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COLLECTIONS IN INSTITUTIONAL HERBARIA LISTED AS *RHIZOPOGON*, BUT NOT BELONGING TO THIS GENUS

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ABSTRACT

Fifty-five collections misidentified and stored in various institutional herbaria, under several *Rhizopogon* species names, are revised. Among these, twelve belong to Ascomycotina and 9 were identified to species level; the other collections, immature fruitbodies were impossible to identify with the data available. Forty-two collections are Basidiomycotina and only an immature *Scleroderma* remain without identification to the species level.

Key words: *Ascomycotina*, *Basidiomycotina*, Taxonomy, Herbarium.

Introduction

During the revision of the genus *Rhizopogon* in Europe (Martín, 1996), 2560 collections were examined. The material comprised collections received on loan or gift from both institutional and personal herbaria worldwide, as well as material collected by ourselves or our collaborators. Among collections sent by institutional herbaria and labelled as *Rhizopogon* spp., 55 were misidentified and belong to other *Basidiomycotina* genera and, even, to Ascomycotina.

In order to facilitate access to these collections by those preparing revisions or monographs we give the list of material under the species to which we have assigned it. The taxa have been arranged alphabetically in subphyla *Ascomycotina* and *Basidiomycotina*. Entries have been arranged by our register number, and include literal transcriptions of the herbarium labels. In the case of hand-writing, such transcriptions may not always be exact. Any additional information not written on the label is given between brackets. Names and number of the exsiccata are given in parenthesis. The herbaria are abbreviated according to Holmgren et al. (1990); with indication of duplex or slide deposited in BCC herbarium.

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Literature descriptions are numerous. Here, we indicate, in general, only the most recent ones.

ASCOMYCOTINA

Choiromyces meandriformis Vitt.

Specimens examined – 2216. CZECH REPUBLIC. In montosis Bohemiae, pr. Prag., leg. Corda as *Rhizopogon magnatum* (Pico) Corda (Raben. Klotzs. Herb. Viv. Myc. 735) (PAV).- 2217. GERMANY. Geyenbanaz, ex Herb. Garovaglio, as *Rhizopogon meandriformis* Corda (PAV).- 2218. *Ibidem*, ex Herb. Garovaglio, as *Rhizopogon albus* Corda (PAV).- 2221. CZECH REPUBLIC. Bohemia, prope Choteiz, ex Herb. Berkeley, ex Herb. Montagne, as *Rhizopogon albus* Corda (PC) [Four envelopes containing in the same collection].- 2222. CZECH REPUBLICH. Prag., ex Herb. Montagne, as *Rhizopogon magnatum* Corda (PC).

Selected literature – SIERRA, MARTÍN & LLIMONA (1991); MONTECCHI & LAZZARI (1993); SPOONER (1993).

Remarks – The young spores are smooth, but when ripened are ornamented with typical tube-like warts.

Elaphomyces granulatus Fr.
(= *E. cervinus* (L) Schlecht)

Specimens examined – 2223. FINLAND. Lapponia inarensis, Inari commune, Muddusniemi, Grid 27°: 765:49, 1.VII.1969, leg. A. & K. Pohjola (TUR 53452).- 2224. FINLAND. Tavastia borealis, Keuruu: Haapamäki, Kaijala, istutuskuopan punaisessa hiekkakerroksessa (in red sand of a planting hole], 24.VI.1981, leg. K. Haapamäki (H).

Selected literature – HAWKER (1954); LAWRYNOWICZ (1988); MONTECCHI & LAZZARI (1993); SPOONER (1993).

Remarks – We compared this material with some *Elaphomyces* species from Dr. Hawker's herbarium deposited in Kew (K, United Kingdom): *Elaphomyces aculeatus* Vitt. (H 15), *E. anthracinus* Vitt. (H 1), *E. granulatus* Fr. (H 6), *E. leucosporus* Vitt. (H 306) and *E. muricatus* Fr. (H 3). (Fig. 1).

Our identification was confirmed by Dr. Calonge (Madrid, Spain) as *E. cervinus* (L) Schlecht. Following the Nomenclatural Code (GREUTER, 1988), and under Art. 13 (d) [limitation to the principle of priority], the valid name is *E. granulatus* Fr.

Stephensia bombycina (Vitt.) Tul. & C. Tul.

Specimens examined – 2260. GERMANY. Glogau, 10.IV.1929, leg. Koch, ex Herb. Soehner 1640, as *Rhizopogon marchii* (M, slide BCC-MPM 2195).

Selected literature – MONTECCHI & LAZZARI (1993); SPOONER (1993).

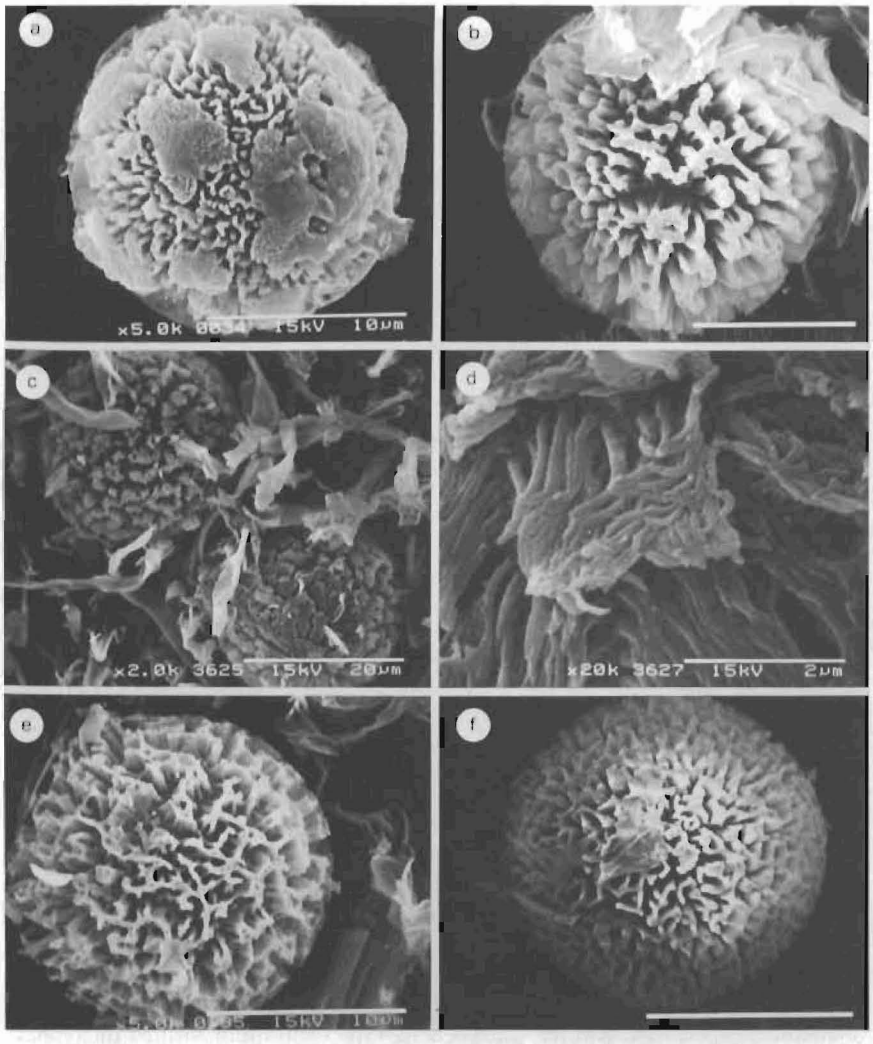

Figure 1. SEM. *Elaphomyces* spores (a-f). **a**: *E. anthracinus* Vitt., (K); **b**: *E. granulatus* Fr., (K) (bar = 10 μm); **c-d**: *E. granulatus* Fr., Reg. 2223 (TUR 53452); **e**: *E. leucosporus*, Vitt. (K); **f**: *E. muricatus* Fr., (K) (bar = 10 μm).

Remarks – In this specimen, as it is typical in *S. bombycina*, the mature gleba has cylindrical asci with eight globose and smooth spores.

Tuber rapaeodorum Tul.
(= *T. puberulum* Berk. & Broome)

Specimens examined – 2261. FRANCE. Côteau des Epaisses, 11.VIII.1879, det. L. Quélet, ex Herb. Quélet, as *Rhizopogon suavis* Quél (PC).

Selected literature – MONTECCHI & LAZZARI (1993); PEGLER (1993).

Remarks – In 1880 Quélet described a new species of *Rhizopogon* from Jura (France), *R. suavis* Quél., which, according to the original description (QUÉLET, 1880), is synonymous with *R. roseolus* (Corda) Th.M. Fr. (type *non vidi*). We were hopeful that this specimen might be a great help in arriving at a correct concept of *R. suavis* Quél., because it had been collected in France and identified by Quélet himself. However, this specimen does not belong to the basidiomycotina. The gleba presents globose to subglobose asci with four to eight reticulate spores. Dr. Pacioni revised this sample in 1983 and placed it in *Tuber rapaeodorum* Tul. MONTECCHI & LAZZARI (1993) mentioned *T. rapaedorum* Tul. as synonymous of *T. pulberulum* Berk. & Broome, giving priority to this last name. However, under Art. 11.2 (GREUTER, 1988) *T. rapaedorum* has priority over *T. puberulum*.

Immature ascomycetes not identified

Specimens examined – 2262. CZECH REPUBLIC. In montosis Bohemiae pr. Prag. Corda, as *Rhizopogon magnatum* (Pico) Corda (M).- 2263.- FINLAND. Helsinki, Kaisaniemi, Hortus Botanicus universitatis, fungus on nursery soil (surface), 26.VIII.1982, leg. P. Alanko 43675, as *Rhizopogon* sp. (H).- 2264.- CZECH REPUBLIC: Prencow, Schemnitzü, 1.X.1887, leg. A. Kmet, as *Rhizopogon niveus* (JE).

BASIDIOMYCOTINA

Bovista colorata (Peck) Kreisel

Specimens examined – 2215. GERMANY. Dresden, leg. Ficinus as *Rhizopogon albus* Fr. (FR).

Selected literature – KREISEL (1967).

Remarks – The sample is constituted of a half fruitbody, easy to identify by the verrucose exoperidium and the intermediate-type capillitium formed of hyphae without pores and septa. Spores are globose (3.5-4.5 μm) and smooth.

Gautieria graveolens Vitt.
(= *G. otthii* Trog.)

Specimens examined – 2302. CZECH REPUBLIC. Bohemia orient., castrum Kacina prope oppidum Kutná Hora, leg. Peyl (PRC, slide BCC-MPM 2078).- 2307. CZECH REPUBLIC. Brünn in Mähren, Hadyberg, auf Waldboden,

VII.1925, leg. J. Hruby, as *Rhizopogon virescens* Karst. (F. Petrak, Flora Bohemiae et Moraviae exsiccata, 2195) (HBG, slide BCC-MPM 2128).- 2308. *Idem* (C); 2309.- *Idem* (S, slide BCC-MPM 2141).- 2310. *Idem* (BP); 2311.- *Idem* (M)

Selected literature – VITTADINI (1831), PILÁT (1958).

Remarks – This species is very close to *Gautieria morchelliformis* Vitt. To distinguish herbarium material the most reliable character is spore shape. In *G. graveolens* spores are ovoid to broadly ellipsoid (13-17 x 10-13 μm), whereas in *G. morchelliformis*, in agreement with JÜLICH (1984), they are broadly ellipsoid, fusiform to citriform (15-25-(30) x 8-18 μm).

Gautieria pallida (Harkn.) Harkn.

Specimens examined – 2098. GERMANY. In montibus prope Königsbrück et Pulsnitz, Saxoniae, aestate et autumno 1879/80, leg. R. Staritz, as *Rhizopogon luteolus* Tul. (Rabenhorst-Winter, Fungi europaei 2640) (JE).- 2303. GERMANY. In monte Oelberg pr. Oestrich (Nassau), in pinetis, raro, autumno, ex Herb. Fuckel 1894, ex Herb. Barbey-Boissier 2152, as *Rhizopogon luteolus* Fr. (Fungi rhenani 1250) (G).- 2305. *Idem* (S, slide BCC-MPM 2131).- 2306. *Idem* (W).- 2304. Without loc. and data, leg. O. Mattirolo, as *Rhizopogon rubescens* Tul. (W, slide BCC-MPM 2191).

Selected literature – PILÁT (1958).

Remarks – In general, the mature fruitbodies of *Gautieria* Vitt. lose the peridium (MARTÍN, DEMOULIN & LLISTOSELLA, 1996); however, in *G. pallida*, even in old dried specimens, the peridium is evident. Spores are very similar to those of *G. graveolens* (ellipsoid with longitudinal costae), but smaller (12-14 x 8-9 μm).

Hymenogaster remyi Zeller & Dodge.

Specimens examined – 2227. ROMANIA. Brassó ad Nagy Függökö, in declivibus patrosis, regio montana, associatio Pinetum silvestris, 900 m, 28.V.1961, as *Rhizopogon rubescens* Tul. (K. László: Plantae Transsilvaniae Exsiccatae), Revised by L. Szemere in 1964 as *R. aestivus* Fr. (BP 22275).

Selected literature – SVRČEK (1958a).

Remarks – In this specimen, the spores are broadly ellipsoid (10-12 x 6.5-8 μm) with verrucose ornamentation (Fig. 2a).

Hymenogaster vulgaris Tul.

Specimens examined – 2225. AUSTRIA. In monte Oelberg pr. Oestrich (Nassau), in pinetis, raro, autumno, ex Herb. Fuckel 1894, ex Herb. Barbey-Boissier, as *Rhizopogon luteolus* Fr. (Fungi rhenani 1250) (UPS).- 2228. URUGUAY. Canelones, Floresta, assoc. *Pinus* and *Eucalyptus*, 1947, as *Rhizopogon* sp. non *roseolus* (Cda) Hollós (Plantae Uruguayenses Exsiccatae 61556) (G).

Selected literature – HAWKER (1954); SVRČEK (1958a); PEGLER (1993).

Remarks – Spores of *Hymenogaster vulgaris* Tul. are fusoid (22-37 x 11-14 µm), not mucronate, with a persistent and longitudinally wrinkled perisporium. The material examined fits well with the description of PEGLER (1993), but spores are smaller (15-20 x 7.5-10 µm). In general, species of *Hymenogaster* Vitt. show a wide range of spore sizes, probably due to changes in spore dimensions as the fruitbody matures.

Hysterangium coriaceum R. Hesse.

Specimens examined – 2229. CZECH REPUBLICH. Moravia merid., Bítov, in picetis, 26.VII.1903 (PRC, slide BCC-MPM 2077).- 2230. FINLAND. Mustiala, 14.VIII.1866, leg. A. Karsten, as *Rhizopogon virens* (UPS, slide BCC-MPM 2055).- 2232. CZECH REPUBLIC. Pr. Görgö, in terra sicca arenosa, VIII.1917, leg. Greselsh, as *Rhizopogon aestivus* Fr. (Mycotheca carpathica 19) (BP 22310).- 2233. UCRANIA. Böhmen, in Häldon bei Luck, VII.1916, leg. O.v. Müller, as *Rhizopogon luteolus* Fr. (W).- 2234. FINLAND. Tavastia australis, Tammela, Mustalis, abietis in terran, 14.VIII.1866, leg. P.A. Karsten 3692, as *Hymenangium virens* (H).

Selected literature – SVRČEK (1958b).

Remarks – Spores are ellipsoid-fusoid (11-14.5 x 4-5 µm), yellowish, with rounded apices, smooth or with a wrinkled episporium. The peridium is pseudoparenchymatous (with hyaline cells) and an external thin layer (20-25 µm) of yellowish hyphae. This species is very close to *H. stoloniferum* Tul. var. *rubescens* (Quél.) Zeller & Dodge, but in this taxon, spores are bigger (19-22 x 6-8 µm) and with acute apices.

Hysterangium membranaceum Vitt.

Specimens examined – 2231. NORWAY: Adgdenes, Verrafjorden, i brønn ved Gina Christiansens hytte, inns. ved Distriktslegen i Agdenes 1980 [found in a well at a summer residence; communicated by the local health officer], as *Rhizopogon vulgaris* (Vitt.) M. Lange (TRH, slides BCC-MPM 2099 and 2100).

Selected literature – SVRČEK (1958b).

Remarks – Spores of this species are the shortest (8-9.5 x 2.5-3.5 µm) of the European species of *Hysterangium* Vitt. that have a prosenchymatous peridium.

Melanogaster variegatus (Vitt.) Tul. s.l.

Specimens examined – 2235. GERMANY. (There are no data on the envelop. However, the sample is accompanied by a letter signed by Dr. B.H. Peter and dated 20.VII.1926, in Schondorf. Dr. Dagmar Triebel (Curator of München Herbarium, Germany) extracted the following information from this letter: Schondorf a Ammersee, under *Abies abies* in Dr. Peter's home, VII.1926 (M).- 2236. GERMANY. Umgebung von Augsburg Wittelsbacher Park, 15.VII.1963, leg. J. Stangl, as *Rhizopogon rubescens* (M).- 2237. GERMANY. Hähuen, VIII.1882,

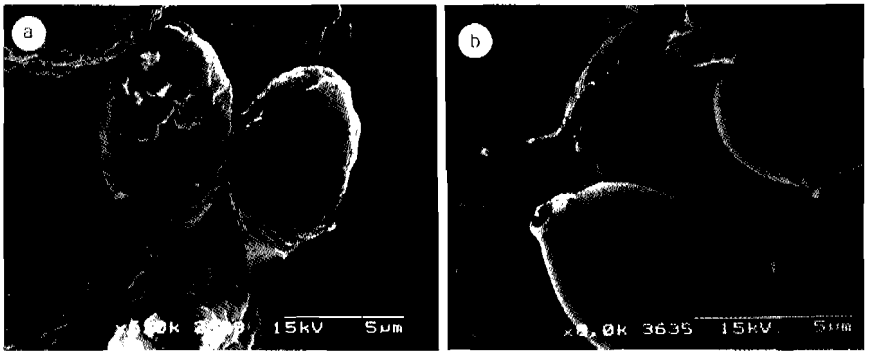

Figure 2. SEM. Spores (a-b). **a**: *Hymenogaster remyii* Zeller & Dodge, Reg. 2227 (BP 2275); **b**: *Melanogaster variegatus* (Vitt.) Tul., Reg. 2245 (BP 33090).

leg. Niessl, as *R. rubescens* Tul. (M).- 2238. GERMANY. Köln-Klettenberg, unter Laubholgebüsch im Bethoven-Park, 15.VIII.1942, leg. H. Hupke, as *Rhizopogon rubescens* Tul (HBG).- 2239. HUNGARY. Mts. Budai: Hüvösvölgy in querceto, 4.VIII.1969 and 11.VIII.1969, leg. L. Nangy, as *Rhizopogon suavis* Quél. (BP 48353).- 2240. HUNGARY. Mts. Bakony, Hárskút, 17.VI.1967, leg. L. Szemere, as *Rhizopogon suavis* Quél. (BP 48355).- 2241. HUNGARY. Mts. Zempléni, Nagybózsva, Szárhegy, *Querceto-Carpinetum*, acidophilum, 28.VII.1965, leg. Babosné, as *Rhizopogon suavis* Quél. (BP 42378).- 2242. HUNGARY. Mts. Budai, Szarvas-hegy, *Fageto-Ornetum hungaricum*, 31.VIII.1955, leg. Babosné et Bohus, as *Rhizopogon suavis* Quél. (BP 32023).- 2243. *Ibidem*, 13.IX.1955, leg. G. Bohus & Babosné, as *Rhizopogon suavis* Quél. (BP 32022).- 2244. HUNGARY. Mts. Zempléni: Szárhegy pr. Nagybózsva *Querco-Carpinetum*, acidophilum, 27.7.1965, leg. Basboné & G. Bohus, as *Rhizopogon suavis* Quél. (BP 42379).- 2245. HUNGARY. Mts. Pilis, Pilisszentkereszt, sub. *Quercus*, 31.V.1959, leg. E. Nánay, as *Rhizopogon aestivus* Fr. (BP 33090).

Selected literature – PEGLER (1993), as *Melanogaster broomeianus* Berk.

Remarks – Spores are subglobose to ovate (6.8-8.6 x 3.3-5.8 µm), dark brown, thick walled and with a broadly truncated base (Fig. 2b). In agreement with MARTÍN & LLIMONA (1994) *Melanogaster broomeianus* Berk. ex Tul. is synonymous with *M. variegatus* (Vitt.) Tul.

Octavianina asterosperma (Vitt.) O. Kuntze

Specimens examined – 2246. GERMANY. Mittelfranken, kr. Hersbruck: Hubonesberg, 27.IX.1946, leg. K. Stares 2807, as *Rhizopogon luteolus* Fr. (S, slide BCC-MPM 2130).

Selected literature – PEGLER (1993).

Remark – As discussed in MARTÍN, SIERRA & TABARÉS (1993), depending on the degree of development of the gleba, spores can vary from smooth, when young, to coarsely ornamented when mature.

Polyporus frondosus (Vall.) Fr.

Specimens examined – 2247. NORWAY. Hordaland, Kvam, Omastrand, Blandingsskog, 4.IX.1987, leg. W. Holm, as *Rhizopogon luteolus* (BG).

Selected Literature – CETTO (1987).

Remarks – The identification of this species was kindly confirmed by Dr. Isabel Salcedo (Bilbao, Spain).

Sclerogaster compactus (Tul. & C. Tul.) Sacc.
(= *S. hysterangioides* (Tul. & Tul.) Zeller & Dodge)

Specimens examined – 2258. GREAT BRITAIN. England, Somerset, Cleeve Cliff, 20.X.1953, leg. R. Godfrey, ex Herb. Hawker 940, as *Rhizopogon roseolus* (Corda) Th.M. Fr. (K).

Selected literature – DODGE & ZELLER (1936); PEGLER (1993).

Remarks – Fruitbody of 2.5 mm diameter, with a white peridium and olive-green gleba. Spores are globose (4-4.5-5 μm) and minutely warted.

Scleroderma bovista Fr.

Specimens examined – 2248. CZECH REPUBLIC. Moravia merid., Hodonín, ad marg. arenosum viae silv., 12.VII.1953, ex Herb. Moravec, as *Rhizopogon luteolus* (PRC).- 2256. FRANCE. Paris, venant de la Belgique et mêlée à celle du Périgord, ex Herb. Desmazières, as *Rhizopogon album* (H).

Selected literature – CALONGE (1983); MARTÍN (1988).

Remarks – The fruitbody without pseudostipe and the reticulate spores are the main characters that distinguish this species from other *Scleroderma* species.

Scleroderma cepa Pers.

Specimens examined – 2249. CZECH REPUBLIC. Radotín pr. Pragam, in silva frondosa ad terram, IX.1952, ex Herb. Moravec (PRC).- 2257. FINLAND. Fredrikshamn (= Hamina), park mittemot RUK, 13.IX.1975, leg. M. Fagerström (H).

Selected literature – CALONGE (1983); MARTÍN (1988).

Remarks – As the above mentioned two species, the fruitbody has no pseudostipe, but the spores are echinulate.

Scleroderma citrinum Pers.

Specimens examined – 2254. CZECH REPUBLIC. Bohemia, Karlovy Vary (= Karlsbad), 1855, [two names: *Rhizopogon albus* and *Tuber cibarium* Sibth] (PRM 742558).

Selected literature – CALONGE (1983); MARTÍN (1988).

Remarks – This colorful species of *Scleroderma* Pers. remain very nicely preserved. Even in herbarium material the yellow colour is well conserved. The gross scales present in the peridium, and the reticulated spores, are the characters that help to separate this species from *S. verrucosum*, with which it is frequently confused.

Scleroderma meridionale Demoulin & Malençon

Specimens examined – 2252. FINLAND. Varsinais-Suomi, Turku commune, Uittamo, slope near seashore, Grid 27°E: 6710:238, 18.VIII.1977, leg. S. Seppä (TUR 65157).

Selected literature – DEMOULIN & MALENÇON (1970); MARTÍN (1988).

Remarks – The general aspect of the fruitbody, the yellow smooth peridium and the presence of a well developed peridium fit well with the original description of this species (DEMOULIN & MALENÇON, 1970). However, the spores have not yet developed reticulate ornamentation.

Scleroderma verrucosum (Bull.) Pers.

Specimens examined – 2251. NETHERLAND. Eindhoven, stratumse heide, 10.IX.1948, leg. J. Daams, as *Rhizopogon luteolus* (L).- 2255.- FINLAND. Etelä-Häme, Lahti, Mukkula, leirintäalueen tien reuna (sekametsän laitaa) (by side of road to the camping site, margin of mixed forest), Grid 27°E 676:42, 9.VIII.1983, leg. E. Ohenoja, as *Rhizopogon* (OULU).

Selected literature – CALONGE (1983); MARTÍN (1988).

Remarks – Spores are echinulate as in *S. cepa*, but the presence of a well developed pseudostipe in *S. verrucosum* separates these taxa.

Scleroderma sp.

Specimens examined – 2253. GERMANY. Bayern, Passau, Engelburgs. IX.1955, leg. S. Killermann, as *Rhizopogon vittadini* od. *Leucogaster* (M).

Remarks – Very young fruitbody, with immature spores (diameter 8-10 μm).

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