in the Linnaean Collections. — London.

—»— 1945: A catalogue of the Linnaean herbarium. — xv + 225 pp. London.

Scheuchzer, J. 1719: Agrostographia, sive Graminum, Juncorum, Cyperorum, iisque affinium historia. — 512 pp. + 19 pls. Tiguri.

de Schlechtendal, D. F. L. 1823: Flora berolinensis. I. Phanerogamia. — lxxii + 535 pp. Berolini.

Scholz, H. 1965: Agrostis tenuis »Highland Bent» ein Synonym der Agrostis castellana. — Ber. Deutschen Bot. Ges. 78: 322—325.

—»— 1969: Novitates systematicae speciei Agrostis coarctata Ehrh. ex. Hoffm. — Willdenowia 5: 479—487.

Schrader, H. A. 1806: Flora germanica 1. — 432 pp. + 6 pls. Goettingae.

Schreber, J. D. C. 1771: Spicilegium Florae Lipsicae. — 148 pp. Lipsiae.

—»— 1810: Beschreibung der Gräser. II. — Leipzig.

Schübler, G. & v. Martens, G. 1834: Flora von Würtemberg. — xxxii + 695 pp. Tübingen.

Schultes, J. A. & Schultes, J. H. 1827: Mantissa in Voulmen Tertium Systematis Vegetabilium Caroli a Linné ex editione Joan. Jac. Roemer & Jos. Aug. Schultes. — 717 pp. Stuttgardtiae.

Selander, S. 1950: Floristic phytogeography of southwestern Lule Lappmark (Swedish Lapland). II. Kärlväxtfloran i sydvästra Lule Lappmark (With English summary). — Acta Phytogeogr. Suecica 28: 1—152 + 488 maps.

Shibata, K. 1957: Karyotype analysis in some forage grasses. II. — Nogaku Shuho 3: 483—493, and Jap. J. Genet. 32: 259—260 (In Japanese).

Sibthorp, J. 1794: Flora Oxoniensis, ... — xxiv + 422 pp. Oxonii.

Sinclair, G. 1816: Hortus Gramineus Woburnensis. 1 ed. — vi, lxvi + 316 pp. London.

—»— 1824: Hortus Gramineus Woburnensis. 2 ed. — xx + 438 pp. London.

Šiškin, B. K. (ШИШКИН, Б. К.) 1934: Полевица. Agrostis L. — In: Komarov, V. L. (КОМАРОВ, В. Л.) (ed.): Флора СССР II (Flora URSS II): 170—188. Leningrad.

—»— (ed.) 1955: Флора Ленинградской области I. — 243 pp. Leningrad.

Sjörs, H. 1956: Nordisk växtgeografi. — 229 pp. Stockholm.

Skovsted, A. 1939: Cytological studies in twin plants. — C. R. Trav. Lab. Carlsberg, Ser. Physiol. 22: 427—446.

Smirnov, P. A. (СМИРНОВ, П. А.) 1938: О некоторых вилах рода Agrostis L. (Résumé: Sur quelques espèces du genre Agrostis L.). — Bull. Soc. Nat. Moscou (Sér. Biol.) 47: 245—250.

Smith, H. 1920: Vegetationen och dess utvecklingshistoria i det centralsvenska högfjällsområdet. — Norrländskt Handbibliotek 9: 1—238 + 2 maps.

Smith, J. E. 1791: Icones pictae plantarum rariorum III. — Londini.

—»— 1800: Flora Britannica I. — 433 pp. Londini.

—»— 1824: The English Flora I. — xlv + 371 pp. London.

Smith, S. J. 1965: Checklist of the grasses of New York State. — New York State Museum Science Service, Bull. 403: 1—44.

Sokolovskaja, A. P. (СОКОЛОВСКАЯ, А. П.) 1937a: Карио-географическое исследование рода Agrostis L. (Summary: A karyo – geographical investigation of the genus Agrostis L.). — J. Bot. URSS 22: 457—480.

—»— 1937 b: Климатипы Agrostis gigantea Roth. (Zusammenfassung: Klimatypen von Agrostis gigantea Roth.). — J. Bot. URSS 22: 481—502.

—»— 1938: A caryogeographical study of the genus Agrostis. — Cytologia 8: 452—467.

—»— 1955: Величина пыльцевых зерен и числа хромосом у некоторых арктических вилов злаков. — Bot. Žurnal 40: 850—853.

—»— 1960: Географическое распространение полиплоидных видов растений (исследование флоры о. Сахалина). (Summary: Geographical distribution of polyploid species of plants [investigation of the flora of Sahalin Island]). — Vestnik Leningradsk. Univ. (Ser. Biol. 4) 15 (21): 42—58.

—»— 1962: К вопросу о корреляции между числом хромосом и величиной пыльцевого зерна у видов диких растений. (Summary: On the problem of correlation between the chromosome number and the size of the pollen grain in wild plant species). — Trans. Mosc. Soc. Nat. (Trans. Conf. Plant Polyploidy 1958: Plant Polyploidy) 5: 80—82.

Sokolovskaja, A. P. 1963: Географическое распространение полиплоидных видов растений (исследованиефлоры полуострова Камчатки). (Summary: Geographical distribution of polyploid plant species [investigation of the flora of Kamčatka]). — Vestnik Leningradsk. Univ. (Ser. Biol. 3) 18 (15): 38—52.

—»— 1966: Географическое распространение полиплоидных видов растений (исследованэи флоры Приморского края). (Summary: Geographical spreading of polyploid species of plants [investigation of the flora of Primore Territory]). — Vestnik Leningradsk. Univ. (Ser. Biol. 1) 21 (3): 92—106.

—»— 1968: Кариологическое исследование флоры Корядкой земли. (A karyological investigation of the flora of the Koriakian Land). — Bot. Žurnal 53: 99—105.

Sokolovskaja, A. P. & Strelkova, O. S. (СОКОЛОВСКАЯ, А. П. & СТРЕЛКОВА, О. С.) 1939: Географическое распределение полиплоидов. I. Исследование растительности Памира. (Summary: The geographical distribution of polyploids. I. Studies of the Pamir's vegetation). — Trudy Petergofsk. Biol. Inst. (Ser. Biol. Nauk 9) 17 (Učenye Zap. Leningradsk. Gos. Univ. 35): 42—63.

—»— 1948: Географическое распределение полиплоидов. III. Исследование флоры альпийской области центрального Кавказского хребта. — Učenye Zap. Ped. Inst. im. Gercena (Kaf. Bot.) 66 (8): 195—216.

—»— 1962 О закономерностях географического распространения полиплоидных видов растений. (Summary: On the regularities of geographical distribution of polyploid plant species). — Trans. Mosc. Soc. Nat. (Trans. Conf. Plant Polyploidy 1958: Plant Polyploidy)5: 83—89.

Sommerfelt, S. C. 1826: Supplementum Florae lapponicae, quam editit Dr. Georgius Wahlenberg. — 331 pp. + pls. Christianiae.

Sorsa, V. 1962: Chromosomenzahlen finnischer Kormophyten. I. — Ann. Acad. Scient. Fennicae (A IV) 58: 1—14.

Spenner, F. C. L. 1825: Flora Friburgensis et regionum proxime adjacentium I. — LXXXVIII + 253 pp. + 2 pls. Friburgi Brisgoviae.

Splechtner, F. 1922: Studien über Blüh- und Befruchtungsverhältnisse einiger Klone und Populationen von Agrostis stolonifera. — Angew. Bot. 4: 250—257.

—»— 1925: Über die Variabilität einiger Populationen und vegetativer Linien von Agrostis stolonifera L. — Zeitschr. Pflanzenzüchtung 10: 69—127.

Sprengel, K. 1821: Neue Entdeckungen der Pflanzenkunde II. — 363 pp. + 3 pls. Leipzig.

Stafleu, F. 1967: Taxonomic Literature. — Regnum Veget. 52: I—XX + 1—566.

Stearn, W. T. 1957: An Introduction to the Species Plantarum and cognate botanical works of Carl Linnaeus. — In: Linnaeus, C., Species Plantarum I. A Facsimile of the first edition 1753: I—XIV + 1—176. London.

—»— 1962: Three prefaces on Linnaeus and Robert Brown. — LII + IV pp. Weinheim.

Stebbins J:r, G. L. 1950: Variation and Evolution in Plants. — 643 pp. New York.

Sterner, R. 1941: Agrostis stolonifera L. och Agrostis gigantea Roth. — Not. Bot. 1941: 232—235.

Störmer, P. 1952: Agrostis gigantea Roth. (With English summary). — Blyttia 10: 73—76.

Strandhede, S. O. 1961: Eleocharis Palustres in Scandinavia and Finland. — Bot. Not. 114: 417—434.

—»— 1966: Morphologic variation and taxonomy in European Eleocharis, subser. Palustres. — Opera Bot. 10 (2): 1—187.

Strandhede, S. O. & Dahlgren, R. 1968: Drawings of Scandinavian plants 9—10. Eleocharis R. Br. — Bot. Not. 121: 1—10.

Stuckey, J. & Banfield, W. G. 1946: The morphological variations and the occurrence of aneuploids in some species of Agrostis in Rhode Island. — Amer. J. Bot. 33: 185—190.

Suessenguth, K. 1936: Phanerogamae. — In: Hegi, G., Illustrierte Flora von Mittel-Europa I. 2 ed.: 102—520. München.

Suomi/Finland. General Atlas. 6 ed. Helsinki 1968.

Suominen, J. 1967: Suomen kasvistontutkimuksen tarkkuudesta. (Summary: On the accuracy of floristic research in Finland). — Luonnon Tutkija 71: 73—77.

Tabernaemontanus, J. T. 1588: Neuw Kreuterbuch mit schönen, künstlichen und leblichen Figuren und Konterfeyten aller Gewächss der Kreuter, ... I. — 818 + 20 pp. Frankfurt a/M.

TATEOKA, T. 1955: Karyotaxonomic studies in Poaceae, II. — National Institute Genet., Misima, Ann. Rep. 5: 68—69.

TAYLOR, R. L. & MULLIGAN, G. A. 1968: Flora of the Queen Charlotte Islands. Part 2. Cytological aspects of the Vascular Plants. — 148 pp. Ottawa.

THUILLIER, J. L. 1799: La Flore des environs de Paris, ... 2 ed. — XLVIII + 550 pp. Paris.

TRINIUS, K. B. 1820: Fundamenta Agrostographiae, ... — X + 214 pp. + 3 pls. Viennae.

—»— 1822: Clavis Agrostographiae antiquioris. Uebersicht des Zustandes der Agrostographie bis auf Linné, und Versuch einer Reduction der alten Synonyme der Gräser auf die heutigen Trivialnamen. — XXIV + 412 pp. + 1 pl. Coburg.

—»— 1824: De graminibus unifloris et sesquifloris Dissertatio botanica, ... — 314 pp. + 5 pls. Petropoli.

—»— 1836: Graminum in America calidiore ab E. Poeppig lectorum pugillus primus. — Linnaea 10: 291—308.

TROLL, H. J. 1931: Untersuchungen über Selbststerilität und Selbstfertilität bei Gräsern. — Zeitschr. Züchtung (A. Pflanzenzüchtung) 16: 105—136.

TURCZANINOW, N. 1856: Flora Baicalensi-Dahurica, ... — Bull. Soc. Imp. Naturalistes Mosc. 29 (1): 1—127.

ULVINEN, T. 1957: Luonnonharrastajan opas. — 263 pp. Mitä—Missä—Milloin. Helsinki.

—»— 1959: Eräitä ilmaston mereisyyden indikaattoreita itärajoillaan. — Luonnon Tutkija 63: 122.

—»— 1962: Savukosken selkosilta. — Luonnon Tutkija 66: 107—117.

WAHLENBERG, G. 1812: Flora lapponica. — 550 pp. + XXX pls. Berolini.

—»— 1820: Flora upsaliensis. — 495 pp. + 1 map. Upsaliae.

—»— 1824: Flora svecica, ... I. 1 ed. — LXXXVIII + 428 pp. Upsaliae.

—»— (ed.) 1826: Svensk Botanik X (1). — 71 pls. Upsala.

VAILLANT, S. 1723: Botanicon Parisiense. — 132 pp. Lugduni Batavorum.

WAISBECK, A. 1905: Neue Beiträge zur Flora des Comitats Vas in West-Ungarn. — Magyar Bot. Lapok 4: 66.

VALENTINE, A. H. & LÖVE, A. 1958: Taxonomic and biosystematic categories. — Brittonia 10: 153—166.

WALTER, TH. 1788: Flora Caroliniana. — VIII + 163 pp. + 1 pl. Londini.

WEBER, C. A. 1920: Die mesophilen Straussgraswiesen der Marschen im Mittellaufe der Weser. Mit vergleichenden Ausblicken auf andere Pflanzenvereinen und Lebensgemeinschaften. Ein Beitrag zur Kenntnis der Grasflur der Wesermarschen. — Abh. Nat. Ver. Bremen 25: 1—63.

WEIMARCK, H. 1963: Skånes flora. — XXIV + 720 pp. Lund.

WIDÉN, K.-G. 1967: Om typifieringen av släktet Agrostis L. — Bot. Not. 120: 508—510.

—»— 1968: Släktet Agrostis L. i Östfennoskandien och angränsande delar av Norge och Sverige. — Manuscript, Dept. Bot., Univ. Helsinki.

WIEGAND, K. M. 1924: Some changes in nomenclature. — Rhodora 26: 2—5.

VILJASOO, L. 1966: 17, Perekond. Kastehein — Agrostis L. — In: Eesti Taimede Määraja: 1008—1013. Tallinn.

WILLDENOW, C. L. 1790: Observationum botanicarum continuatio prima. — Mag. Bot. 4 (11): 15—41.

—»— 1797: Caroli a Linné Species plantarum I. — XXXI + 1568 pp. Berolini.

—»— 1808: Bemerkungen über Scirpus autumnalis und Avena Loeflingiana. — Mag. Ges. Naturf. Freunde Berlin 2: 284—290.

WILLKOMM, M. & LANGE, J. 1861: Prodromus Florae Hispanicae I. — 316 pp. Stuttgartiae.

WIMMER, F. & GRABOWSKI, H. 1827: Flora Silesiae I. — XVI + 446 pp. Vratislaviae.

WISTRAND, G. 1962: Studier i Pite Lappmarks kärlväxtflora med särskild hänsyn til skogslandet och de isolerade fjällen. (Zusammenfassung: Studien über die Gefässpflanzenflora der Pite Lappmark mit besonderer Berücksichtigung des Waldlandes und der isolierten niederen Fjelde). — Acta Phytogeogr. Suecica 45: 1—212 + 168 maps.

WISTRAND, G. & LUNDQUIST, J. 1964: Kärlväxtflora på och kring stränder inom mellersta Piteälvens vattensystem. (Zusammenfassung: Die Gefässpflanzenflora an und entlang den Ufern im Fluss-System des mittleren Piteälv [Nordschweden]). — Kungl. Svenska Vetenskapsakad. Skrifter Naturskyddsärenden 51: 1—72.

WITHERING, W. 1796: An Arrangement of British Plants II. 3. ed. — Birmingham.

WOOD, A. 1861: Classbook of Botany of the United States and Canada. New ed. — New York.

VOVK, A. G. (ВОВК, А. Г.) 1965a: Анатомические особенности листьев некоторых видов полевицы (Agrostis L.) Украинской ССР. — Naučnye Doklady Vysšej Školy (Biol. Nauki) 1965 (3): 83—87.

—»— 1965b: Об украинских видах полевицы из цикла Agrostis alba s. lat. — Vestnik Har'kovsk. Univ. (Ser. Biol. 1) 11 (35): 132—137.

—»— 1966: Pro stroky ta rytmy cvitinnja ukrajins'kyh mitlyc' (rid Agrostis L.). (Summary: On the periods and rhytms of florescence of Ukrainian bentgrasses [genus Agrostis L.]). — Ukrajins'kij Bot. Žurnal 23 (4): 30—36.

—»— 1968: Полевицы, род Agrostis L., украинской флоры. — 27 pp. Har'kov.

—»— 1970: Hromosomni čysla vydiv ta form ukrajins'kyh mitlyc' (Rid Agrostis L.). (Summary: Chromosome numbers of the Ukrainian Agrostis species and forms). — Ukrajins'kij Bot. Žurnal 27: 739—742.

WULFF, H. D. 1937: Chromosomenstudien an der schleswig-holsteinischen Angiospermen-Flora. I. — Ber. Deutschen Bot. Ges. 55: 262—269.

ŽUKOVA, P. G. (ЖУКОВА, П. Г.) 1967: Числа хромосом у некоторых видов растений Крайнего Северо-Востока СССР. II. (Chromosome numbers in some species of plants of the North-Eastern part of the U.S.S.R. II). — Bot. Žurnal 52: 983—987.

ÅBERG, E. 1940: Viviparous forms of Agrostis. — Lantbrukshögskolans Ann. (Ann. Agric. College Sweden) 8: 461—463.

FIG. 25. The lectotype of *A. canina* L. Specimen I:3 in Hortus Siccus Burseri (UPS). Scale in cm.

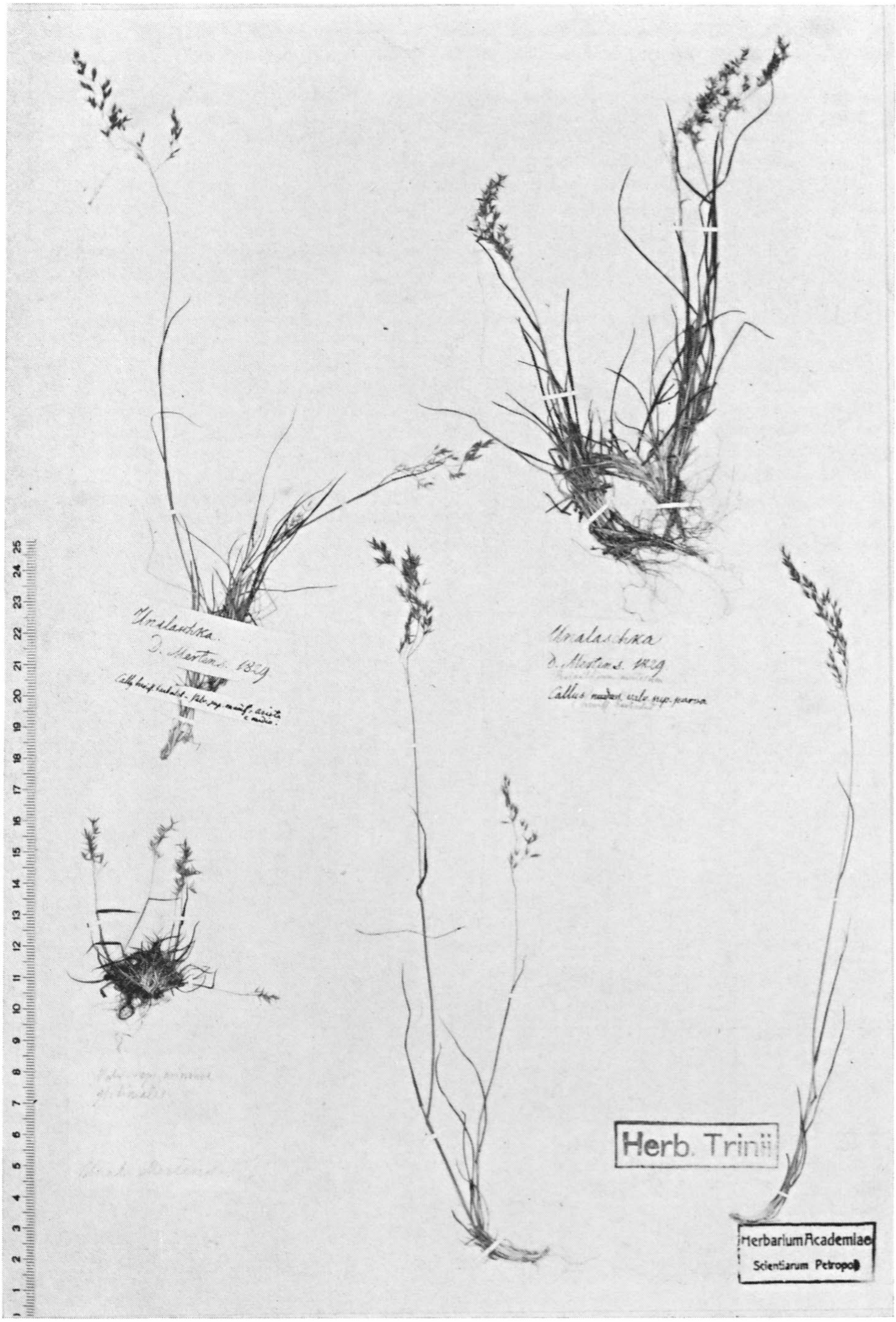

FIG. 26. *A. mertensii* Trin. North America, Alaska, Unalaska, 1829 K. H. Mertens (LE). Lectotype: upper specimen on the left. Scale in cm.

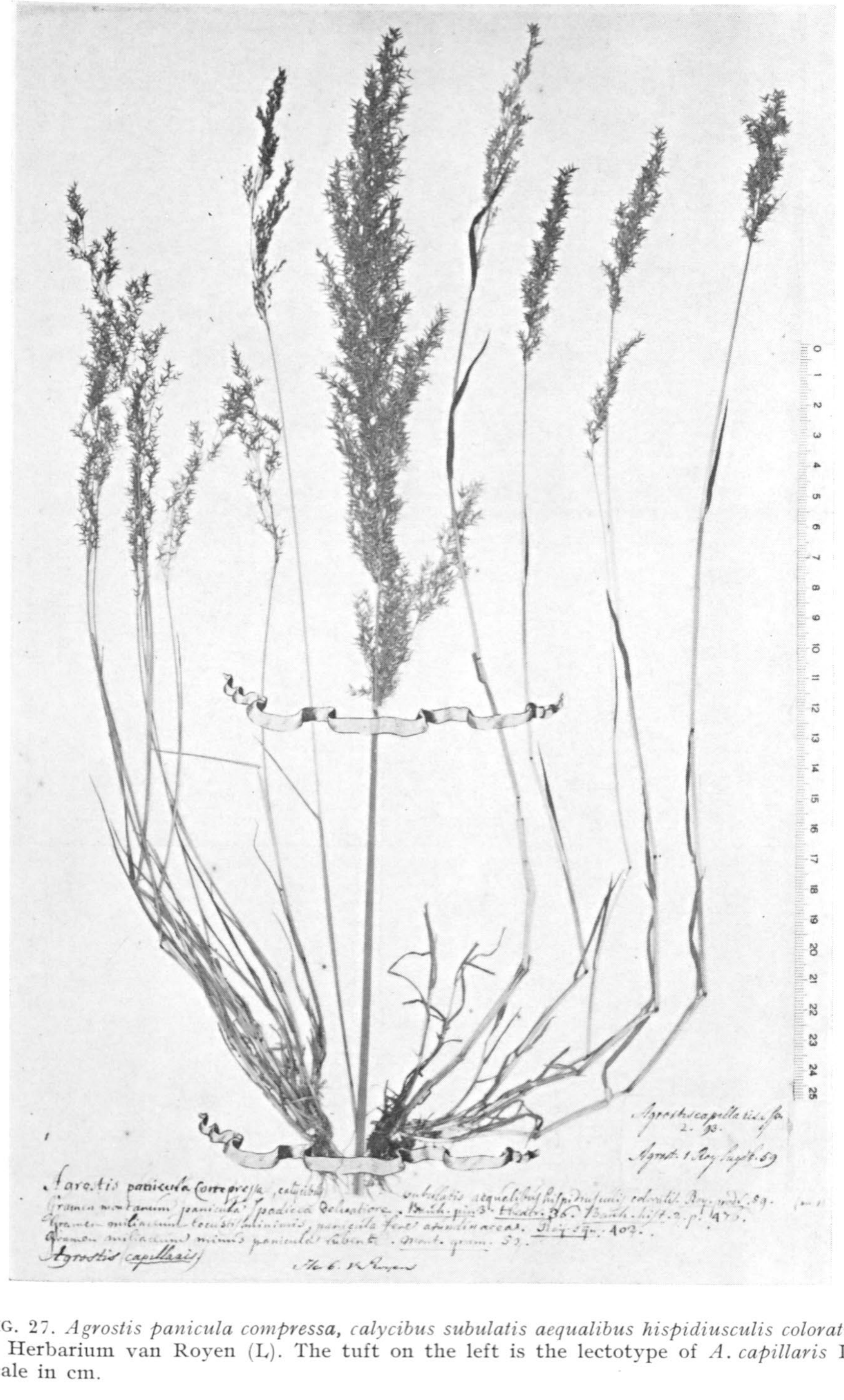

FIG. 27. *Agrostis panicula compressa, calycibus subulatis aequalibus hispidiusculis coloratis* in Herbarium van Royen (L). The tuft on the left is the lectotype of *A. capillaris* L. Scale in cm.

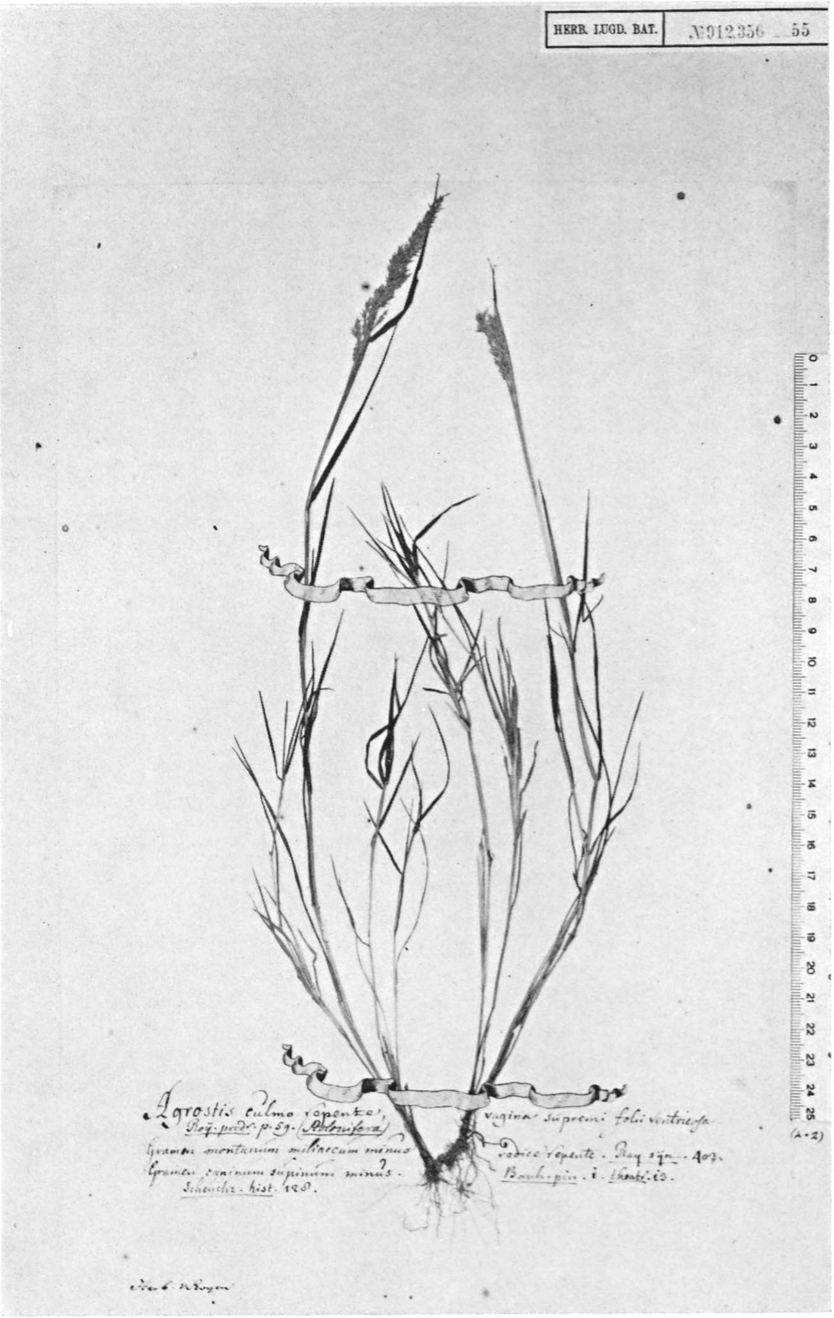

FIG. 28. *Agrostis culmo repente vagina supremi folii ventricosa* in Herbarium van Royen (L). Lectotype of *A. stolonifera* L. Scale in cm.

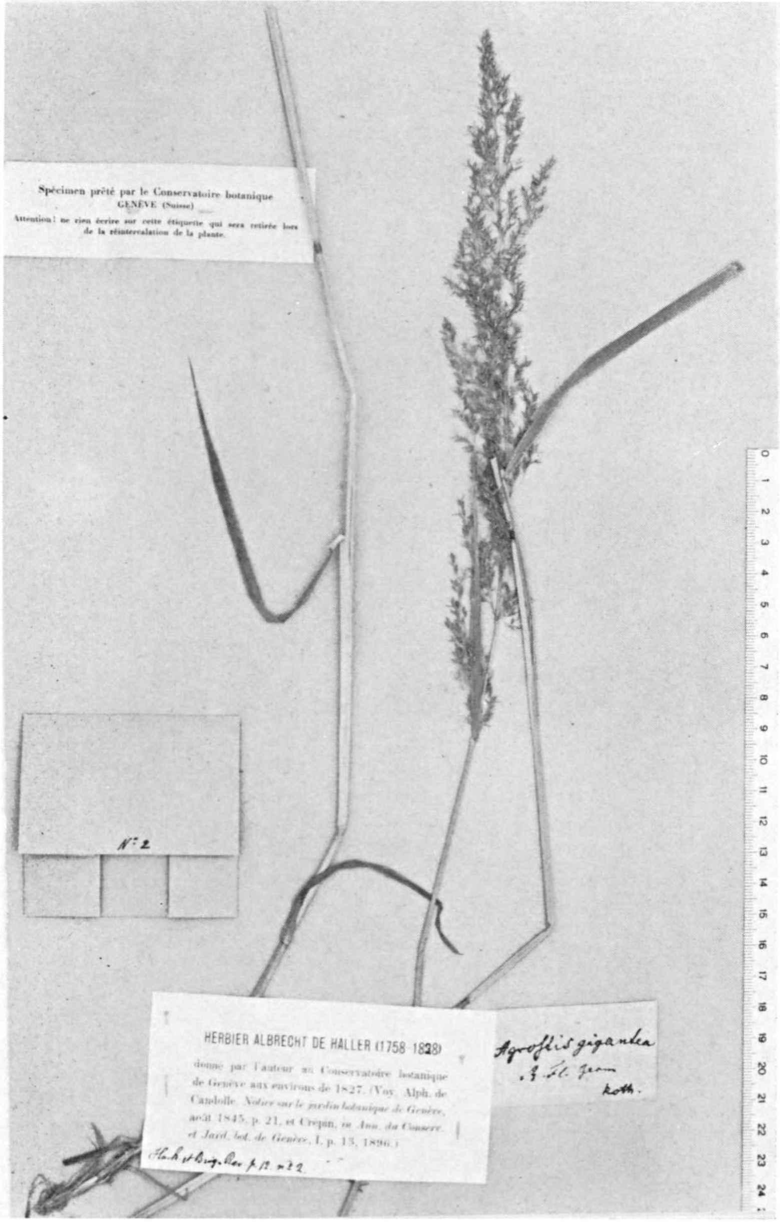

FIG. 29. The lectotype of *A. gigantea* Roth. In Herbarium Albrecht de Haller filius (G; specimen No. 2 sub nom. *A. alba* var. *gigantea* subvar. *compressa* in HACKEL & BRIQUET 1907: 37). Scale in cm.

FIG. 30. *A. gigantea* var. *repens*. Sweden, TL Pajala, leg. L. L. Laestadius (UPS). The specimen on the left (1) is the lectotype of *A. vulgaris β repens* Laest. Scale in cm.

FIG. 31. *A. gigantea*. Sweden, PL Arjeplog, Hornavan, 1963 J. Lundquist (UPSV). Cf. the text p. 107. Scale in cm.

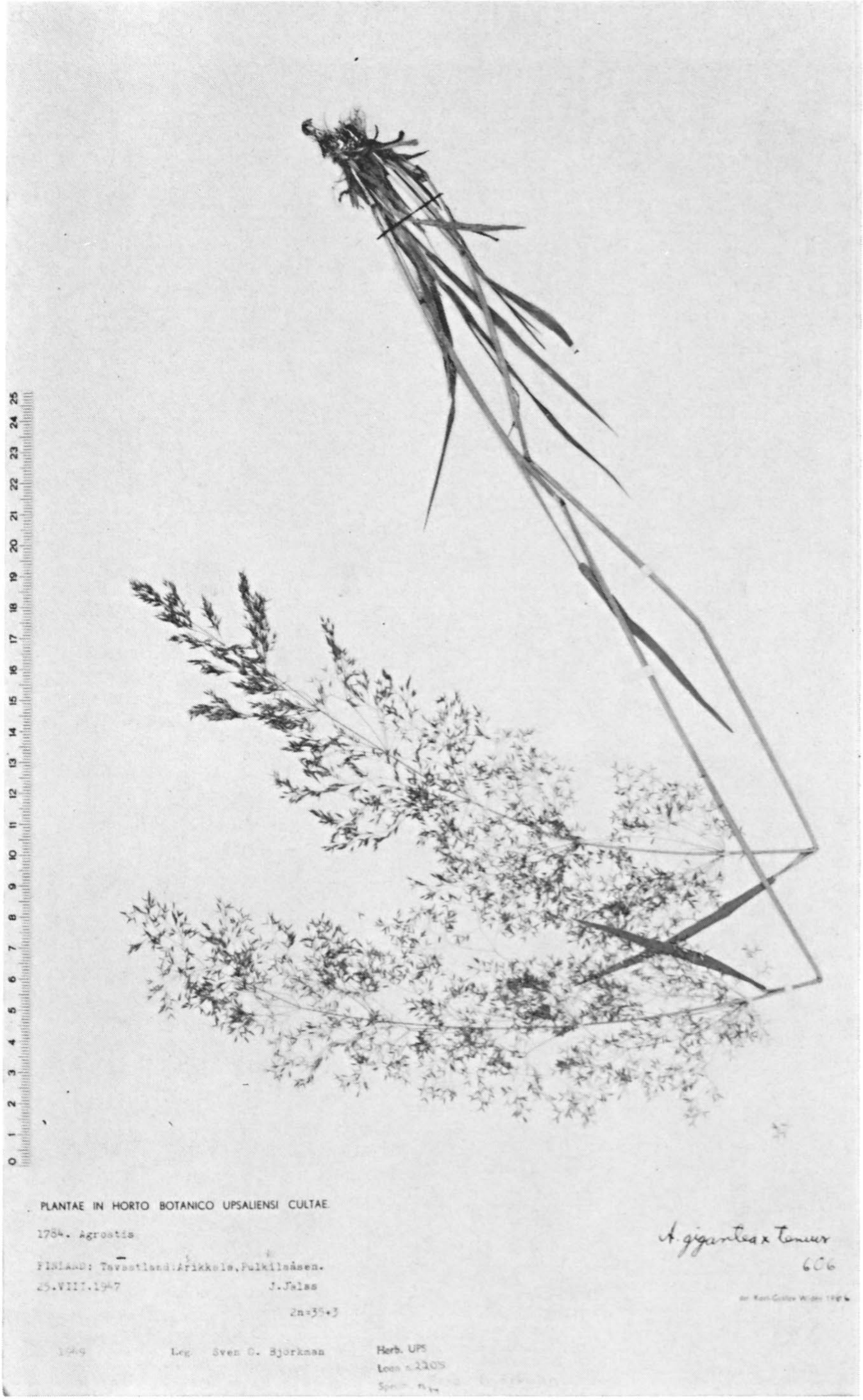

FIG. 32. The holotype specimen of *A.* × *bjoerkmanii* Widén. Finland, Ta Asikkala, Pulkkila ridge, 1947 J. Jalas. Cultivated in Uppsala, 1949 S. O. Björkman No. 1784. Chrom. No. 2 n = 35 + 3. Scale in cm.

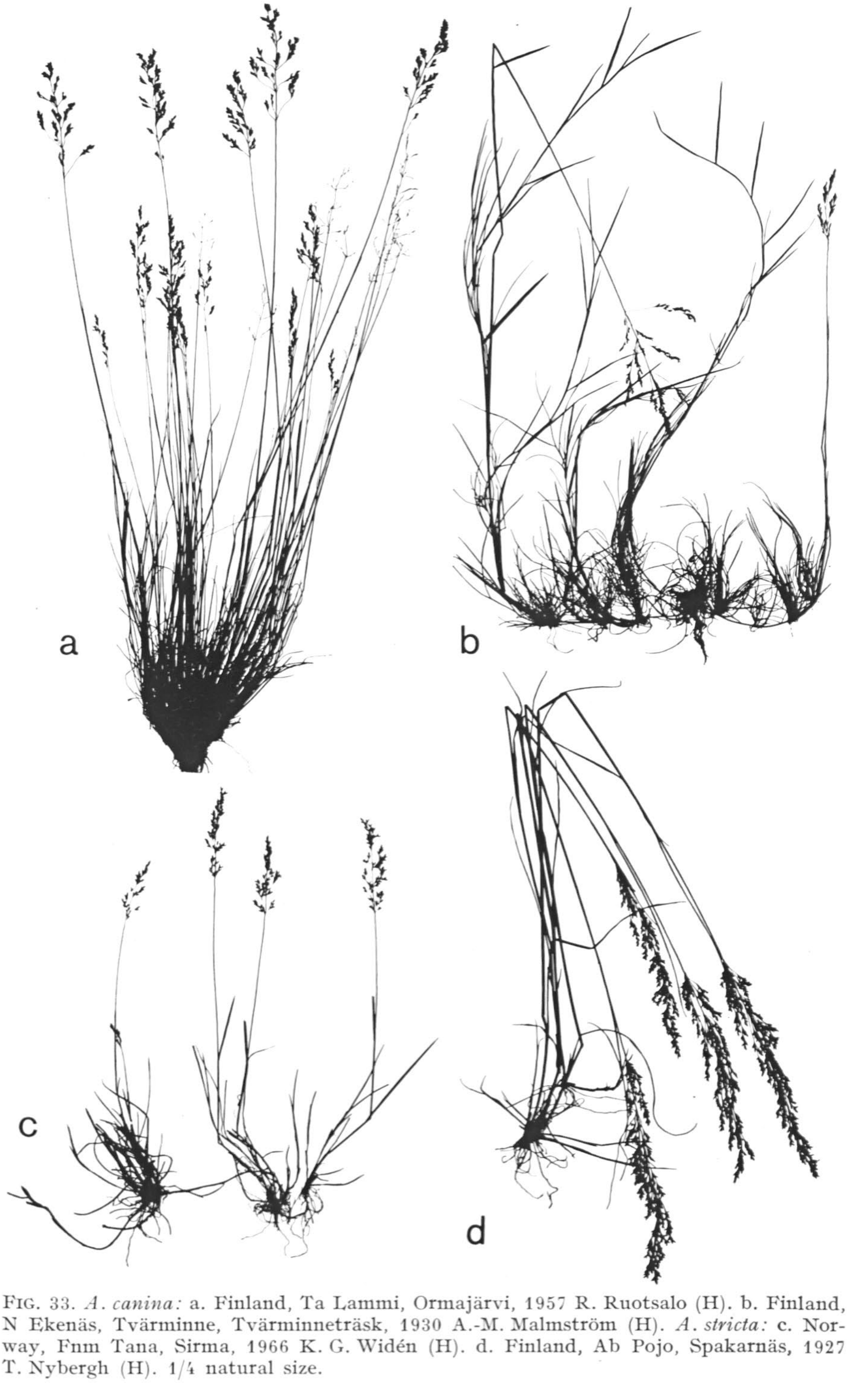

FIG. 33. *A. canina:* a. Finland, Ta Lammi, Ormajärvi, 1957 R. Ruotsalo (H). b. Finland, N Ekenäs, Tvärminne, Tvärminneträsk, 1930 A.-M. Malmström (H). *A. stricta:* c. Norway, Fnm Tana, Sirma, 1966 K. G. Widén (H). d. Finland, Ab Pojo, Spakarnäs, 1927 T. Nybergh (H). 1/4 natural size.

FIG. 34. *A. mertensii:* a. Finland, Le Enontekiö, R. Muonio, at mouth of Lassinoja, 1966 K. G. Widén (H). *A. clavata* Trin.: b. »f. *umbrosa*». Finland, Ob Rovaniemi, Pekkala, SW slope of Kaihuanvaara, 1956 M. J. Kotilainen (H). c. »f. *aprica*». Finland, Sb Maaninka, Tuovilanlahti, 1901 H. Lindberg (H). *A. capillaris:* d. Finland, Kb Pielisjärvi, Ruunaa, Karppilanvaara, 1962 C. E. Sonck (H) 1/4. natural size.

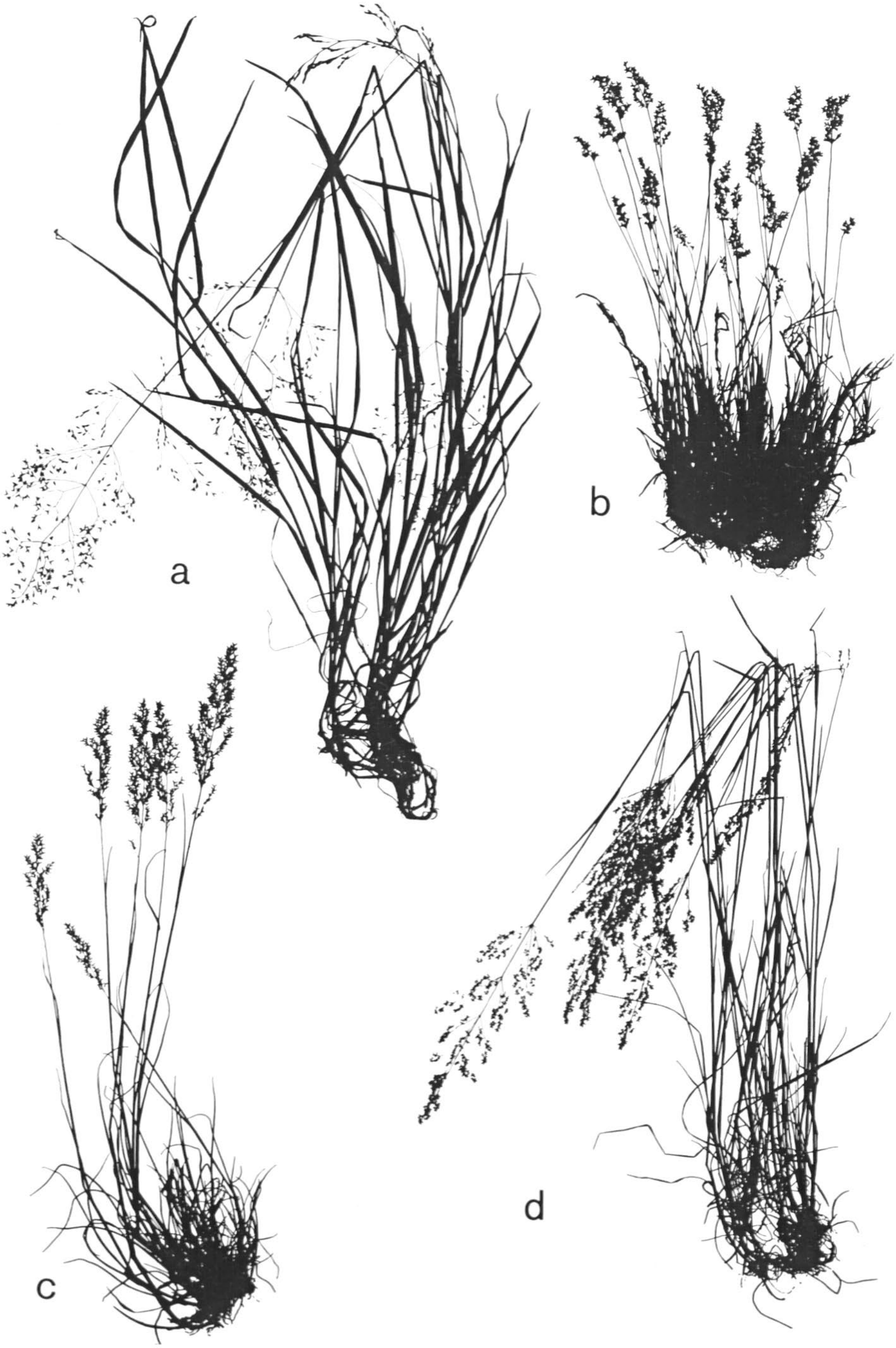

FIG. 35. *A. capillaris:* a. Finland, Sb Maaninka, Korkeakoski, sandy shore of rivulet, 1966 K. G. Widén (H). *A. stolonifera:* b. Finland, Ab Vihti, Irjala, 1921 K. Linkola (H). c. Finland, N Borgå, Pellinge, Hasselö, rock crevice, 1963 K. G. Widén (H). d. Karelian A.S.S.R., Kl Sortavala, Suur-Heposaari, rocky shore of Ladoga, 1931 K. Linkola (H). 1/4 natural size.

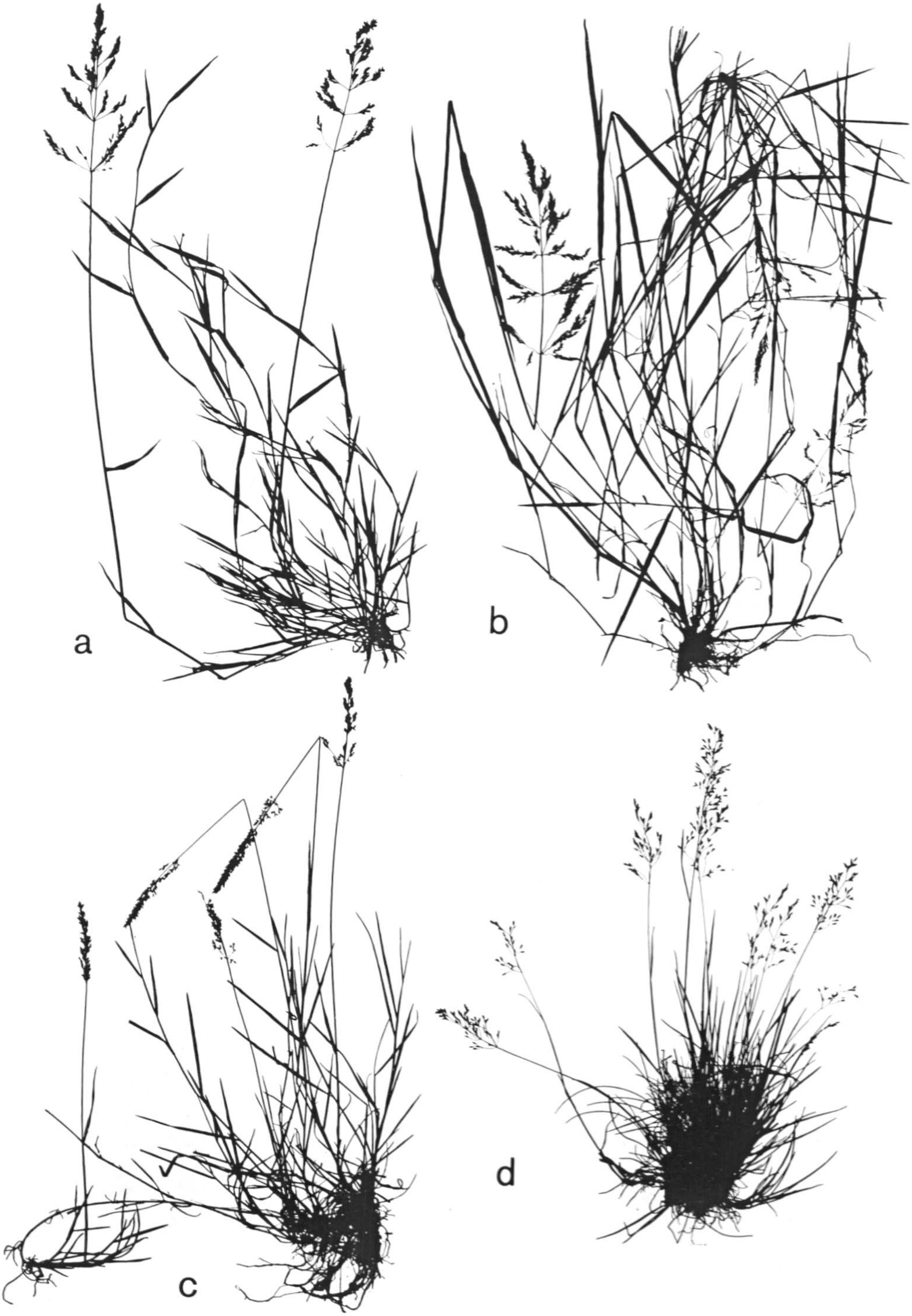

Fig. 36. *A. stolonifera:* a. Finland, N Borgå, Drägsby, roadside, 1966 K. G. Widén (H). b. Finland, N Borgå, Pellinge, Hasselö, shore meadow, 1963 K. G. Widén (H). c. Murmansk Region, Lps Pechenga, sandy shore of R. Lota, 1967 K. G. Widén (H). d. *A. mertensii × stricta.* Finland, Li Utsjoki, Puksala, sandy shore, 1969 K. G. Widén (H). 1/4 natural size.

FIG. 37. *A. gigantea:* a. cfr var. *gigantea*. Finland, N Helsinki, 1879 Hj. Hjelt (TURA). b. var. *repens*. Finland, Sa Punkaharju, Punkasalmi, sandy lake shore, 1967 K. G. Widén (H). c. cfr var. *dispar*. Finland, N Borgå, arable land, 1960 K. G. Widén (H). d. var. *glaucescens*. Holotype specimen. Finland, N Borgå, Pellinge, W Sandö, gravelly shore, 1970 K. G. Widén (H). 1/4 natural size.

FIG. 38. *A.* × *bjoerkmanii:* a. Finland, Le Enontekiö, R. Muonio, at mouth of Lassinoja, 1966 K. G. Widén (H). b. Finland, Lk Savukoski, Hihnavaara, sandy river shore, 1966 K. G. Widén (H). *A.* × *murbeckii:* c. Finland, Ab Nagu, Styrskobb, rock-pool, 1961 K. G. Widén (H). d. Finland, Ks Kuusamo, Juuma, Jyrävän köngäs, 1966 K. G. Widén (H). 1/4 natural size.

FIG. 39. *A. gigantea* × *stolonifera:* a. Finland, Le Inari, sandy shore of Luttojoki about 25 km from the Soviet boundary, 1966. Cultivated in the Bot. Garden, 1967 K. G. Widén (H). b. Finland, Ks Kuusamo, Juuma, Jyrävän köngäs, 1966 K. G. Widén (H). c. *A. canina* × *stolonifera.* Finland, N Borgå, Pellinge, Ängsholm, 1970 K. G. Widén (H). d. *A. stolonifera* × *stricta.* Finland, Ks Kuusamo, sandy shore of Ala-Kitkajärvi, 1967 K. G. Widén (H). 1/4 natural size.

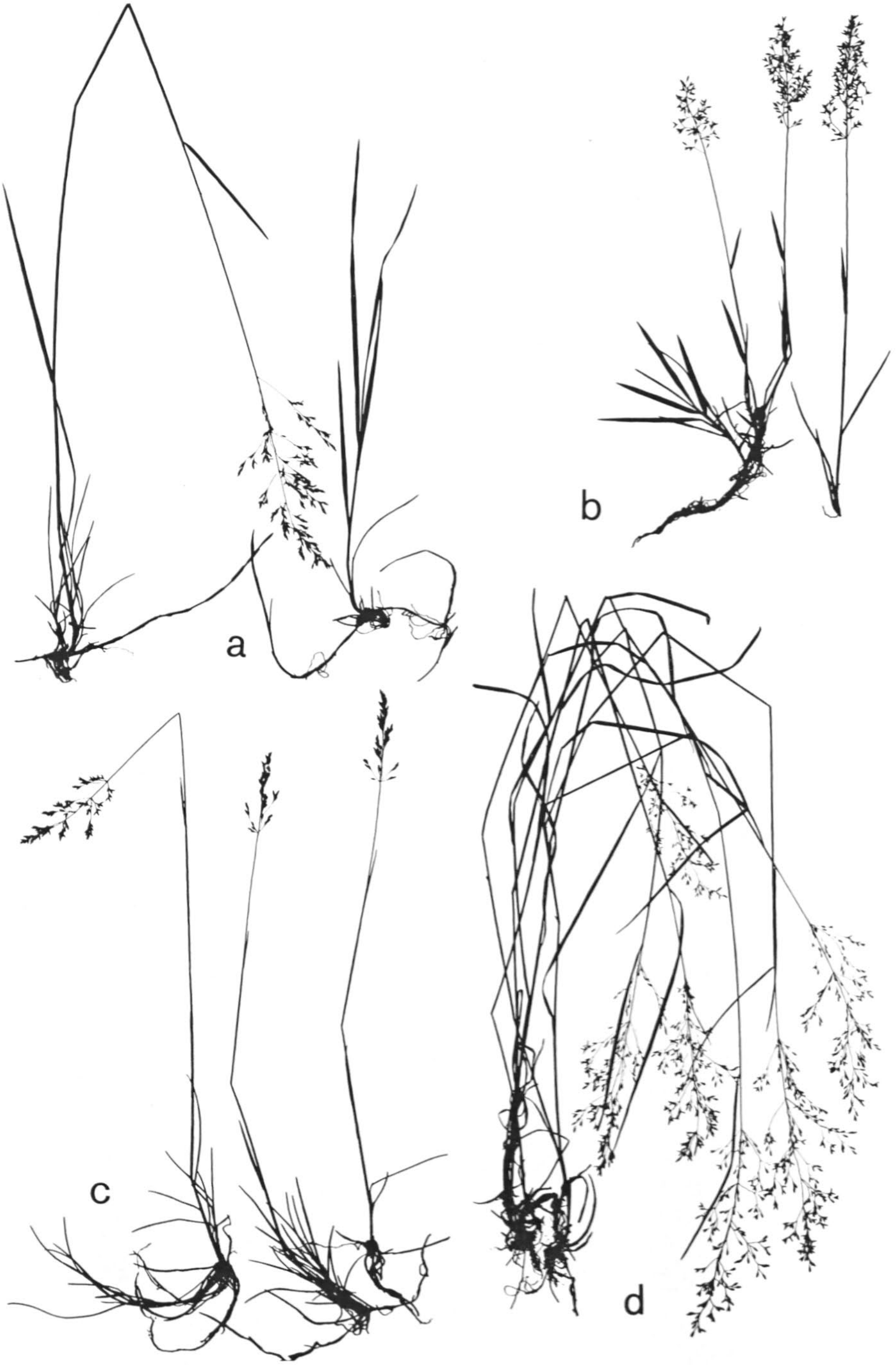

FIG. 40. a. *A. gigantea* × *mertensii*. Murmansk Region, Lps Pechenga, sandy shore of R. Lota about 25 km from the Finnish boundary, 1967 K. G. Widén (H). b. *A. mertensii* × *stolonifera*. Finland, Le Enontekiö, R. Muonio, at mouth of Lassinoja, 1967 K. G. Widén (H). c. *A. capillaris* × *stricta*. Murmansk Region, Lps Pechenga, roadside about 25 km from the Finnish boundary, 1967 K. G. Widén (H). d. *A.* cfr *capillaris* × *clavata*. Finland, Ob Rovaniemi, Pekkala, SW slope of Kaihuanvaara, 1956 M. J. Kotilainen (H). 1/4 natural size.

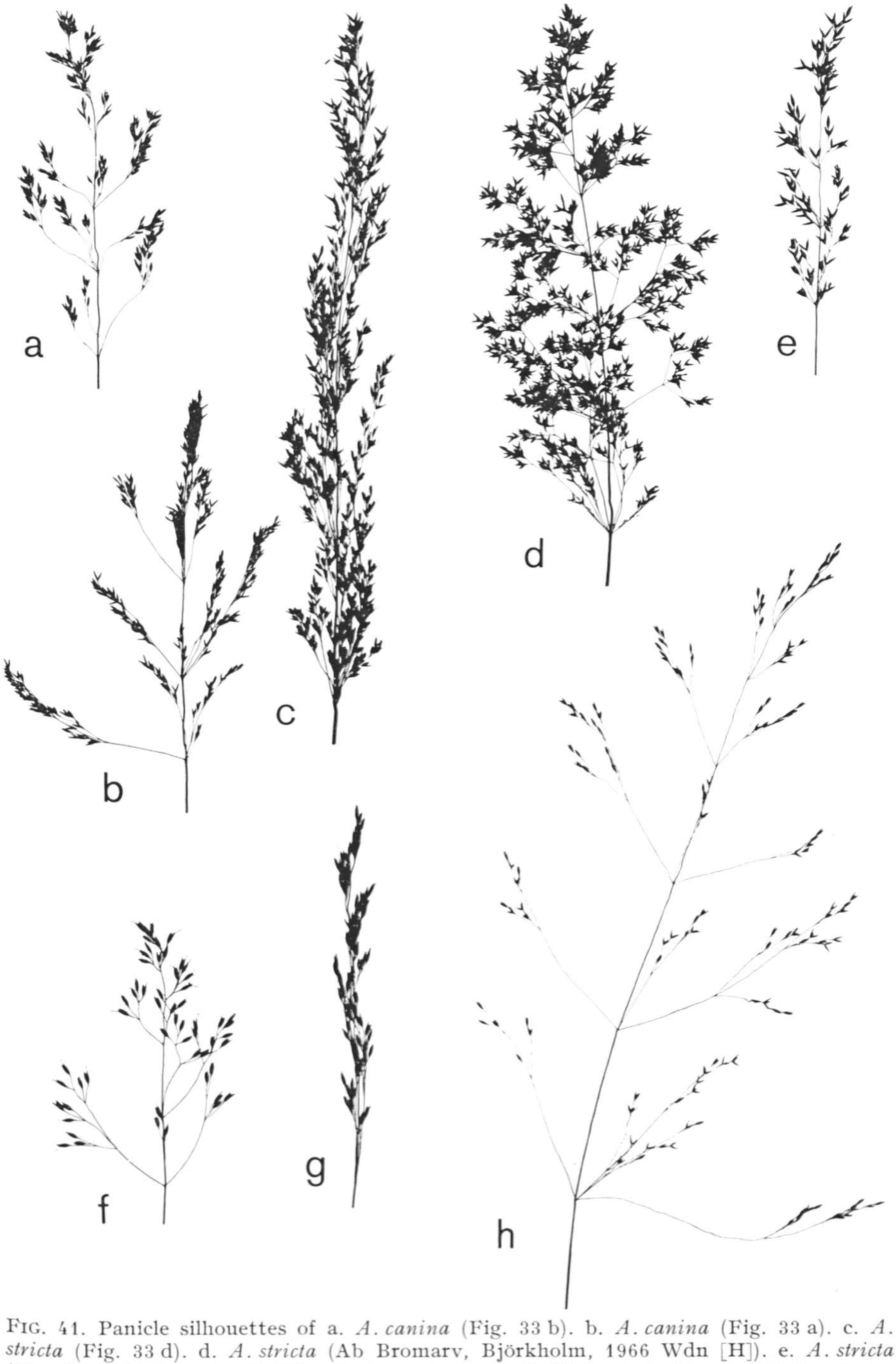

FIG. 41. Panicle silhouettes of a. *A. canina* (Fig. 33 b). b. *A. canina* (Fig. 33 a). c. *A. stricta* (Fig. 33 d). d. *A. stricta* (Ab Bromarv, Björkholm, 1966 Wdn [H]). e. *A. stricta* (Fig. 33 c). f. *A. mertensii* (Fig. 34 a). g. *A. mertensii* (Finland, Le Enontekiö, Lassinoja, 1966 K. G. Widén [H]). h. *A. clavata* (Fig. 34 b). 2/3 natural size.

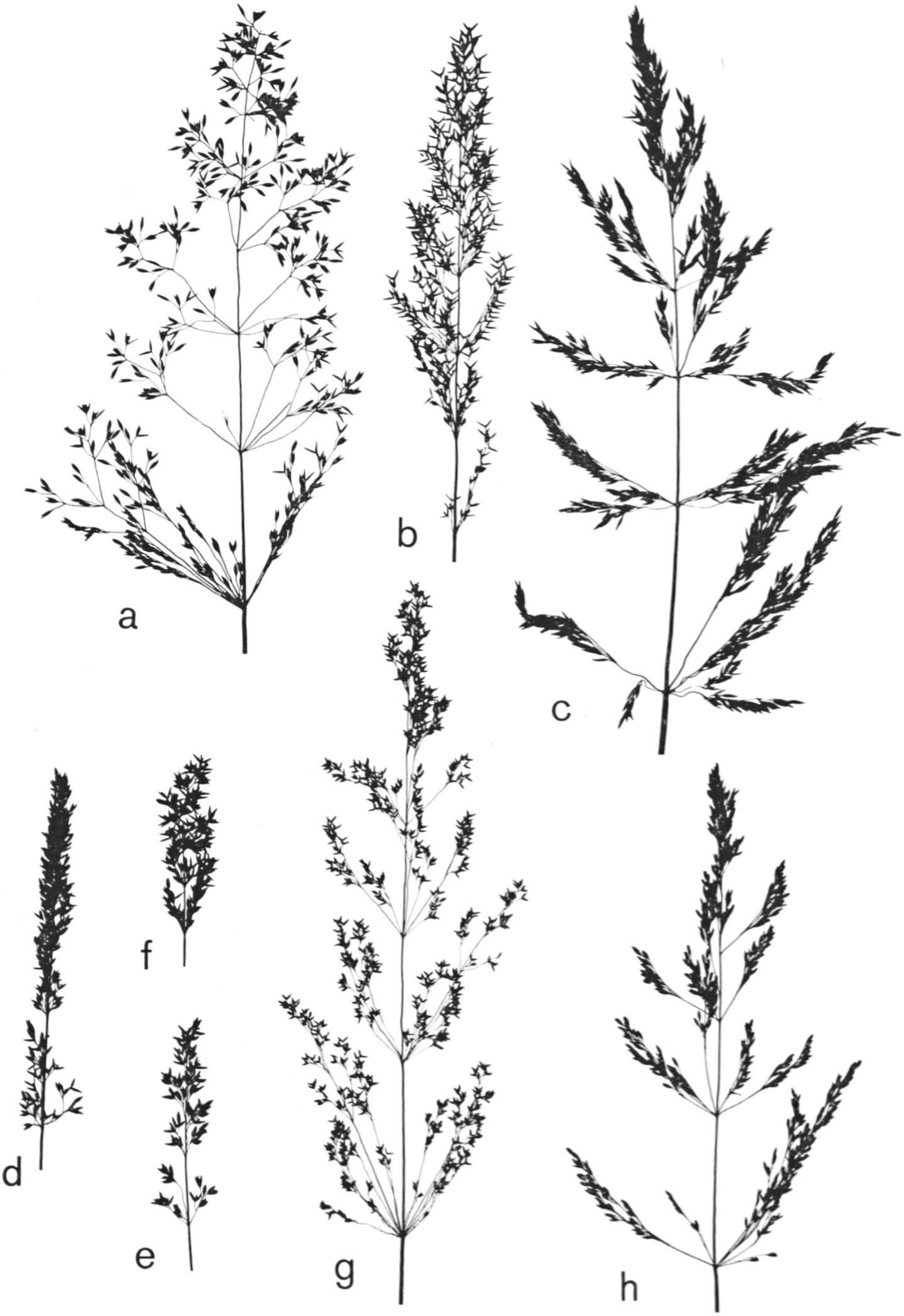

FIG. 42. Panicle silhouettes of a. *A. capillaris* (Fig. 34 d). b. *A. stolonifera* (Fig. 35 c). c. *A. stolonifera* (Fig. 36 b). d. *A. stolonifera* (Fig. 36 c). e. *A. stolonifera* (TL Kiruna, L. Torne, at mouth of Snuorajokk, 1919 Th. C. E. Fries [H]). f. *A. stolonifera* (Fig. 35 b). g. *A. stolonifera* (Fig. 35 d). h. *A. stolonifera* (Fig. 36 a). 2/3 natural size.

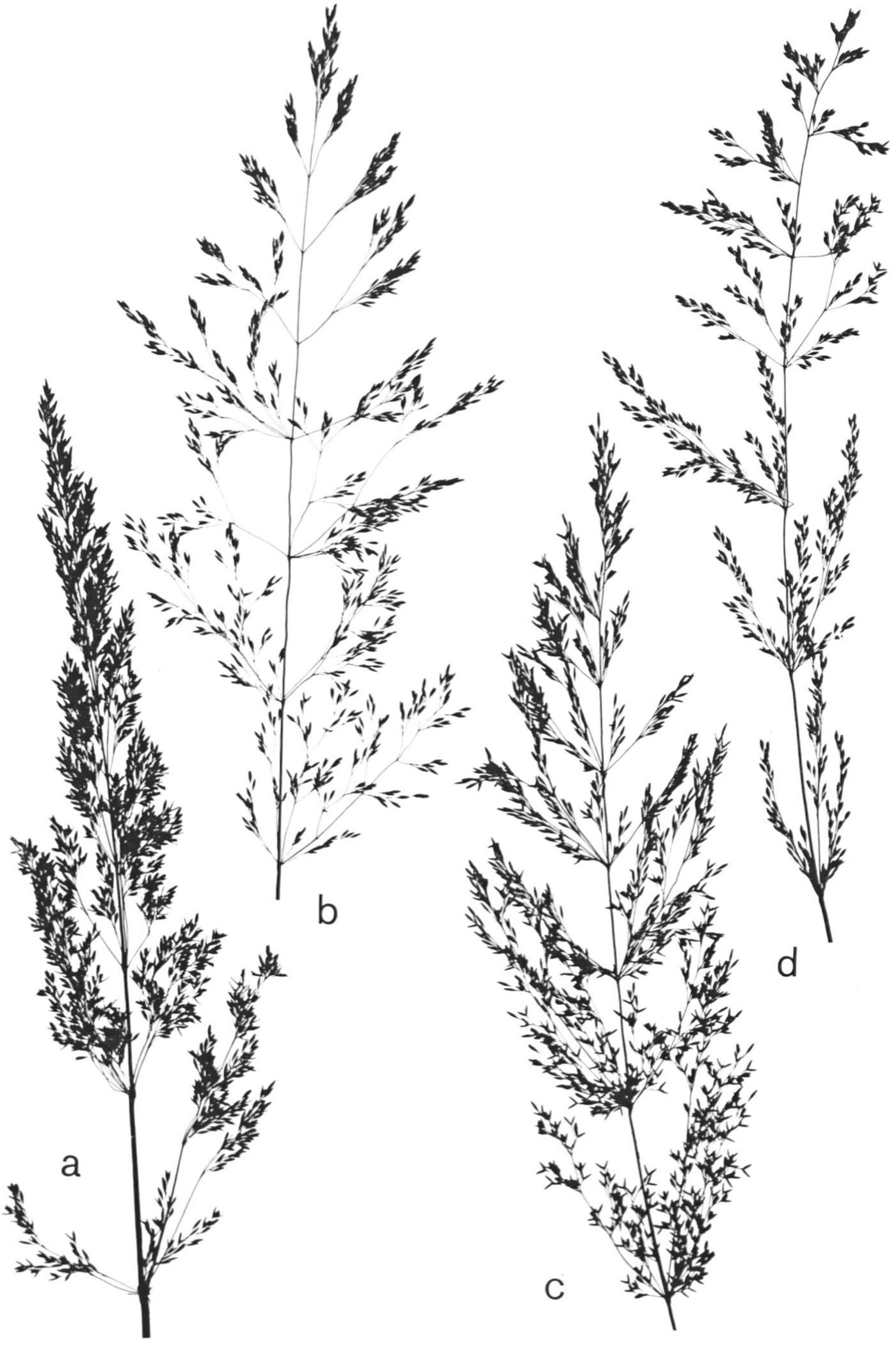

FIG. 43. Panicle silhouettes of *A. gigantea*. a. cfr var. *gigantea* (Fig. 37 a). b. var. *glaucescens* (Fig. 37 d). c. cfr var. *dispar* (Fig. 37 c). d. var. *repens* (Fig. 37 b). 2/3 natural size.

FIG. 44. Panicle silhouettes of a. *A. mertensii* × *stricta* (Fig. 36 d). b. *A.* × *bjoerkmanii* (Fig. 38 b). c. *A.* × *bjoerkmanii* (Fig. 38 a). d. *A.* × *murbeckii* (Fig. 38 d). e. *A.* × *murbeckii* (Fig. 38 c). 2/3 natural size.

FIG. 45. Panicle silhouettes of a. *A. gigantea* × *stolonifera* (Fig. 39 a). b. *A. gigantea* × *stolonifera* (Fig. 39 b). c. *A. canina* × *stolonifera* (Fig. 39 c). d. *A. stolonifera* × *stricta* (Fig. 39 d). e. *A. mertensii* × *stolonifera* (Fig. 40 b). f. *A. gigantea* × *mertensii* (Fig. 40 a). g. *A. capillaris* × *stricta* (Fig. 40 c). h. *A.* cfr *capillaris* × *clavata* (Fig. 40 d). 2/3 natural size.

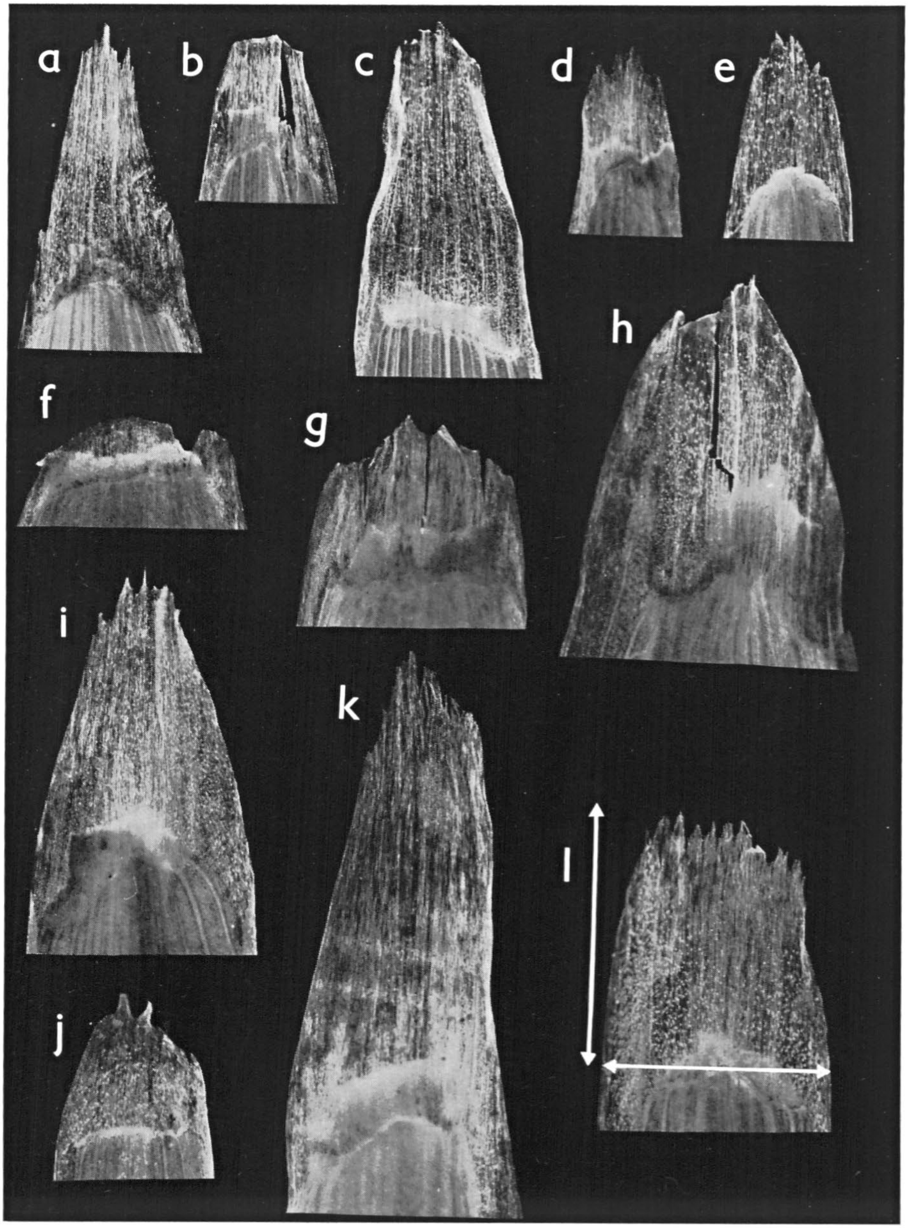

FIG. 46. Ligule from second culm leaf of a. *A. canina* (N Borgå, Pellinge, Älskholm, 1959 Wdn [H]). b. *A. stricta* (Fig. 33 c). c. *A. stricta* (Fig. 33 d). d. *A. mertensii* (Fig. 34 a). e. *A. clavata* (Fig. 34 b). f. *A. capillaris* (Fig. 34 d). g. *A. capillaris* (N Borgå, Pellinge, Hasselö, 1962 Wdn [H]). h. *A. stolonifera* (Fig. 35 c). i. *A. stolonifera* (Fig. 36 b). j. *A. stolonifera* (Fig. 36 c). k. *A. gigantea* var. *glaucescens* (N Borgå, Pellinge, Hasselö, 1963 Wdn [H]). l. *A. gigantea* var. *repens* (Fig. 37 b). Magnification about 10 ×.

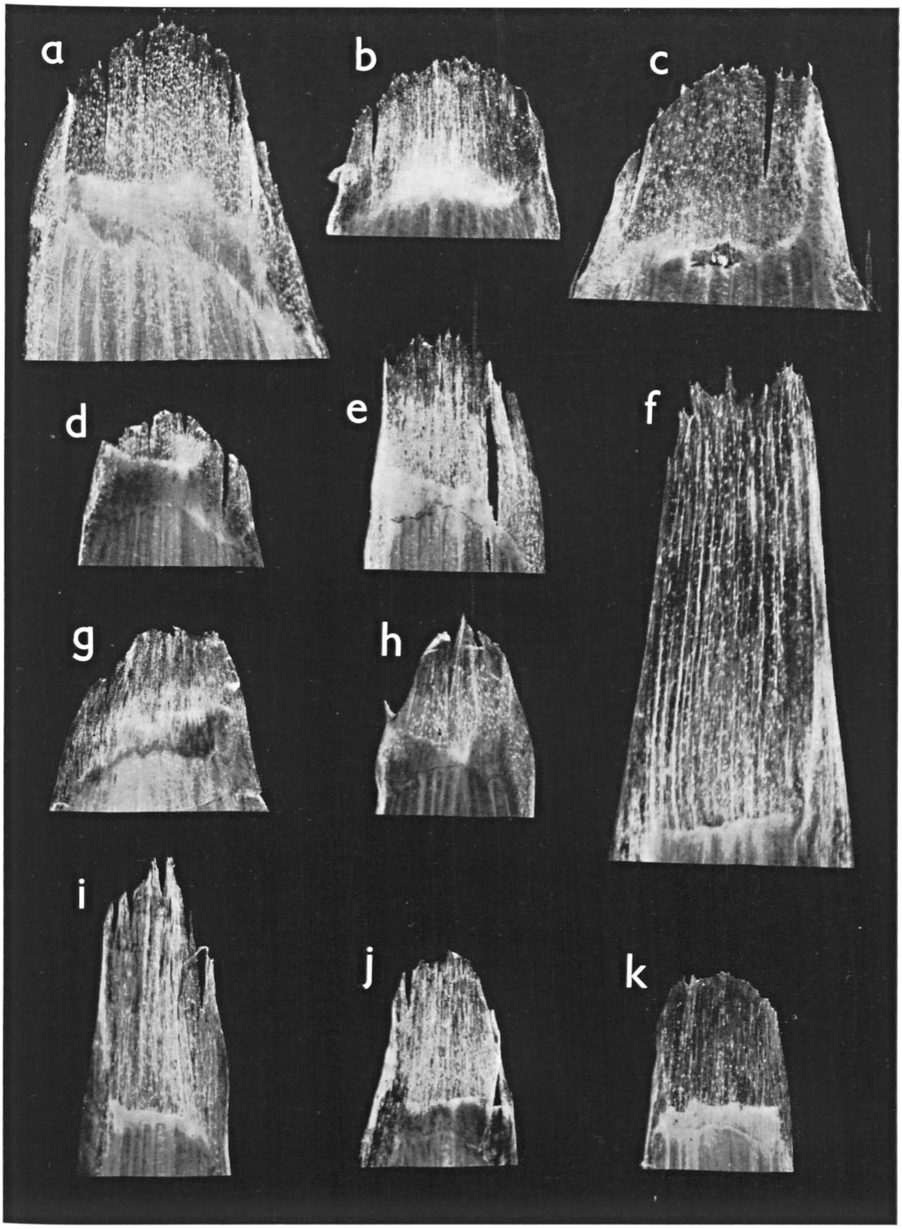

FIG. 47. Ligule from second culm leaf of a. *A.* × *bjoerkmanii* (Fig. 38 b). b. *A.* × *bjoerkmanii* (Fig. 38 a). c. *A.* × *murbeckii* (Fig. 38 c). d. *A.* × *murbeckii* (Fig. 38 d). e. *A. gigantea* × *stolonifera* (Fig. 39 b). f. *A. canina* × *stolonifera* (Fig. 39 c). g. *A. stolonifera* × *stricta* (Fig. 39 d). h. *A. mertensii* × *stolonifera* (Fig. 40 b). i. *A. gigantea* × *mertensii* (Fig. 40 a). j. *A. capillaris* × *stricta* (Fig. 40 c). k. *A.* cfr *capillaris* × *clavata* (Fig. 40 d). Magnification about 10 ×.

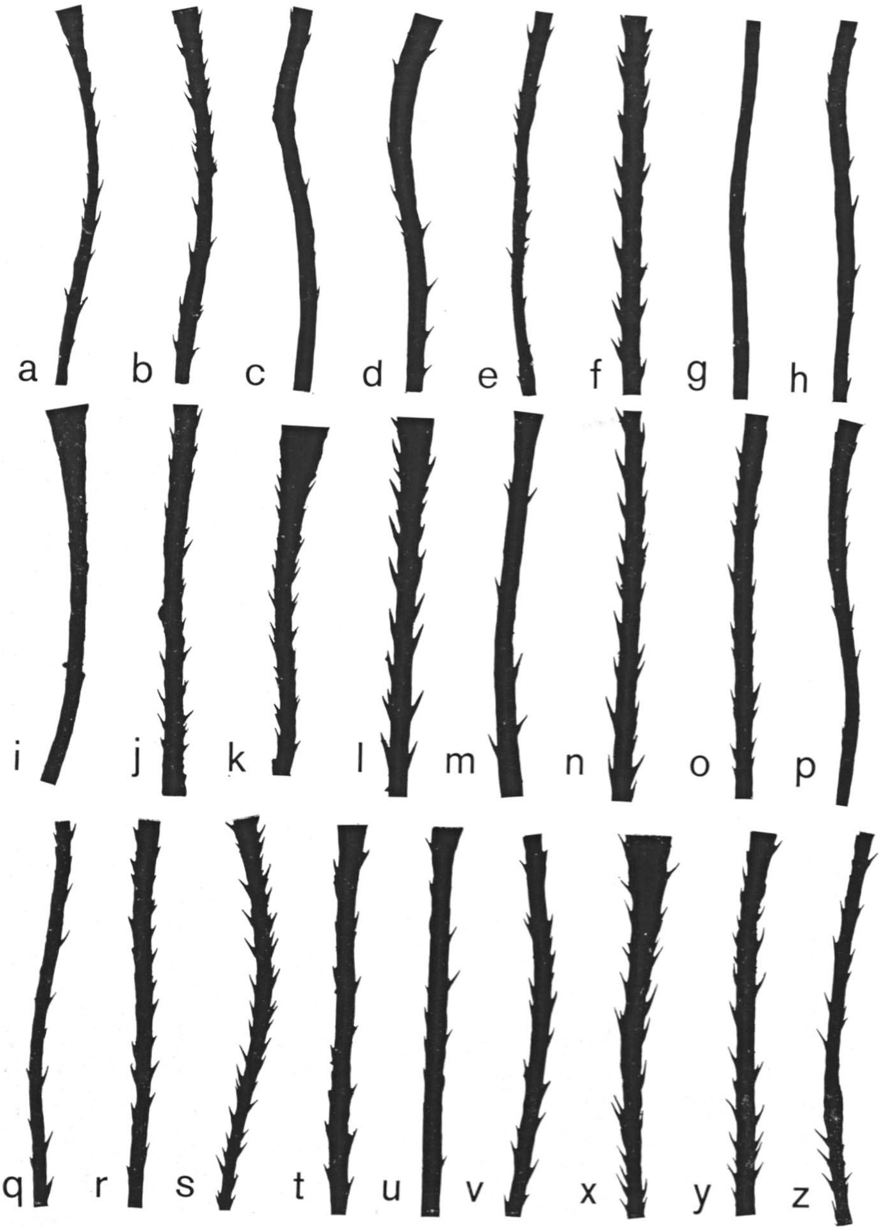

FIG. 48. Pedicel silhouettes of a. *A. canina* (Ta Ylöjärvi, Pengonpohja, 1905 A. A. Sola [H]). b. *A. stricta* (Fig. 33 d). c. *A. stricta* (Fig. 33 c). d. *A. mertensii* (Fig. 34 a). e. *A. clavata* (Fig. 34 b). f. *A. scabra* (N Helsinki, 1931 I. Hiitonen [H]). g. *A. capillaris* (Fig. 34 d). h. *A. capillaris* (Fig. 46 g). i. *A. stolonifera* (Fig. 35 c). j. *A. stolonifera* (Fig. 36 b). k. *A. stolonifera* (Fig. 36 c). l. *A. gigantea* var. *repens* (Fig. 37 b). m. *A. mertensii* × *stricta* (Trs Kvaenangen, 1966 Wdn [H]). n. *A.* × *bjoerkmanii* (Fig. 38 b). o. *A.* × *bjoerkmanii* (Fig. 38 a). p. *A.* × *bjoerkmanii* (N Borgå, 1960 Wdn [H]). q. *A.* × *murbeckii* (Fig. 38 c). r. *A.* × *murbeckii* (Fig. 38 d). s. *A. gigantea* × *stolonifera* (Fig. 39 b). t. *A. canina* × *stolonifera* (Fig. 39 c). u. *A. stolonifera* × *stricta* (Fig. 39 d). v. *A. mertensii* × *stolonifera* (Fig. 40 b). x. *A. gigantea* × *mertensii* (Fig. 40 a). y. *A. capillaris* × *stricta* (Fig. 40 c). z. *A. capillaris* × *clavata* (Fig. 40 d). Magnification about 30 ×.

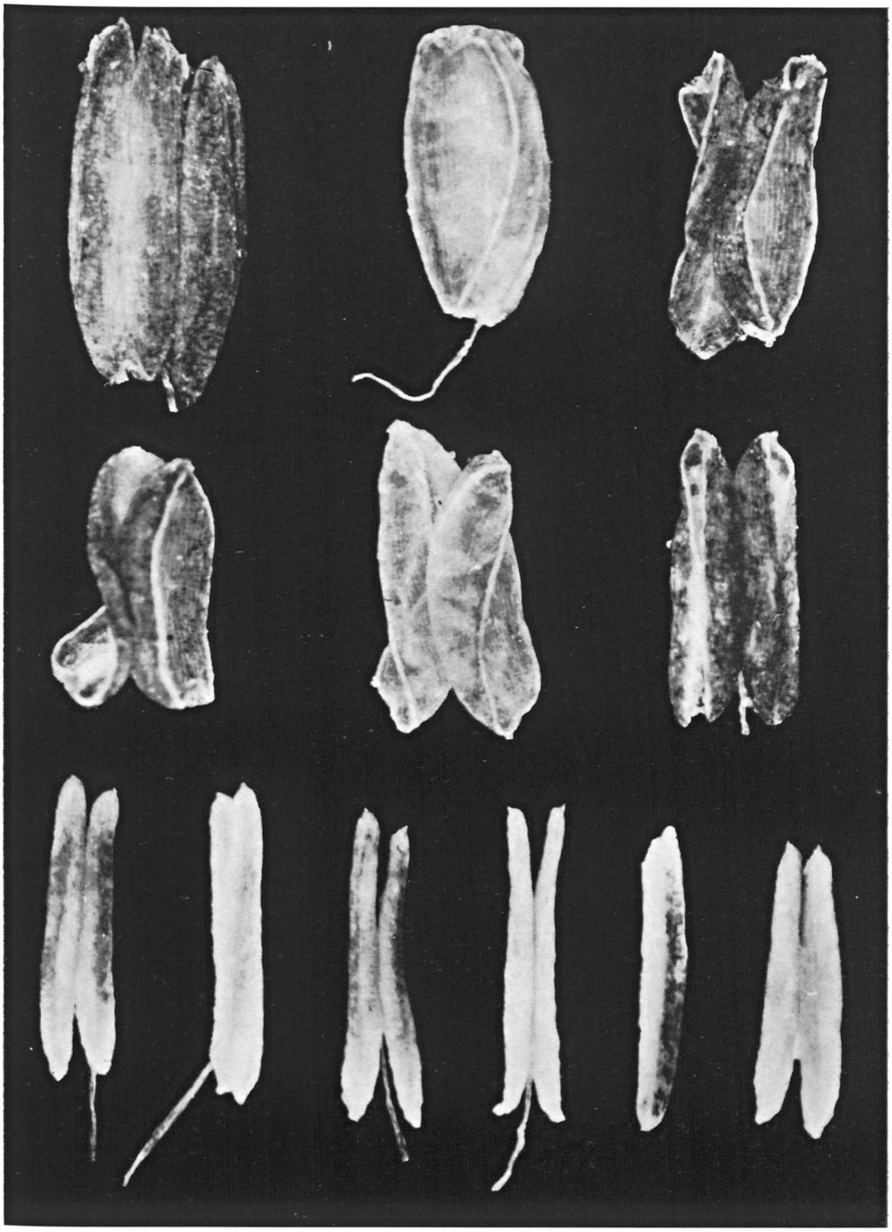

FIG. 49. Anthers. Upper two rows: dehiscent anthers of *A. stolonifera* (Fig. 35 c). Lower row: non-dehiscent anthers of *A. canina* × *stolonifera* (Fig. 39 c). Magnification about 40 ×.

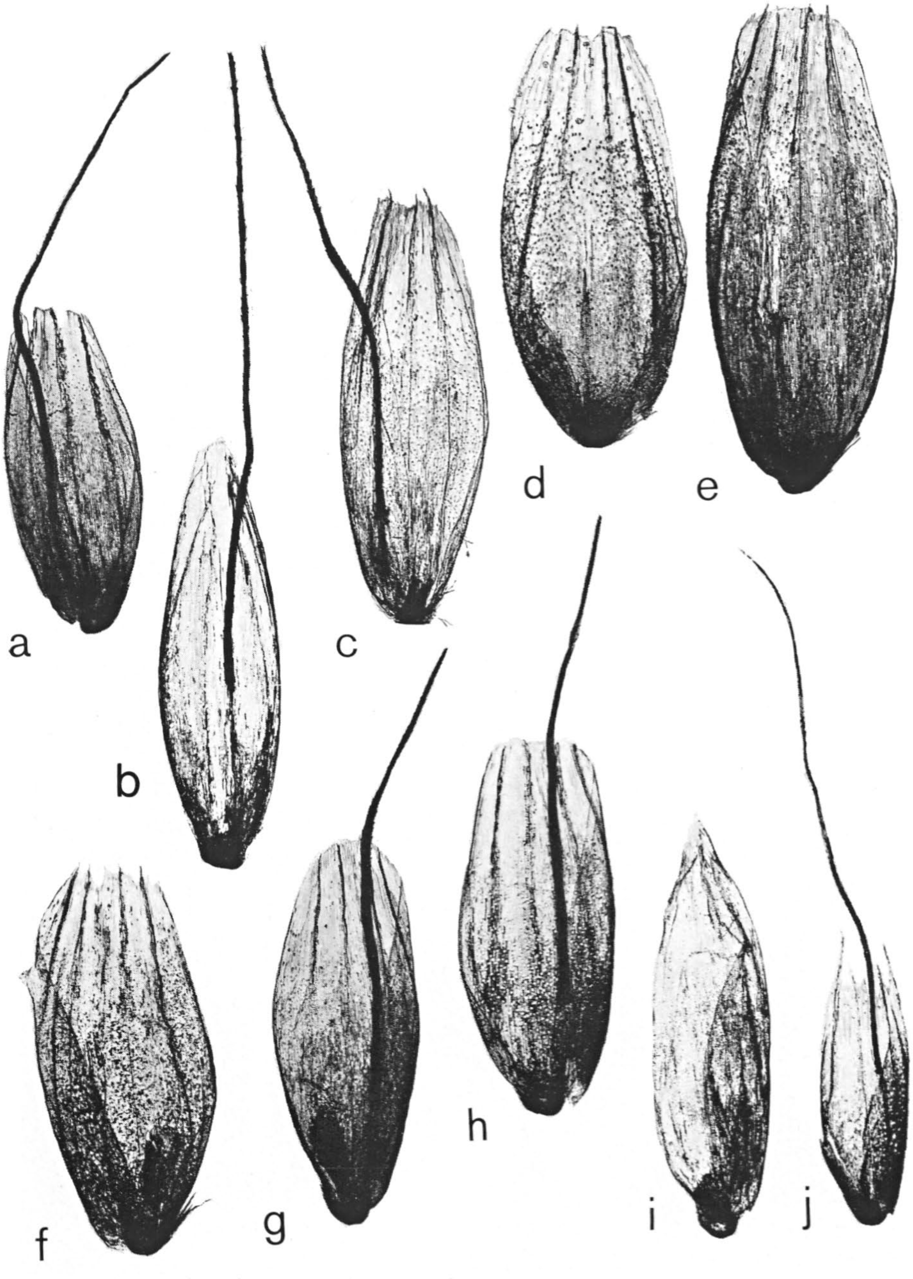

FIG. 50. Florets of a. *A. canina* (Fig. 48 a). b. *A. mertensii* (TL Abisko, Njulla, 1969 P. & I. Kytövuori [H]). c. *A. stricta* (TL Karesuando, 1967 Wdn [H]). d. *A. stricta* (Le Enontekiö, Kilpisjärvi, river shore, 1966 Wdn [H]). e. *A. stricta* (Le Enontekiö, R. Muonio, at mouth of Lassinoja, 1966 Wdn [H]). f. *A. stricta* (Ab Dragsfjärd, Ekhamn, 1961 Wdn [H]). g. *A. stricta* (N Sibbo, Immersby, 1966 Wdn [H]). h. *A. stricta* (N Helsinki, Brunnsparken, 1963 Wdn [H]). i. *A. clavata* (Sb Maaninka, Korkeakoski, 1915 M. J. Kotilainen [H]). j. *A. pourretii* (N Helsinki, 1940 B. Pettersson [H]). Magnification about 30 ×.

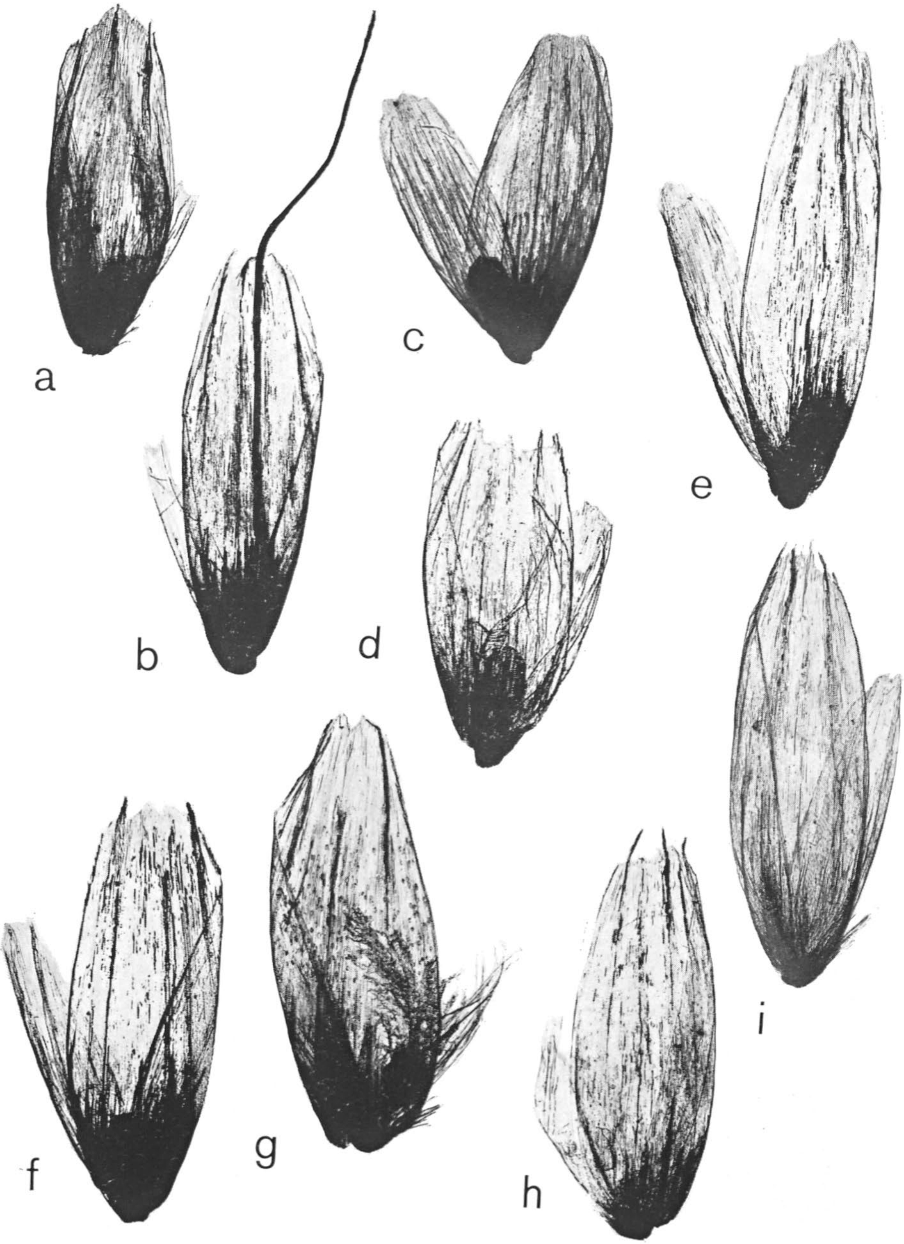

FIG. 51. Florets of a. *A. capillaris* (Fig. 46 g). b. *A. capillaris* (Trs Balsfjord, Haugafjell, 1969 P. & I. Kytövuori [H]). c. *A. stolonifera* (Fig. 36 c). d. *A. stolonifera* (Fig. 35 c). e. *A. stolonifera* (Fig. 36 b). f. *A. gigantea* (Fig. 37 c). g. *A.* × *bjoerkmanii* (Fig. 48 p). h. *A.* × *murbeckii* (N Borgå, Pellinge, Hasselö, 1960 Wdn [H]). i. *A. gigantea* × *stolonifera* (Fig. 39 b). Magnification about 30 ×.

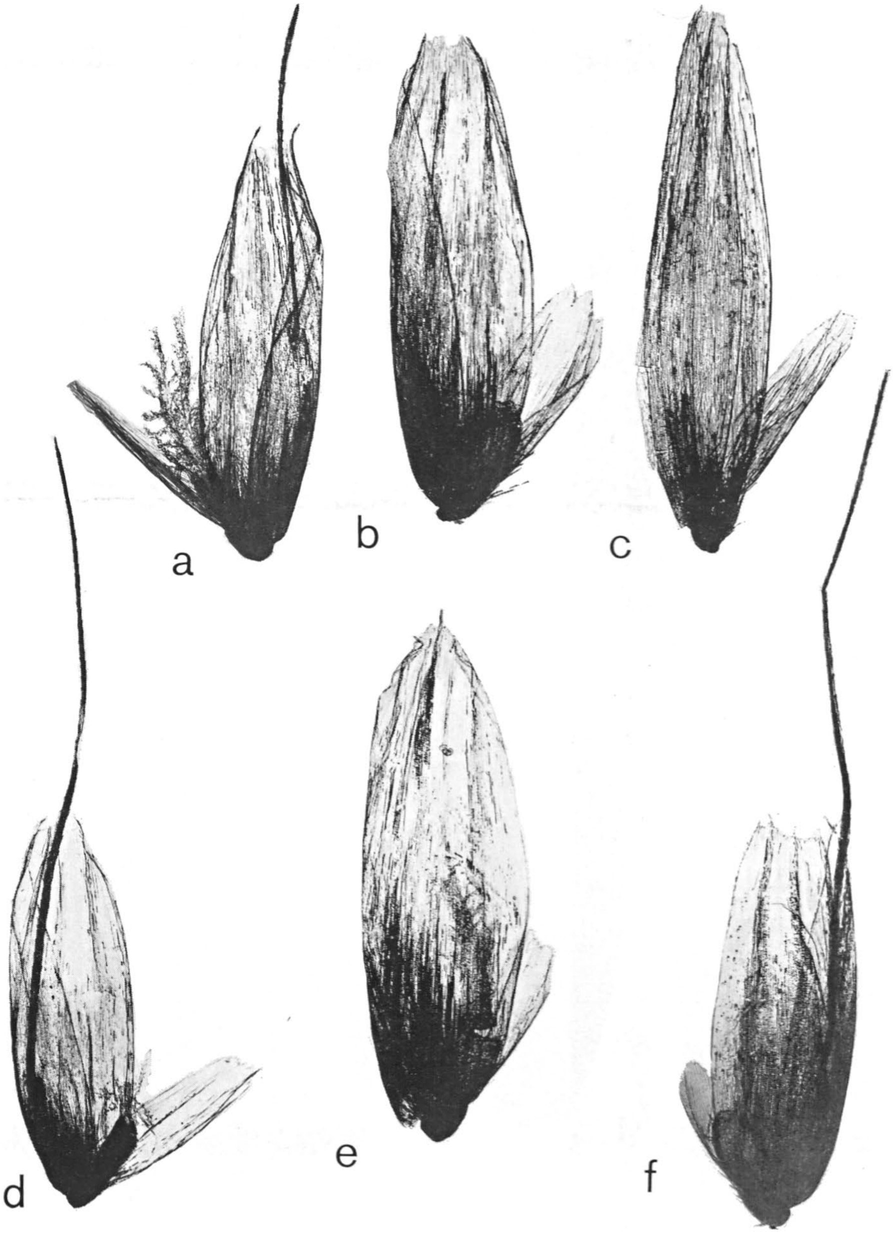

FIG. 52. Florets of a. *A. stolonifera* × *stricta* (Fig. 39 d). b. *A. mertensii* × *stolonifera* (Fig. 40 b). c. *A. gigantea* × *mertensii* (Fig. 40 a). d. *A. canina* × *stolonifera* (Fig. 39 c). e. *A.* cfr *capillaris* × *clavata* (Fig. 40 d). f. *A. capillaris* × *stricta* (Fig. 40 c). Magnification about 30 ×.

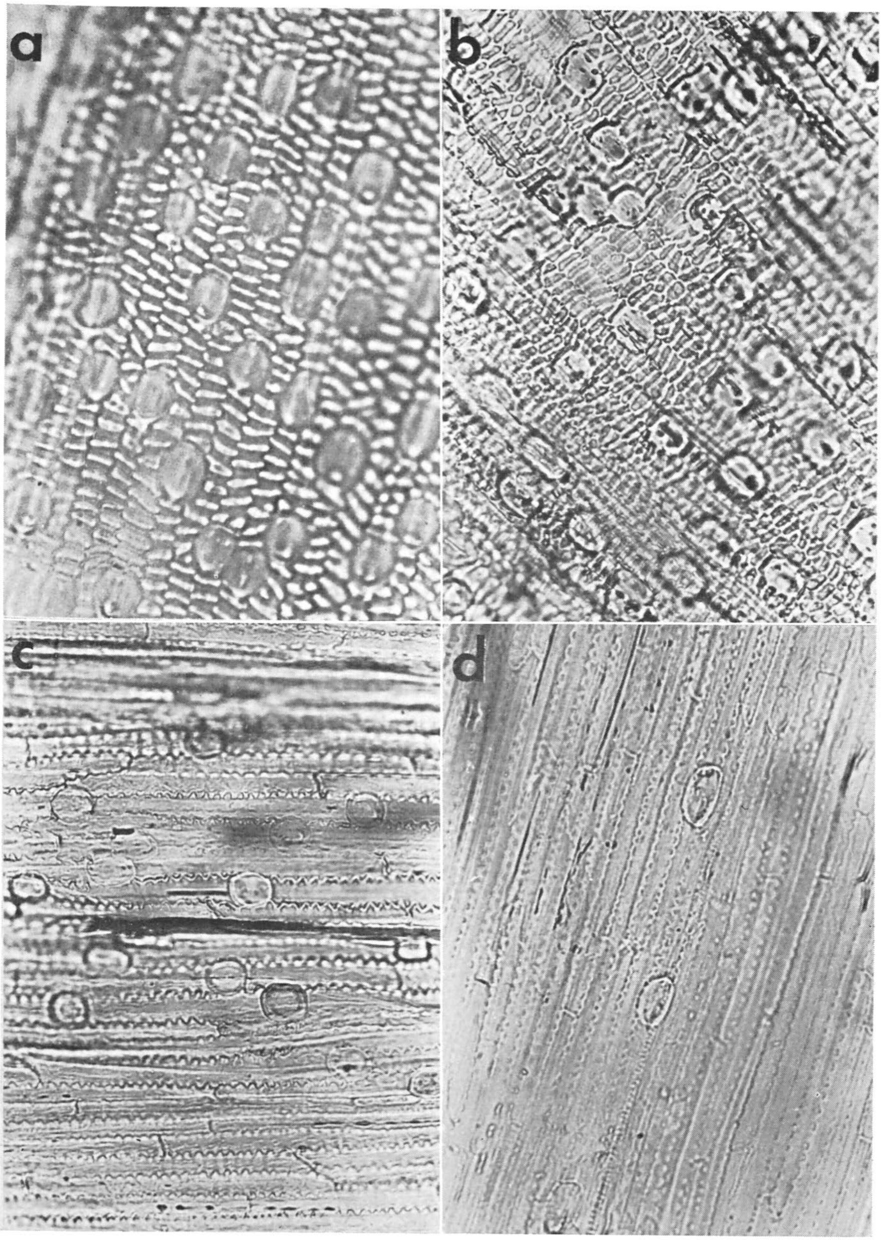

FIG. 53. Density of prickle-hairs on lemma. a. dense (*A. canina*, Fig. 48 a). b. dense — intermediate (*A. capillaris* × *stricta*, Fig. 40 c). c. intermediate (*A. stolonifera*, Ks Kuusamo, Juuma, Jyrävän köngäs, 1966 Wdn [H]). d. scattered (*A. gigantea* × *stolonifera*, Ks Kuusamo, Juuma, Jyrävän köngäs 1966 Wdn [H]). Magnification about 550 ×.

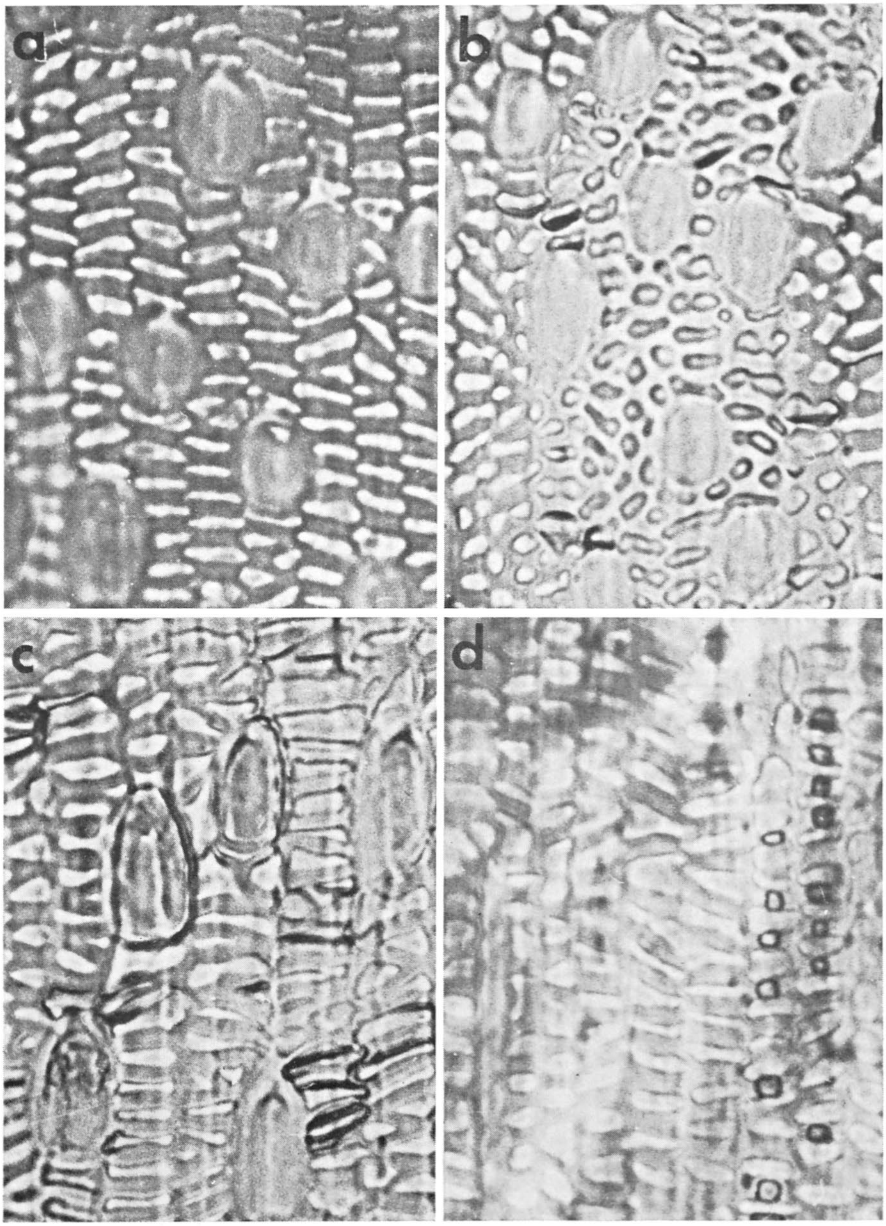

FIG. 54. Lemma surface structure of a. *A. canina* (Fig. 48 a). b. *A. stricta* (Fig. 33 d), c. *A. mertensii* (Lps Pechenga, Pummanki, 1927 A. A. Cajander [H]). d. *A. clavata* (Fig. 34 b). Magnification about 1100 ×.

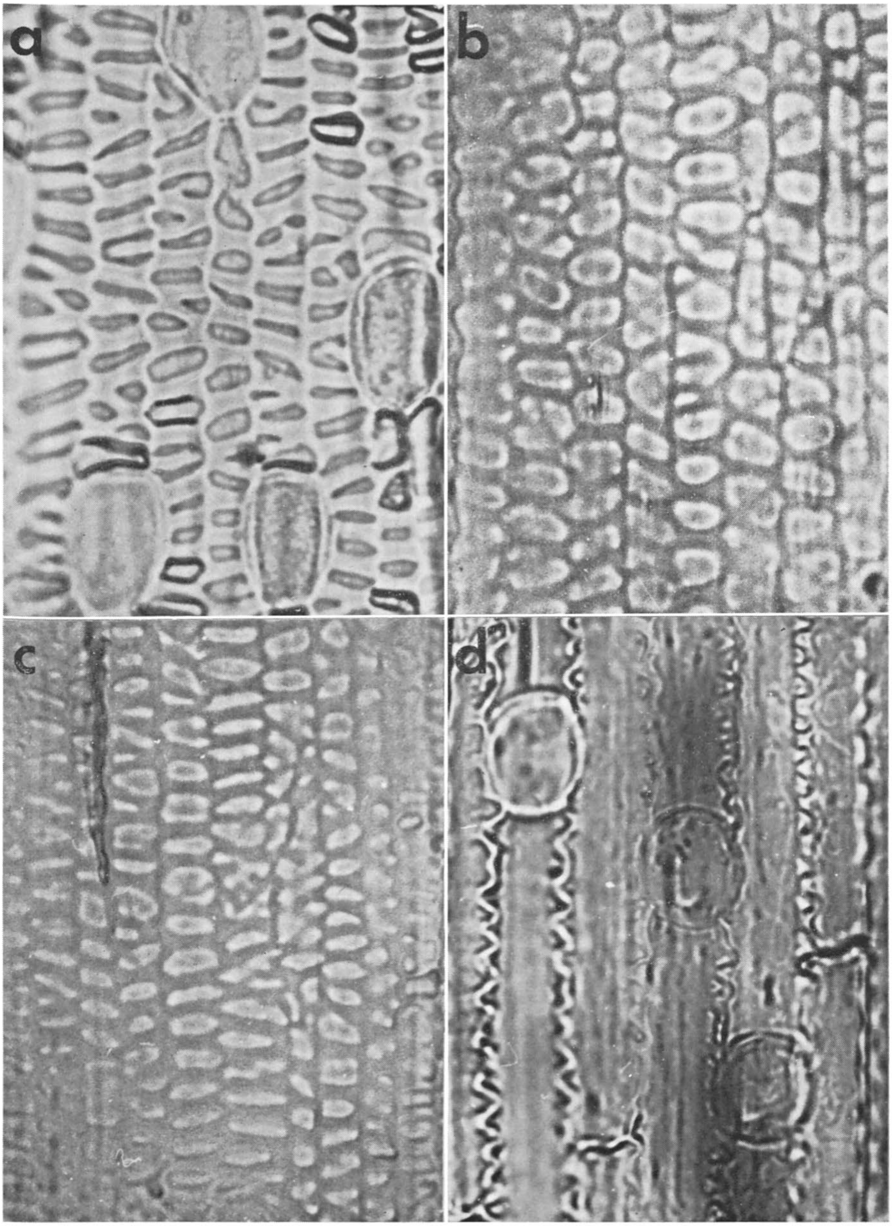

FIG. 55. Lemma surface structure of a. *A. scabra* (Fig. 48 f). b. *A. capillaris* (Fig. 34 d). c. *A. capillaris* (N Borgå, Pellinge, Hasselö, 1963 Wdn [H]). d. *A. stolonifera* (Fig. 53 c). Magnification about 1100 ×.

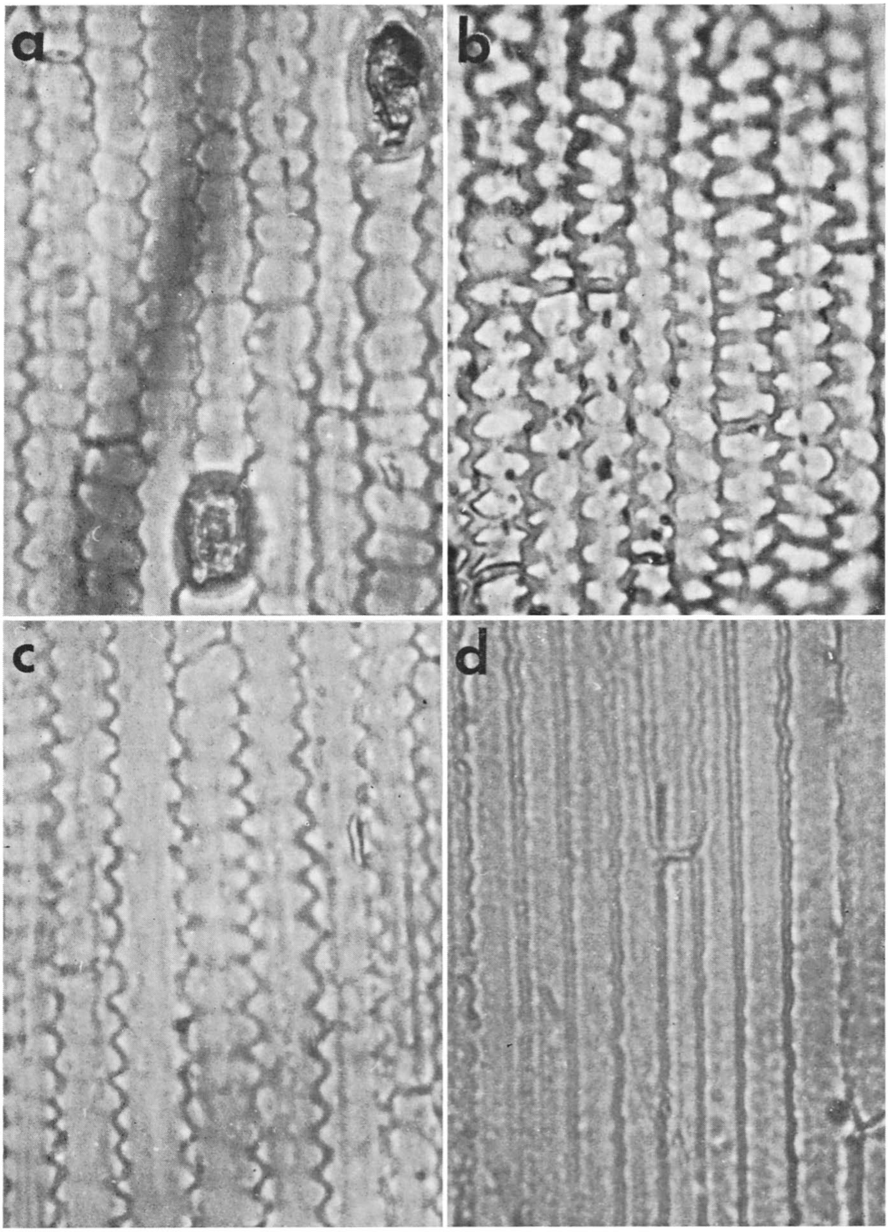

FIG. 56. Lemma surface structure of a. *A. stolonifera* (Fig. 35 b). b. *A. stolonifera* (Fig. 35 d). c. *A. stolonifera* (N Borgå, Pellinge, Hasselö, 1963 Wdn [H]). d. *A. gigantea* var. *repens* (Kb Lieksa, Kinahmonniemi, Korpilahti, 1962 C. E. Sonck [H]). Magnification about 1100 ×.

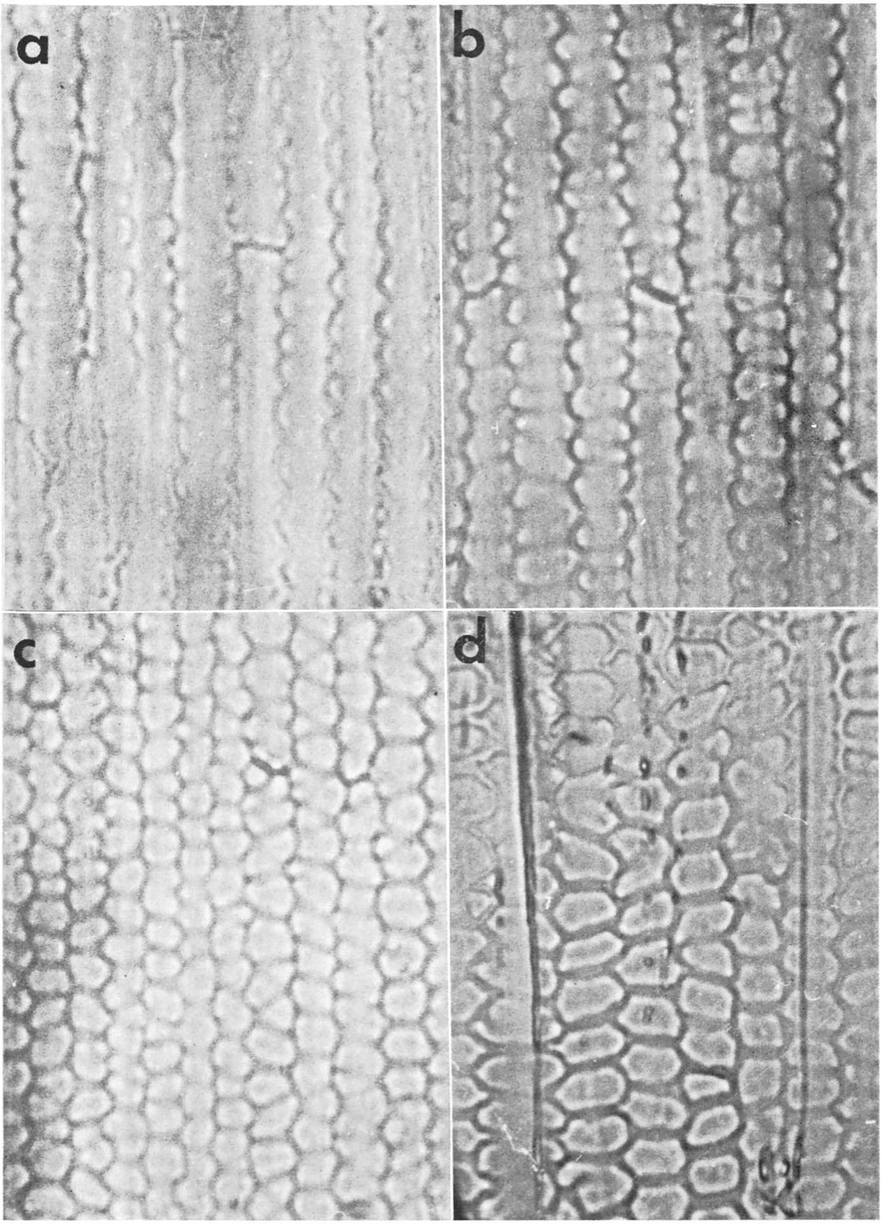

FIG. 57. Lemma surface structure of a. *A. gigantea* cfr var. *dispar* (Fig. 37 c). b. *A.* × *bjoerkmanii* (Le Enontekiö, R. Muonio, at mouth of Lassinoja, 1914 J. Montell [TURA]). c. *A.* × *bjoerkmanii* (Kb Pielisjärvi, Kontiovaara, shore of Suomunjärvi, 1960 C. E. Sonck [H]). d. *A.* × *murbeckii* (N Borgå, Pellinge, Hasselö, 1962 Wdn [H]). Magnification about 1100 ×.

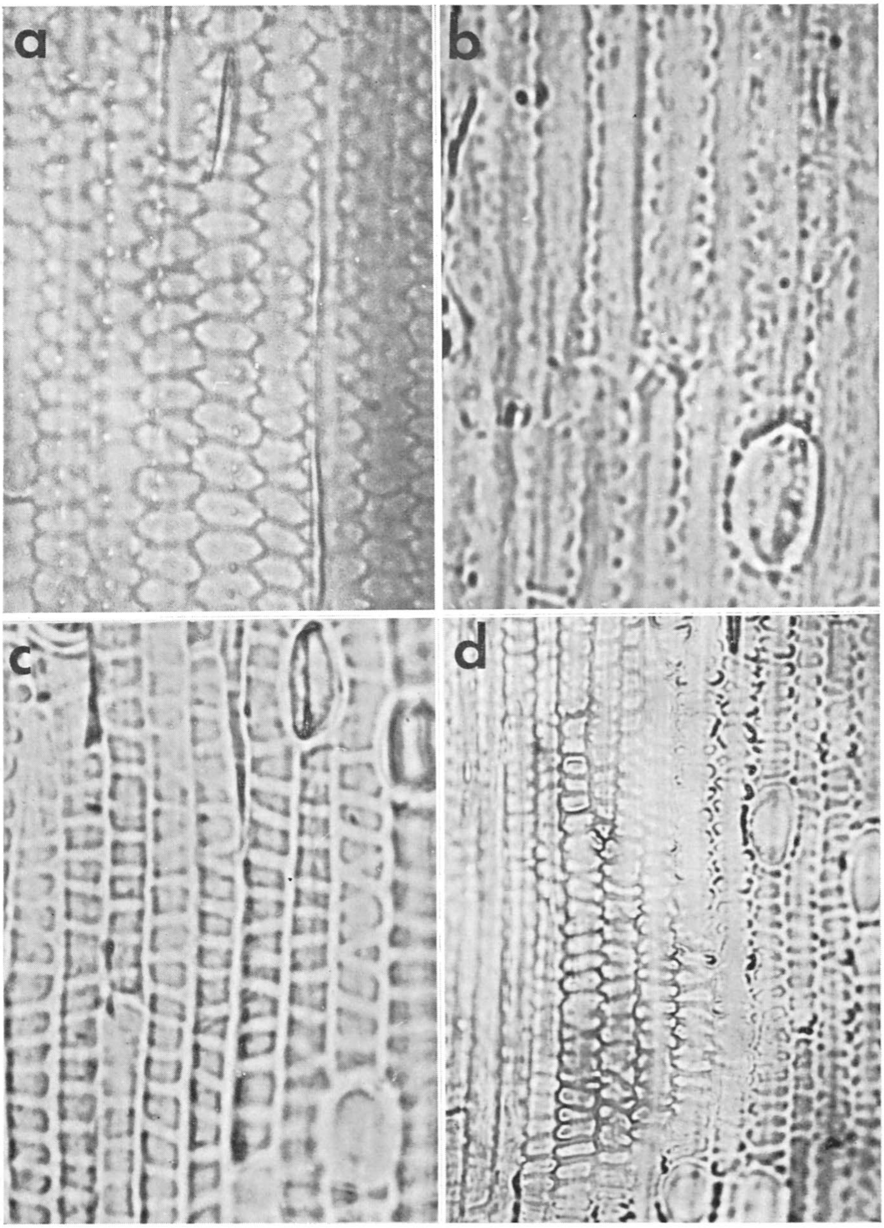

FIG. 58. Lemma surface structure of a. *A.* × *murbeckii* (N Borgå, Pellinge, Hasselö, 1963 Wdn [H]). b. *A. gigantea* × *stolonifera* (Fig. 39 b). c. *A. canina* × *stolonifera* (Fig. 39 c). d. *A. stolonifera* × *stricta* (Fig. 39 d). Magnification about 1100 ×.

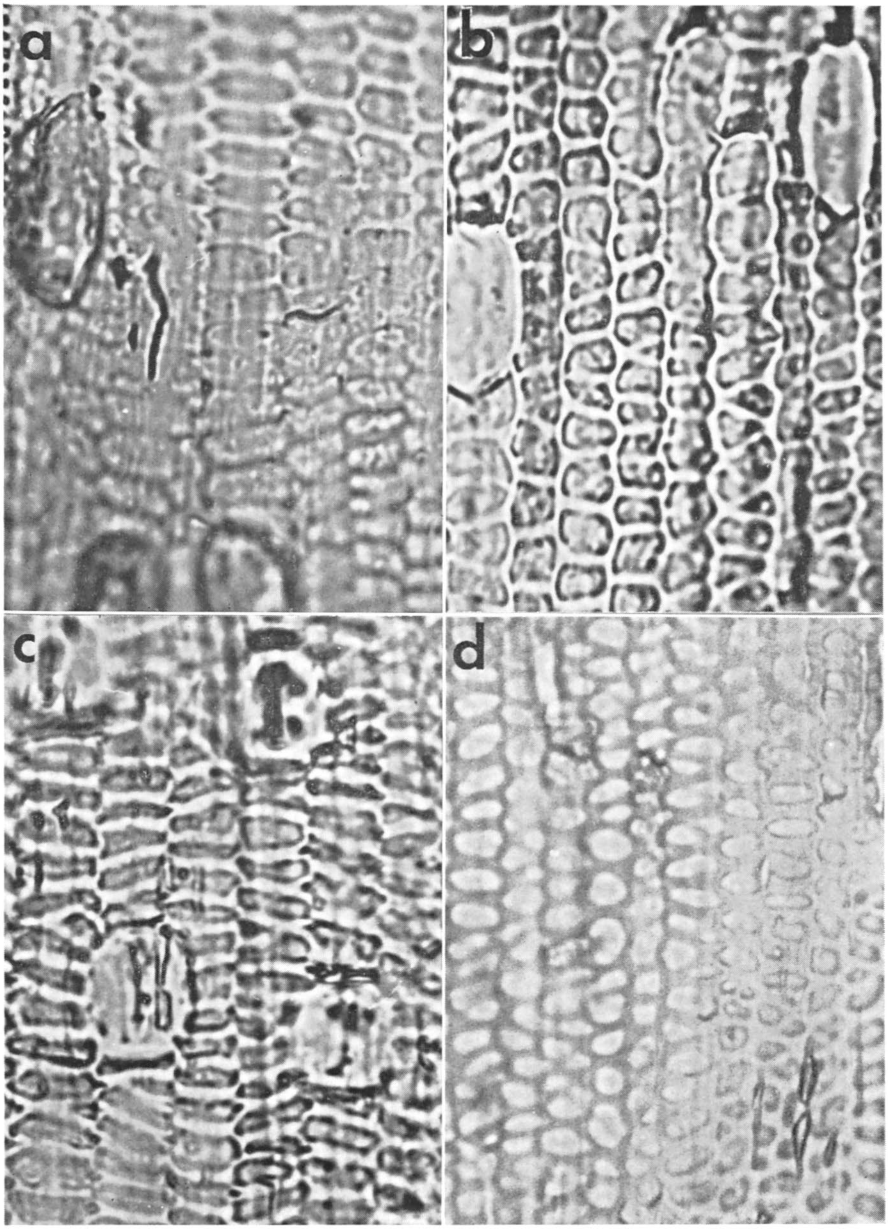

FIG. 59. Lemma surface structure of a. *A. gigantea* × *mertensii* (Fig. 40 a). b. *A. mertensii* × *stolonifera* (Fig. 40 b). c. *A. capillaris* × *stricta* (Fig. 40 c). d. *A.* cfr *capillaris* × *clavata* (Fig. 40 d). Magnification about 1100 ×.

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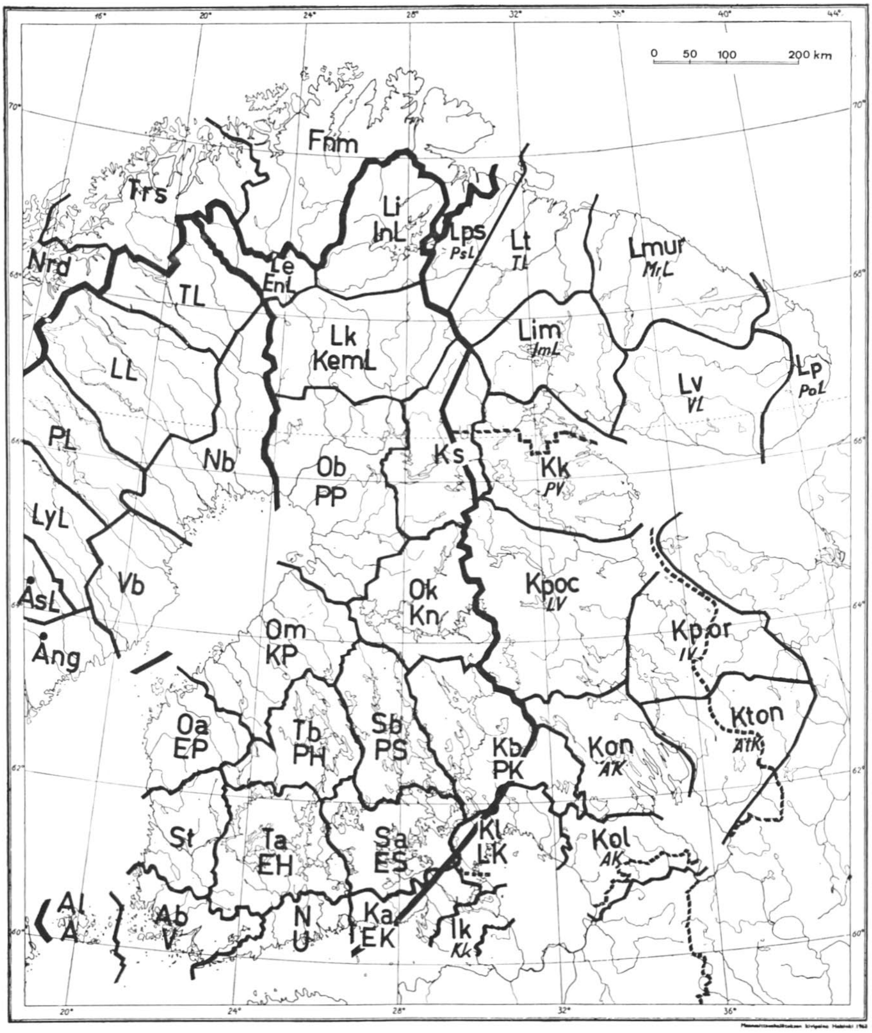

Fig. 60. Biogeographical provinces. (Parallel abbreviations correspond to province designations in Finnish (not used in this work)).

East Fennoscandia:

Ab = Regio aboënsis
Al = Alandia
Ik = Isthmus karelicus
Ka = Karelia australis
Kb = Karelia borealis
Kk = Karelia keretina
Kl = Karelia ladogensis
Kol = Karelia olonetsensis
Kon = Karelia onegensis
Kpoc = Karelia pomorica occidentalis
Kpor = Karelia pomorica orientalis

Ks = Regio kuusamoënsis
Kton = Karelia transonegensis
Le = Lapponia enontekiensis
Li = Lapponia inarensis
Lim = Lapponia Imandrae
Lk = Lapponia kemensis
Lmur = Lapponia murmanica
Lp = Lapponia ponojensis
Lps = Lapponia petsamoënsis
Lt = Lapponia tulomensis
Lv = Lapponia Varsugae

N = Nylandia
Oa = Ostrobottnia australis
Ob = Ostrobottnia borealis
Ok = Ostrobottnia kajanensis
Om = Ostrobottnia media
Sa = Savonia australis
Sb = Savonia borealis
St = Satakunta
Ta = Tavastia australis
Tb = Tavastia borealis

Norway:

Fnm = Finnmark
Nrd = Nordland
Trs = Troms

Sweden:

LL = Lule Lappmark
LyL = Lycksele Lappmark
Nb = Norrbotten

PL = Pite Lappmark
Vb = Västerbotten
Ång = Ångermanland
Ås L = Åsele Lappmark

——— boundary of province when not coinciding with international boundary.

——— international boundary.

- - - - - - - boundary of regions of the U.S.S.R. (from south to north, Leningrad Region, Karelian A.S.S.R. and Murmansk Region).

Sus muut sarjat

Societas

FLORA FENNICA

1. **V. F. Brotherus:** Die Laubmoose Fennoskandias. 635 S. (1923).
2. **Alvar Palmgren:** Carex-gruppen Fulvellae Fr. i Fennoskandien 1. 165 s. + tavlor I—XXV. (1959).
3. **Gunnar Marklund:** Der Ranunculus auricomus -Komplex in Finnland I. Diagnosen und Fundortslisten einiger Sippen des R. auricomus L. coll. (s.str.). 128 S. + 94 Tafeln. (1961).
4. **Gunnar Marklund:** Der Ranunculus auricomus -Komplex in Finnland II. Diagnosen und Fundortslisten einiger Sippen von R. fallax (W. & Gr.) Schur, R. monophyllus Ovcz. und R. cassubicus L. 198 S. (1965).
5. **Karl-Gustav Widen:** The genus *Agrostis* L. in eastern Fennoscandia. Taxonomy and distribution. 209 pp. (1971).

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