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Check-list of *Veronica* subg. *Pseudolysimachium* (Plantaginaceae) of Siberia

Конспект вероник подрода *Pseudolysimachium* (*Veronica*, Plantaginaceae) Сибири

P. A. Kosachev¹, D. Albach², A. L. Ebel³

П. А. Косачёв¹, Д. Альбах², А. Л. Эбель³

¹*Altai State University, Lenina str., 61, Barnaul, 656049, Russia. E-mail: pakosachev@yandex.ru*

¹*Алтайский государственный университет, пр-т Ленина, 6,; Барнаул, 656049, Россия*

²*Institute of Biology and Environmental Sciences, Carl von Ossietzky University of Oldenburg,*

Carl von Ossietzky-Str. 9–11, Oldenburg, 26111, Germany

²*Институт биологии и наук о Земле, Университет им. Карла фон Осицкого, ул. Карла фон Осицкого,*

9–11, Ольденбург, 26111, Германия. E-mail: dirk.albach@uni-oldenburg.de.

³*Tomsk State University, Lenina str., 36, Tomsk, 634050, Russia. E-mail: alex-08@mail2000.ru*

³*Томский государственный университет, пр. Ленина, 36, Томск, 634050, Россия*

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Summary. Here, we present a critical check-list of *Veronica* subgenus *Pseudolysimachium* (W. D. J. Koch) Buchenau (Plantaginaceae Juss.) in Siberia, represented by 4 sections, 19 species and 4 subspecies. Two subsections of the subgenus (*Pinnatae* и *Dauricae*) are elevated to the taxonomic rank of a section. The Latin diagnosis for *V. linariifolia* var. *baicalensis* Boriss. is given, which has been previously described only in Russian.

Аннотация. В статье представлен критический конспект вероник подрода *Pseudolysimachium* (W. D. J. Koch) Buchenau (Plantaginaceae Juss.) Сибири, состоящий из 4 секций, 19 видов и 4 подвидов. Для двух подсекций (*Pinnatae* и *Dauricae*) предложен секционный таксономический ранг. Обнаружено название разновидности (*V. linariifolia* var. *baicalensis* Boriss.), ранее описанной на русском языке.

Introduction

Veronica subgenus *Pseudolysimachium* (W. D. J. Koch) Buchenau (Scrophulariaceae Juss. s. l.; Plantaginaceae Juss., following APG II (2003) and III (2009)) is a distinct (with the exception of *V. schmidtiana* Regel) and easily recognizable group

in the genus distributed across Eurasia (Albach et al., 2004).

In the last decade renewed interest has been given to the study of the subgenus. This interest has been raised by the polymorphism and frequent hybridization and polyploidy in the group. This has led to considerable systematic complexity in the group and many taxonomic questions. Based on phylogenetic studies based on nuclear and plastid DNA regions, the relationship of the subgenus within the genus has been clarified (Albach, Chase, 2001; Albach, Fischer, 2003; Albach et al., 2004, 2005). However, relationships within the subgenus remain obscure.

In recent years, the renewed interest has led to studies of comparative morphology and ecogeography of the species in the Altai Mountains, which revealed unanticipated taxonomic diversity (Kosachev, 2003, 2010; Kosachev, German, 2004). Before these studies subgenus *Pseudolysimachium* was studied in Siberia only floristically in some regions. For the whole former USSR only a few

more specialized but still regional studies in the group have been published (Afanasjeva, Meschkova, 1961; Elenevsky, 1968, 1971, 1977, 1978; Klovov, 1976; Manukjan, 1984; Tzvelev, 1981) despite the fact that an important role for the evolution of the subgenus has been assigned to the development of the Eurasian steppe across the former USSR (Kamelin, 1998). For the Altai territory a systematic overview was given by Kosachev (2003), which we update here based on our more recent studies using field observations, morphology, flow cytometry and DNA-based phylogenetic analyses.

Key to the *Veronica* subgen.

Pseudolysimachium of Siberia

1. Leaves pinnate or pinnatepartite 2
+ Leaves entire, margin serrate, dentate, crenate or shallowly lobed 6
2. All leaves sessile, pinnately dissected into linear or filiform lobes. Calyx glabrous 3
+ Leaves with short or long petioles, all or only the lower leaf blades pinnately divided into oblong or lanceolate obtuse lobes. Calyx pubescent 4
3. Plant 15–50 cm tall. Leaves 1–3 cm long. Inflorescences long (up to 25 cm), sparse. Calyx cut into lanceolate, long pointed lobes. Corolla pale blue, white or pink
..... 13.1. *V. pinnata* L. subsp. *pinnata*
+ Plants 5–10 cm tall. Leaves 0.5–1 cm long. Inflorescences short (1–1.5 cm). Calyx divided into semi-ovate lobes. Corolla bright blue
..... 13.2. *V. pinnata* subsp. *nana* (Kryl.) Polozhij
4. All above-ground parts of the plant glandular pubescent 16. *V. × sessiliflora* Bunge
+ Plants, except for mixed simple and glandular ovary and capsule, pubescent with simple hairs only 5
5. Plants to 45 cm tall, green. Inflorescences solitary, rarely branched. Calyx pubescent with short glandular hairs 15. *V. × altaica* Kosachev
+ Plants to 50(55) cm tall. Inflorescence paniculate. Calyx pubescent with simple hairs
..... 12. *V. reverdattoi* Krasnob.
6. All parts of the plant white-tomentose with simple, abundant curly hairs 7
+ Green or gray-green plants, not tomentose, with simple or glandular hairs 9
7. Leaf margins finely serrate-dentate. Vegetative shoots at the base of the generative shoot absent
..... 8. *V. sergievskiana* Polozhij
+ Leaf margins shallowly crenate, upper leaves entire. Short vegetative shoots present at the base of the generative shoot 8
8. Calyx lobes lanceolate-linear, 3 mm, with a few glandular hairs on the margin. Corolla with rounded-ovate, obtuse lobes. Stamens not exposed or nearly exposed from the corolla
..... 11. *V. × czemalensis* Kosachev et Albach
+ Calyx lobes ovate-oblong or lanceolate, 3–4 mm long. Corolla with oblong-ovate to broadly ovate lobes. Stamens markedly exerted from corolla 7. *V. incana* L.
9. All parts of the plant pubescent with multicellular glandular hairs, making the plant in living state sticky 10. *V. porphyriana* Pavl.
+ Plants pubescent with simple and (or) short glandular hairs, if multicellular glandular hairs present, then middle and upper leaves deeply serrated (*V. sajanensis*) 10
10. Leaves deeply unequally or sharply, often twice serrate 11
+ Leaves crenate, finely serrate, shallowly serrate-dentate or entire 14
11. Leaves deeply serrate-dentate. Inflorescence axis, calyx, bracts and pedicels shaggy from dense pubescence of long simple and glandular hairs. Calyx almost to the base divided into very narrow, linear and acute lobes. Plants of subalpine and alpine meadows, less common in tundra
..... 3. *V. sajanensis* Printz
+ Other combination of characters 12
12. Leaves covered with simple or a mixture of simple and glandular hairs, ovate or oblong-ovate, margin deeply unequally serrate
..... 14. *V. daurica* L.
+ Leaves glabrous or with a few sparse hairs, broadly lanceolate or lanceolate; margin serrate-dentate, incised serrate-dentate, often double-dentate 13
13. Plants to 60 cm tall, strongly branched above. Stems procumbent to ascending. Leaves deeply incised-dentate. Bracts long, exceeding the pedicel, at the top of the inflorescence almost reaching the top of the calyx teeth .. 2. *V. taigischensis* Stepanov
+ Plants 50 to 120 cm tall, weakly branched above. Stems erect. Leaves serrate, often twice-dentate. Bracts equal to pedicel or slightly longer ..
..... 1. *V. longifolia* L.
14. Leaves whorled, 3–4 in a whorl. Bracts shorter than pedicels 5. *V. spuria* L.
+ Leaves opposite, sometimes alternate in the upper part of the stem. Bracts reach middle of calyx or beyond 15
15. Leaves serrate or unequally serrate. Corolla lobes ovate, ovate-lanceolate, oblong-rounded, obtuse or slightly pointed 18

- + Leaves crenate or slightly dentate. Corolla lobes lanceolate, long-acuminate 16
16. Plants gray-green, hairy in all parts of glandular hairs with a slight admixture of simple hairs 9.1. *V. spicata* subsp. *spicata*
- + Plants dark green, sometimes glossy. Stems in lower half glabrous, in the upper half covered with short glandular hairs, or the stems completely glabrous 17
17. Plants glabrous; bracts up to 1 cm long 9.2. *V. spicata* subsp. *kamelinii* Kosachev
- + Plants glabrous below the middle, densely pubescent with glandular hairs above; bracts up to 0.5 cm long 9.3. *V. spicata* subsp. *paczoskiana* (Klok.) Kosachev
18. All parts of the plant densely covered with long white cobwebby hairs 19
- + Plants covered with short simple and glandular hairs. Sometimes leaves glabrous (*V. linariifolia*) 20
19. Sepals almost triangular, 1.5–2 mm long. Capsule obovate, about 3 mm long and wide, with a wide triangular notch about 1.5 mm deep, glabrous 18. *V. × grisea* Kosachev et A. L. Ebel
- + Calyx lobes linear, 4 mm long. Capsule 2.5 × 2 mm, rounded-ovate, with no recesses, pubescent with long white hairs on the entire surface 4. *V. krasnoborovii* Kosachev et Schaulo
20. Leaves opposite, lower ovate to ovate-oblong, with rounded or wedge-shaped base; middle and upper leaves oblong-lanceolate, with wedge-shaped base. Capsule at the top pubescent with simple, jointed hairs. Streamsides of upper belt of Altai 17. *V. × schmakovii* Kosachev
- + Lower leaves opposite, upper ones can be alternate; oblong-lanceolate or narrowly lanceolate, cuneate at the base. Capsule pubescent at the top with glandular hairs or glabrous. Plants of steppe belt (bushes, slopes) 21
21. Stems hairy with 2–3-celled simple downwards curved hairs, in the inflorescence with short glandular hairs. Leaves on the margin with 2–3-celled glands. Capsule in the upper third covered with long simple and glandular hairs 19. *V. × kolyvanensis* Kosachev et Shmakov
- + Stems covered with short simple hairs curved upwards. Leaves glabrous, rarely pubescent with scattered hairs. Capsule glabrous 6. *V. linariifolia* Pall. ex Link

In the process of assembling this critical conspectus we investigated material from the following herbariums ALTB, IRK, LE, MHA, MW,

NS, NSK, TK, and the herbarium of Altai botanical garden (Ridder, Kazakhstan).

In the conspectus we provide the main bibliographical information (regional floras and determination keys) that summarize the floristic knowledge of the investigated territory. We state all synonyms relevant for the territory of Siberia, as well as information on types, taxonomy, ecology, distribution area within Siberia and chromosome number/ploidy level. Distribution in the region follows the floristic districts of the “Flora of Siberia” (Malyshev, 1988).

Conspectus of *Veronica* subgenus *Pseudolysimachium* Buchenau in the territory of Siberia

Subgen. *Pseudolysimachium* (W. D. J. Koch) Buchenau, 1894, Fl. Nordwestd. Tiefebene: 447; Ortega, Albach, Fischer, 2008, Taxon, 57, 1: 3. – *V. sect. Pseudolysimachium* W. D. J. Koch, 1837, Syn. Fl. Germ.: 527 (“*Pseudo-Lysimachium*”, see ICBN Art. 60.9); Borisova, 1955, Fl. USSR, 22: 367; Elenevsky, 1978, Sist. Geogr. Veronik SSSR Prilezh. Stran: 97; Polozhij, 1996, Fl. Sib. 12: 28; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 160. – Gen. *Pseudolysimachion* Opiz, 1852, Seznam: 80; Hong et Fischer, 1998, Fl. China, 18: 66.

Perennial plants with terminal inflorescences (sometimes also lateral ones). Leaves opposite or verticillate. Calyx quadripartite. Corolla tube length longer than width, hairy inside, with four vascular bundles. Capsules mostly shorter than 4 mm, flattened, almost elliptic or circular, apex obtuse or shortly notched. Style longer than capsule. Seeds numerous, small, flattened, reticulate. Base chromosome number $x = 17$. Palearctic: Europe, Northern Asia, North America, in Japan south to tropical regions.

Lectotype (Holub, Pouzar, 1967): *V. spicata* L. (*Pseudolysimachium spicatum* (L.) Opiz).

1. *Veronica* sect. *Longifoliae* (Holub) Kosachev et Albach, **comb. nova.** – *Pseudolysimachion* sect. *Longifoliae* (Holub) Trávníček, 1998, Preslia, 70, 3: 195. – *Pseudolysimachion* ser. *Longifoliae* Holub, 1967, in Holub et Pouzar, Folia Geobot. Phytotax. 2, 4: 423. – *Veronica* subsect. *Longifoliae* (Holub) A. Jelen. 1977, Bull. Soc. Nat. Moscou, 82, 1: 151; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 160, p. p. – *V. sect. Pseudolysimachia* ser. *Longifoliae* Boriss. 1955, Fl. USSR, 22: 372 (descr. ross.). – *Pseudolysimachion* ser. *Spuriae* Holub, 1967, in Holub et Pou-

zar, Folia Geobot. Phytotax. 2, 4: 423. – *Veronica* sect. *Pseudolysimachium* subsect. *Spuriae* (Holub) A. Jelen. 1977, Bull. Soc. Nat. Moscou, 82, 1: 152; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 162. – *V.* sect. *Pseudolysimachium* ser. *Spuriae* Boriss. 1955, Fl. USSR, 22: 375, descr. ross.

Type: *V. longifolia* L.

1. *V. longifolia* L. s. str. 1753, Sp. Pl. 1: 10; Bunge, 1829, in Ledeb., Fl. Alt. 1: 26; Ledeb. 1847–1849, Fl. Ross. 3: 232; Krylov, 1939, Fl. West. Sib. 10: 2438; Borisova, 1955, Fl. USSR, 22: 367; Gamajunova et Dmitrieva, 1965, Fl. Kazachst. 8: 67; Elenevsky, 1978, Sist. Geogr. Veronik SSSR Prilezh. Stran: 98; Polozhij, 1979, Fl. Krasnojarsk. kr. 9, 2: 12; Polozhij, 1996, Fl. Sib. 12: 32; Anenonov et al., 2001, Key Pl. Burjat.: 491; Wibe, 2001, Key Pl. Kemerovsk. oblasti: 274; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 161; Kosachev, 2003, Key Pl. Altaiskii krai: 356; Xiaoling, Nurbay, 2004, Fl. Xinjian. 4: 394; Krasnoborov, 2007, Key Pl. Republic Tuva: 411; Czepinoga et al., 2008, Konspekt fl. Irkutsk. oblasti: 214; Doronkin, 2012, Konspekt fl. Aziatskoi Rossii: 395. – *V. luxurians* Ledeb. 1829, Fl. Alt. 1: 27, in adnot. – *Pseudolysimachion longifolium* (L.) Opiz, 1852, Seznam: 80; Hong et Fisch. 1998, Fl. China, 18: 68. – *Veronica pseudolongifolia* Printz, 1921, Veg. Siber.-Mongol. Front.: 380; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 161. – *Veronica longifolia* subsp. *pseudolongifolia* (Printz) Albach, 2008, Taxon, 53, 2: 4. – *Pseudolysimachion longifolium* subsp. *pseudolongifolium* (Printz) Holub, 1998, Preslia, 70: 109. – *V. longifolia* subsp. *borealis* (Trautv.) Kuvajev, 1981, Botan. Zeitschr. 66, 7: 953. – *V. longifolia* subsp. *borealis* (Trautv.) Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 161, comb. superfl. – *V. longifolia* subsp. *septentrionalis* (Boriss.) Albach, 2008, Taxon, 53, 2: 4. – *V. septentrionalis* Boriss. 1955, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR, 17: 341. – *Pseudolysimachion septentrionale* (Boriss.) Á. et D. Löve, 1976, Bot. Not. 128: 518. – *P. longifolium* subsp. *septentrionale* (Boriss.) Holub, 1967, in Holub et Pouzar, Folia Geobot. Phytotax. 2: 425.

Described from Europe (Habitat in Tataria, Austria, Suecia).

Lectotype (E. Fischer, 1997, Feddes Repert. 108: 114): Herb. Linn. No. 26.6 (LINN).

Moist forests or meadows but not dense birch or pine forests, creek margins.

Distribution in Siberia: **West. Sib.:** TJU – Jam (northern distribution margin – Obskaja Lippe, Nachodka bay), Tb, KU, OM, TO, NO, KE, AL – Ba,

Go; **Central Sib.:** KR – Ta (northernmost occurrence near Chatanga river), Pu, Tn, Cha, We, TU; **East. Sib.:** IR – An, Pr, BU – Se, Juzh, Czi – Ka, Schi, JaK – Ol, Wi, Al, Jan, Ko.

General distribution: Scandinavia, Central to Western Europe, Northern Mediterranean, Caucasus, Russia (European part, Western and Eastern Siberia, Far East), Central Asia, Near East, Dschungarija-Kaschgarija, China, Japan, North America.

Chromosome number: $2n = 34$ (Fischer, 1969; Raitanen, 1967;), 64 (Polozhij, 1996), 68 (Meschkova, 1965; Probatova, Sokolovskaja, 1989; Raitanen, 1967), 90 (Polozhij, 1996).

Note 1. In the Altai and Sayan Mountains *V. longifolia* var. *macrantha* Boriss. is found with long-ovate leaves and glandular calyx.

Note 2. The typical subspecies is certainly central for the evolution of the endemic *V. sieboldiana* Miq., *V. subsessilis* (Miq.) Carriere, *V. ovata* Nakai, that grow in Japan, Korea and the island of Tschetshzudo.

Note 3. The main differences between *V. maritima* L. and *V. longifolia* L. are the calyx indumentum (simple long hairs in the former, short glandular hairs in the latter), the length of the bracts (longer or equal than pedicels in the former, or equal to shorter in the latter) and leaf base (cuneate to cordate in the former, rounded in the latter). Furthermore, leaves are often in whorls of 3–4 leaves in the European *V. maritima* and opposite in the Asian *V. longifolia* (Trávniček, 2000). The distinction is, however, questionable given the breadth of variation in the European part and the prevalence of hybridization.

Note 4. In LE one can find a possible hybrid *V. longifolia* L. × *V. daurica* Stev. based on the determination of A. G. Elenevsky (Zabaikalsk. Area between the rivers Nercza and Kuenga, in the surroundings of the village Staraja Olova, meadows near the mouth of river Tungusky Olova. 09 VIII 1911. V. Sukatshev und G. Poplavskaja). This specimen requires further study.

2. *V. taigischensis* Stepanov, 1997, Botan. Zeitschr. 82, 9: 93; Doronkin, 2012, Konspekt fl. Aziatskoi Rossii: 396. – *V. pseudolongifolia* subsp. *pseudolongifolia* var. *taigischensis* (Stepanov) Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 161. – *V. longifolia* subsp. *longifolia* var. *taigischensis* (Stepanov) Assejeva, 2003, Botan. Zeitschr. 88, 1: 110. – *Pseudolysimachion taigischense* (Stepanov) Holub, 1998, Preslia, 70, 2: 109.

Described from West Sayan.

Type: Krasnojarskii krai, Karatuzkii district, River Tajgisch close to the mouth of river Kedran,

on the steep bank of the river with moss, in Taiga (*Pinus sibirica* + *Abies sibirica*). 15 VI 1992. N. V. Stepanov (NS, iso – ALTB!, KGU, KRAS, LE!, MW).

In Taiga-forest.

Distribution in Siberia: **Central Sib.:** KR – We (known only from type locality).

General distribution: endemic.

Note: The species was found along the lower hills of the West Sayan near the village Tansybej (Stepanov, 1997).

3. *V. sajanensis* Printz, 1921, Contr. Fl. As. 3: 385; Borisova, 1955, Fl. USSR, 22: 375; Elenevsky, 1978, Sist. Geogr. Veronik SSSR Prilezh. Stran: 105; Polozhij, 1996, Fl. Sib. 12: 36; Anenonov et al., 2001, Key Pl. Burjat.: 491; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 161; Krasnoborov, 2007, Key Pl. Republic Tuva: 411; Czepinoga et al., 2008, Konspekt fl. Irkutsk. oblasti: 214; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 395.

Described from the Sayan Mountains (...Subalpine tracts in the Altaian).

Subalpine and alpine meadows, tundra in high-alpine regions.

Distribution in Siberia: **Central Sib.:** KR – We, TU; **East. Sib.:** IR – An.

General distribution: endemic. *Veronica sajanensis* has once been recorded from Mongolia (Neuffer et al., 2003) but relevant record was based on the misidentified specimen of *V. schmakovii* (German et al., 2003).

Chromosome number: $2n = 18$ (Polozhij, 1996) likely misdetermined (Albach et al., 2004).

Note: The species takes on an intermediate position between section *Longifoliae* and *Spicatae* (Elenevsky, 1978), although an influence of section *Pinnatae* is possible based on DNA-sequence analysis (Kosachev, Mayland-Quellhorst, Albach, unpublished).

4. *V. krasnoborovii* Kosachev et Schauilo, 2013, Turczaninowia, 16, 3: 9.

Described from Sayan Mountains.

Type: Tuva ASSR, Ulug-Khem distr., Uyuk range, valley of Orto-Khem, right tributary of Bayan-Kol, alt. 1100 m. Gravelly streamside. 02 VIII 1976. M. Lomonosova, A. Choodu (NS!, iso – NS!).

Gravel banks of river.

Distribution in Siberia: **Central Sib.:** TU.

General distribution: endemic.

5. *V. spuria* L. 1753, Sp. Pl.: 10; Ledeb. 1847–1849, Fl. Ross. 3: 231, p. p.; Krylov, 1939, Fl. West. Sib. 10: 2440; Borisova, 1955, Fl. USSR, 22: 376;

Gamajunova et Dmitrieva, 1965, Fl. Kazachst. 8: 67; Elenevsky, 1978, Sist. Geogr. Veronik SSSR Prilezh. Stran: 105; Polozhij, 1996, Fl. Sib. 12: 38; Wibe, 2001, Key Pl. Kemerovsk. oblasti: 274; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 162; Kosachev, 2003, Key Pl. Altaiskii krai: 356; Xiaoling, Nurbay, 2004, Fl. Xinjian. 4: 394; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 396. – *V. paniculata* L. 1759, Syst. Nat., ed. 10, 2: 849. – *V. paniculata* Pall. 1771, Reise, 1: 196; Bunge, 1829, in Ledeb. Fl. Alt. 1: 29. – *Pseudolysimachion spurium* (L.) Opiz, 1852, Seznam: 80. – *Pseudolysimachion spurium* (L.) Rauschert, 1966, Wiss. Z. Univ. Halle, cl. math.-natur. 15: 775; Trávníček, 2000, Preslia, 72: 431.

Described from Europe and Siberia (in australiore, Siberia).

Lectotype (E. Fischer, 1997, Feddes Repert. 108: 114): Herb. Linn. No. 26.56 (LINN).

Steppes, dry meadows, pine forests, birch forest margins.

Distribution in Siberia: **West. Sib.:** TJU – Tb, KU, OM, NO, AL – Ba. Northern margin of distribution in Siberia is 56° N (Polozhij, 1996).

General distribution: Central Europe, Mediterranean, Caucasus, Russia (European part), Central Asia, Dschungarija-Kaschgarija.

Chromosome number: $2n = 34$ (Meschkova, 1965; Simonet, 1934).

6. *V. linariifolia* Pall. ex Link, 1820, in Sprengel, Schrader et Link, Jahrb. Gewächsk. 1, 3: 35; Borisova, 1955, Fl. USSR, 22: 386; Elenevsky, 1978, Sist. Geogr. Veronik SSSR Prilezh. Stran: 107; Polozhij, 1996, Fl. Sib. 12: 29; Anenonov et al., 2001, Key Pl. Burjat.: 491; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 163; Czepinoga et al., 2008, Konspekt fl. Irkutsk. oblasti: 214; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 395. – *V. cartilaginea* Ledeb. 1829, Fl. Alt. 1: 28. – *V. linariifolia* subsp. *cartilaginea* (Ledeb.) Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 163. – *V. rubicunda* Ledeb. 1829, Fl. Alt. 1: 28. – *V. spuria* β Ledeb. 1847–1849, Fl. Ross. 3: 231. – *Pseudolysimachion linariifolium* (Pall. ex Link) Yamazaki, 1968, Journ. Jap. Bot. 43, 10–11: 410.

Described from Transbaikalia.

Type: Herb. Willdenow Cat. No. 00167 (B).

Steppe, meadows, scree.

Distribution in Siberia: **East. Sib.:** IR – An, BU – Se, Juzh., Czi – Schi.

General distribution: Russia (Far East), Mongolia, China, Japan.

Chromosome number: $2n = 34$ (Albach et al., 2008; Marhold, 2008).

Note: At Baikal Lake (Kultuk) and in the north of Mongolia one can find specimens with broad-lanceolate leaves, dense indumentum of stem and petiole and with large pinkish flowers. This variation has been described in Russian only: *V. linariifolia* var. *baicalensis* Boriss. (1955, Fl. USSR, 22: 389). Therefore, we here provide the Latin diagnosis and designate the type: Folia late lanceolata. Caulis et petioli foliis dense pubescentia. Corolla magna subroseus.

Type: At the river Irkut, Tunkinski district, Torski basin, near Krasny Jar Mountains, in willow shrub. 03 VII 1931. No. 27. V. I. Smirnov (IRK!, iso – IRK!).

Based on morphological characteristics, this species has similarities with *V. spuria*. Therefore, reports of *V. spuria* for the Flora of Mongolia may be wrong (see Kosachev, 2010; Smirnov et al., 2003).

2. Sect. *Pseudolysimachium* W. D. J. Koch, 1837, Syn. Fl. Germ.: 527. – Elenevsky, 1977, Bull. Soc. Nat. Moscou, 82, 1: 152; Elenevsky, 1978, Sist. Geogr. Veronik SSSR Prilezh. Stran: 110 (sub “Subsect. *Pseudo-Lysimachium*”). – *Pseudolysimachion* ser. *Spicatae* Holub, 1967, in Holub et Pouzar, Folia Geobot. Phytotax. 2, 4: 423. – *Veronica* sect. *Pseudolysimachia* ser. *Spicatae* Boriss. 1955, Fl. USSR, 22: 380, descr. ross. – *V.* sect. *Pseudolysimachia* ser. *Incanae* Boriss., 1955, Fl. USSR, 22: 377, p. p., descr. ross. – *V.* sect. *Pseudolysimachium* ser. *Spicatae* Boriss. ex Yamazaki, 1957, Journ. Fac. Sci. Univ. Tokyo (Bot.), 7, 1–3: 139, p. p. – *V.* sect. *Pseudolysimachium* subsect. *Spicatae* (Boriss. ex Yamazaki) Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 162. – *Pseudolysimachion* sect. *Pseudolysimachion*: Trávniček, 1998, Preslia, 70, 3: 195.

Inflorescence thick, spike-like. Plants low with short rhizomes.

Type: lectotype of the subgenus.

7. *V. incana* L. 1753, Sp. Pl. 1: 10; Bunge, 1829, in Ledeb. Fl. Alt. 1: 32; Ledeb. 1847–1849, Fl. Ross. 3: 235; Krylov, 1939, Fl. West. Sib. 10: 2444; Borisova, 1955, Fl. USSR, 22: 377; Gamajunova et Dmitrieva, 1965, Fl. Kazachst. 8: 68; Elenevsky, 1978, Sist. Geogr. Veronik SSSR Prilezh. Stran: 110; Polozhij, 1979, Fl. Krasnojarsk. kr. 9, 2: 13; Polozhij, 1996, Fl. Sib. 12: 29; Anenonov et al., 2001, Key Pl. Burjat.: 491; Wibe, 2001, Key Pl. Kemerovsk. oblasti: 274; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 163; Kosachev, 2003, Key Pl. Altaiskii kraj: 356; Krasnoborov, 2007, Key Pl. Republic Tuva: 410; Czepinoga et al., 2008, Konspekt

fl. Irkutsk. oblasti: 214; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 395. – *V. bellidifolia* Juz. 1950, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR, 13: 297; Borisova, 1955, Fl. USSR, 22: 379. – *Pseudolysimachion incanum* (L.) Holub, 1967, Folia Geobot. Phytotax. 2, 4: 424; Hong et Fischer, 1998, Fl. China, 18: 67.

Described from Ukraine.

Lectotype (Trávniček, 1998, Preslia, 70: 196): Herb. Linn. No. 26.7, second specimen from the left (LINN).

Steppe and rocky slopes, steppes, dry pine or lark forest.

Distribution in Siberia: **West. Sib.:** OM, NO, TO, KE, AL – Ba, Go; **Central Sib.:** KR – Tn (at the lower Tunguska river, Ilimpija, mouth of the lower Tschunka river), Cha, We, TU; **East. Sib.:** IR – An, BU – Se, JUZH, CZI – Schi, JAK – Ol, Wi, Al, Jan, Ko.

General distribution: Central Europe, Russia (European part, Western and Eastern Siberia), Far East, Central Asia, Mongolia, China.

Chromosome number: $2n = 32$ (Yakutia, Selerskan village – Polozhij, 1996), $2n = 2x = 34$ (Yakutia, Tscherski village – Polozhij, 1996), $2n = 4x$ (based on flow cytometry: Kosachev, Mayland-Quellhorst, Albach, unpublished).

Note: The species is tetraploid in Western Europe (Albach et al., 2008). In the Asiatic part of Russia and even in the south of Siberia diploid and tetraploid plants can be found, but only diploids in Yakutia. Further studies of karyology and DNA are necessary. Counts of 32 chromosomes are likely misdeterminations (chromosomes in the subgenus are small and sticky, which makes exact determination difficult – Albach et al., 2008).

8. *V. sergievskiana* Polozhij, 1996, Fl. Sib. 12: 37; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 163; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 395.

Described from East Siberia.

Type: Tschitaer area, on the banks of the Nertscha river, below the village Zjulzja, 52°33' N, 116°12' E. In the steppe. 04 VII 1952. L. P. Sergijevskaja, L. I. Obolenzev (TK).

Steppe.

Distribution in Siberia: **East. Sib.:** Czi – Schi (type locality – Zjulzja village; Schischkino village).

General distribution: endemic.

Chromosome number: $2n = ?$

Note: The species is little known and requires further study.

9.1. *V. spicata* L. s. str. 1753, Sp. Pl.: 10; Bunge, 1829, in Ledeb. Fl. Alt. 1: 30, p. p.; Ledeb. 1847–

1849, Fl. Ross. 3: 233, p. p.; Krylov, 1939, Fl. West. Sib. 10: 2442; Borisova, 1955, Fl. USSR, 22: 381, p. p.; Gamajunova et Dmitrieva, 1965, Fl. Kazachst. 8: 68; Elenevsky, 1978, Sist. Geogr. Veronik SSSR Prilezh. Stran: 112; Polozhij, 1996, Fl. Sib. 12: 38; Wibe, 2001, Key Pl. Kemerovsk. oblasti: 276; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 163; Kosachev, 2003, Key Pl. Altaiskii krai: 357; Czepinoga et al., 2008, Konspekt fl. Irkutsk. oblasti: 214; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 395. – *V. psilophylla* Nevski ex Kryl. 1939, Fl. West. Sib. 10: 2442. – *Pseudolysimachion spicatum* (L.) Opiz, 1852, Seznam: 80; Hong et Fischer, 1998, Fl. China, 18: 68.

Described from Europe.

Lectotype (E. Fischer, 1997, Feddes Repert. 108: 114): Herb. Linn. No. 26.10 (LINN).

Steppe, dry meadows, rocky slopes.

Distribution in Siberia: **West. Sib.:** TJU – Tb, KU, OM, TO, NO, KE, AL – Ba; **Central Sib.:** KR – Cha; **East. Sib.:** IR – An.

General distribution: Scandinavia, Central and Western Europe, Mediterranean, Caucasus, Russia (European part, West and East Siberia), Central Asia (North), North America (introduced).

Chromosome number: $2n = 34$ (Fischer, 1969; Polozhij, 1996), 68 (see Albach et al., 2008).

9.2. *V. spicata* subsp. *kamelinii* Kosachev, 2003, Turczaninowia, 6, 1: 19; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 395.

Described from the Altai.

Type: Altai krai, Kurjinskii district, Kolyvanskii ridge, northwestern slope of Mount Sinjucha near Kolyvanstroja, 51°15.5' N, 82°34' E. AA No. 272. 18 VI 1999. Kamelin R. V., Schmakov A. I., Tschubarov I., Kostjukov S., Antonjuk E., Kosachev P. (ALTB).

Mixed forest.

Distribution in Siberia: **West. Sib.:** AL – Ba (type locality).

General distribution: endemic.

Chromosome number: $2n = 2x$ (= ca. 34) (our data based on flow cytometry, Kosachev, Albach, Mayland-Quellhorst, unpublished).

Note: Nuclear DNA (ITS) from this subspecies contains ribotypes characteristic of *V. spicata* from Bashkiria and *V. orchidea* Crantz (Kosachev, Mayland-Quellhorst, Albach, unpublished).

9.3. *V. spicata* subsp. *paczoskiana* (Klok.) Kosachev, 2003, Turczaninowia, 6, 1: 22. – *V. paczoskiana* Klok. 1976, Novosti sistematiki vyssich i nizsich rastenij (Kiev) 1975: 105; Doronkin, 2012,

Konspekt fl. Asiatskoi Rossii: 395. – *V. spicata* subsp. *spicata* var. *pseudoorchidea* Pacz. 1909, Zapiski Novorossijskago Obscestva Estestvoispytatelej 34: 144; Assejeva, 2002, Novit. Syst. Pl. Vasc., 163. – *V. pseudorchidea* (Pacz.) Klok. 1976, Novosti sistematiki vyssich i nizsich rastenij (Kiev) 1975: 109, quoad nomen. – *V. psilophylla* Nevski ex Kryl. 1939, Fl. West. Sib. 10: 2442, nom. nud. – *V. spicata* subsp. *spicata* auct., non L.: Tzvelev, 1981, Bull. Soc. Nat. Moscou, 86, 6: 85.

Described from Ukraine.

Type: Ukraine, Tscherkassk province, Kanevskii district, Michajlovka village, Michajlovskii pine forest (pinetum pteridiosum), 27 VII 1972. M. Klokov (Kiev) (KW).

Pine forest.

Distribution in Siberia: **West. Sib.:** KU, TJU – Tb, OM, NO, TO, AL – Ba, Go (village Tschemal; river Tschulyschman).

General distribution: Ukraine, Belarus.

Chromosome number: $2n = 2x = 34$ (Androschtschuk, 1988; our data based on flow cytometry, Kosachev, Albach, Mayland-Quellhorst, unpublished).

Note: As demonstrated by recent study (Kosachev, Ebel, 2010), the subspecies is distributed in pine forests of West Siberia. It may be a more ancestral form in *V. spicata*.

10. *V. porphyriana* Pavl. 1951, Vestnik Akad. Nauk KazSSR, 4: 92; Borisova, 1955, Fl. USSR, 22: 382; Sergievskaja, 1964, Fl. West. Sib. 12, 2: 3447; Gamajunova et Dmitrieva, 1965, Fl. Kasachst. 8: 69; Polozhij, 1979, Fl. Krasnojarsk. kr. 9, 2: 14; Polozhij, 1996, Fl. Sib. 12: 33; Wibe, 2001, Key Pl. Kemerovsk. oblasti: 275; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 164; Kosachev, 2003, Key Pl. Altaiskii krai: 357; Krasnoborov, 2007, Key Pl. Republic Tuva: 413; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 395. – *V. spicata* L. var. *viscosissima* Kar. et Kir. 1841, Bull. Soc. Nat. Mosc. [14], 4: 721 (No 664). – *V. spicata* subsp. *porphyriana* (Pavl.) A. Jelen. 1978, Sist. Geogr. Veronik SSSR Prilezh. Stran: 115. – *V. spicata* auct., non L.: Xiaoling, Nurbay, 2004, Fl. Xinjian. 4: 393. – *Pseudolysimachion porphyrianum* (Pavl.) Holub, 1967, Folia Geobot. Phytotax. (Praha), 4, 2: 425. – *P. spicatum* auct., non Opiz: Hong et al., 1998, Fl. China, 18: 68, p. p.

Described from Transili Alatau.

Type: Kazakhstan, prov. Almaatensis, montes Alatau Transiliensis, ad fontes fl. Talgar Sinistrum in cobresietis, 3000 m alt., No. 351, 27 VII 1940, fl. et fr. immat., leg., P. P. Poljakov" (AA!).

In the alpine and subalpine zone of mountains, meadows, steppic and rocky slopes, fir- (Tian Shan) and pine-forest, rocky and steppic river valleys in the foothills.

Distribution in Siberia: **West. Sib.:** KE, AL – Ba, Go; **Central Sib.:** KR – Cha, We, TU.

General distribution: Southern Central Asia.

Chromosome number: $2n = 2x = 34$ (Afanasjeva, Meschkova, 1961; Rostovtseva, Krasnoborov, Krasnikova, 1981, sub *V. spicata*; our data based on flow cytometry, Kosachev, Mayland-Quellhorst, Albach, unpublished).

Note: This species from the mountainous region, growing from foothills to high alpine zone is according to our research a central taxon in the subgenus that is involved in hybridization with several other taxa.

11. *V. × czemalensis* Kosachev et Albach, 2013, Turczaninowia, 16, 3: 12.

Described from the Altai.

Type (with isotypes): “Tuva Republic, Ovyurskii distr., Tzagan-Shibetu range, upper reaches of Arzaiti, left bank. 50°27'40.3” N, 90°49'49.4” E, KZ 2104. 16 VII 2006. A. I. Shmakov, S. V. Smirnov, M. G. Kutsev, A. V. Vaganov, R. A. Zubov, M. S. Ivanova, A. A. Kechaikin, A. P. Shalimov” (ALTB).

Meadows, steppes and scrubs in lower mountains of the Northern Altai, high mountain steppes in the Zagan-Schibetu Mountains.

Distribution in Siberia: **West. Sib.:** AL – Go; **Central Sib.:** TU.

General distribution: endemic.

Note: This taxon has been found in the process of molecular-genetic studies (Kosachev, Mayland-Quellhorst, Albach, unpublished). The hybrid requires further study in the zone of sympatry of *V. porphyriana* and *V. incana*.

3. Sect. **Pinnatae** (Holub) Kosachev et Albach, **stat. nov.** – *Pseudolysimachion* ser. *Pinnatae* Holub, 1967, in Holub et Pouzar, Folia Geobot. Phytotaxon. 2, 4: 423. – *Veronica* subsect. *Pinnatae* (Holub) Jelen. 1977, Bull. Soc. Nat. Moscou, 82, 1: 152; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 162. – *Veronica* sect. *Pseudolysimachia* ser. *Pinnatae* Boriss. 1955, Fl. USSR, 22: 368, p. p. (descr. ross.).

Leaves pinnatifid or pinnatifidpartite.

Type: *V. pinnata* L.

12. *V. reverdattoi* Krasnob. 1973, Novosti Geogr. Sist. Rast. Sibiri 1973: 4; Polozhij, 1979, Fl. Krasnojarsk. kr. 9, 2: 14; Polozhij, 1996, Fl. Sib. 12:

36; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 162; Krasnoborov, 2007, Key Pl. Republic Tuva: 410; Doronkin, 2012, Konspekt fl. Aziatskoi Rossii: 395. Described from Khakassia.

Type: Krasnojarskii krai, Khakassia autonomous region, Taschtypski district, in the vicinity of the vilage Karagajskaja, 2 km north of it, stony steppe. 14 VIII 1970, non-flowering, I. M. Krasnoborov (NS, iso – LE! ALTB!).

Stony slopes, various types of steppe.

Distribution in Siberia: **Central Sib.:** KR – Cha, TU (Teeli village; Lake Kara-Chol).

General distribution: endemic.

Chromosome number: $2n = ?$

Note: I. M. Krasnoborov (1973) noted the similarity of the species with *V. sessiliflora* Bunge (probably a hybrid of *V. pinnata* and *V. porphyriana* – Kamelin, 1998), but our analysis of cpDNA of the type material revealed similarity to *V. incana* (Kosachev, Mayland-Quellhorst, Albach., unpublished).

13.1. *V. pinnata* L. s. str. 1767, Mantissa, 1: 24; Bunge, 1829, in Ledeb. Fl. Alt. 1: 33; Ledeb. 1847–1849, Fl. Ross. 3: 230; Krylov, 1939, Fl. West. Sib. 10: 2446; Borisova, 1955, Fl. USSR, 22: 391; Gamajunova et Dmitrieva, 1965, Fl. Kazachst. 8: 73; Elenevsky, 1978, Sist. Geogr. Veronik SSSR Pri-lezh. Stran: 118; Polozhij, 1979, Fl. Krasnojarsk. kr. 9, 2: 14; Polozhij, 1996, Fl. Sib. 12: 32; Wibe, 2001, Key Pl. Kemerovsk. oblasti: 274; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 162; Kosachev, 2003, Key Pl. Altaiskii krai: 355; Krasnoborov, 2007, Key Pl. Republic Tuva: 410; Czepinoga et al., 2008, Konspekt fl. Irkutsk. oblasti: 214; Doronkin, 2012, Konspekt fl. Aziatskoi Rossii: 395. – *Pseudolysimachion pinnatum* (L.) Holub, 1967, Folia Geobot. Phytotax. 2, 4: 428; Hong et Fischer, 1998, Fl. China, 18: 67.

Described from Siberia (Habitat in Siberia. Laxman).

Neotype (Elenevsky, 1978, l. c.: 118, as “type”): Herb. Linn. 26.18 (LINN).

Steppes of lower foothills and mountains, rocky and gravelly banks of rivers.

Distribution in Siberia: **West. Sib.:** KE, AL – Ba, Go; **Central Sib.:** KR – Cha, We, TU; **East. Sib.:** IR – An.

General distribution: Central Asia, China, Mongolia (northern and central parts).

Chromosome number: $2n = 2x$ (= ca. 34) (our data based on flow cytometry, Kosachev, Mayland-Quellhorst, Albach, unpublished).

13.2. *V. pinnata* subsp. *nana* (Kryl.) Polozhij, 1996, Fl. Sib. 12: 33; Assejeva, 2002, Novit. Syst.

Pl. Vasc., 34: 162; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 395. – *V. pinnata* f. *nana* Kryl. 1907, Fl. Alt.: 939; Krylov, 1939, Fl. West. Sib. 10: 2447.

Described from Altai.

Type: “Altaj austro-orientalis, in fluxu Czegan Usun et Elangasch. 01 VII 1901. P. Krylov” (TK!).

Dry, rocky slopes, mountain steppe.

Distribution in Siberia: **West. Sib.:** AL – Go; **Central Sib.:** TU.

General distribution: Mongolia.

Chromosome number: $2n = 2x$ (= ca. 34) (our data based on flow cytometry, Kosachev, Mayland-Quellhorst, Albach, unpublished).

Note: Based on the study of nuclear ITS it is clear that *V. pinnata* subsp. *nana* contains exclusively pinnata-ribotypes and *V. pinnata* subsp. *pinnata* contains a mixture of pinnata-ribotypes with spicata- or longifolia-ribotypes (Kosachev, Mayland-Quellhorst, Albach, unpublished).

4. Sect. **Dauricae** (Holub) Kosachev et Albach, **stat. nov.** – *Pseudolysimachion* ser. *Dahuricae* Holub, 1967, Folia Geobot. Phytotax. 2, 4: 422. – *Veronica* subsect. *Dauricae* (Holub) A. Jelen. 1977, Bull. Soc. Nat. Moscou, 82, 1: 152. – *V.* sect. *Pseudolysimachia* ser. *Grandes* Boriss. 1955, Fl. USSR, 22: 371, p. p. (descr. ross.).

Leaves crenate to pinnatifid. Inflorescences thick. Flowers white.

Type: *V. daurica* Stev.

14. *V. daurica* Stev. s. str. 1817, Mem. Soc. Nat. Mosc. 5: 339; Borisova, 1955, Fl. USSR, 22: 372; Elenevsky, 1978, Sist. Geogr. Veronik SSSR Prilezh. Stran: 108; Polozhij, 1996, Fl. Sib. 12: 28; Anenonov et al., 2001, Key Pl. Burjat.: 491, “*dahurica*”; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 161; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 394. – *Veronica grandis* Fisch. ex Spreng. 1821, Neue Entdeck. 2: 122. – *Pseudolysimachion dahuricum* (Stev.) Yamazaki, 1968, Journ. Jap. Bot. 47, 1–3: 410.

Described from Dauria.

Type: In Dauria circa Doroninsk (LE!).

Steppe, meadows, mixed and poplar forest, sandy-stony slopes.

Distribution in Siberia: **East. Sib.:** BU – Se, JUZH, CZI – Schi.

General distribution: Russia (der Far East), Mongolia, China, Japan.

Chromosome number: $2n = 32, 34$ (Albach et al., 2008; Graze, 1935).

Note: One of the most plesiomorphic types of the subgenus. According to morphological characteristics and genetic similarities, the species is close to *V. schmidtiana* and *V. nakaiana* Ohwi, which are sister to the rest of the subgenus (Kosachev, Mayland-Quellhorst, Albach, unpublished).

Intersectional species

15. *V. × altaica* Kosachev, 2003, Turczaninowia, 6, 1: 26; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 394. – *V. × austrosibirica* Kosachev, 2003, Turczaninowia, 6, 1: 28; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 394.

Described from West Altai.

Type: Altai krai, Tretjakovskii district, Porutschikova Mountains, 12 km south of Ekaterininskoe village, 50°46.5' N, 82°04' E. TASCHE No. 692, 03 VII 1996. Kamelin R. V., Shmakov A. I., Terechina T. A., Smirnov S., Solovjev A., Tikhonov D., German D., Antonjuk E. (ALTB).

Foothill steppe, rocky slopes and scree of the mountains.

Distribution in Siberia: **West. Sib.:** AL – Ba, Go. General distribution: endemic.

Chromosome number: $2n = 2x$ (= ca. 34) (our data based on flow cytometry, Kosachev, Mayland-Quellhorst, Albach unpublished).

Note: contains nuclear DNA ribotypes characteristic of *V. spicata* subsp. *kamelinii* and *V. pinnata* L., confirming a hybridogeneous origin of the species (Kosachev, Mayland-Quellhorst, Albach, unpublished).

16. *V. × sessiliflora* Bunge (pro sp.), 1829, in Ledeb., Fl. Alt. 1: 32; Ledeb. 1829, Ic. pl. Fl. Ross., t. 126; Ledeb. 1847–1849, Fl. Ross. 3: 230; Krylov, 1939, Fl. West. Sib. 10: 2447; Borisova, 1955, Fl. USSR, 22: 391; Gamajunova et Dmitrieva, 1965, Fl. Kazachst. 8: 72; Polozhij, 1996, Fl. Sib. 12: 37; Assejeva, 2002, Novit. Syst. Pl. Vasc., 34: 162; Krasnoborov, 2007, Key Pl. Republic Tuva: 410; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 395. – *V. pinnata* var. *sessiliflora* (Bunge) Härle, 1932, Bibl. Bot. 104: 30.

Described from the Central Altai: “Hab. in locis sterilibus deserti ad fluvios Kurai et Tschuja (B.)”.

Lectotype (Kosachev, 2011, Novit. Syst. Pl. Vasc. 43: 136): [27 Altai] *Veronica sessiliflora* Bunge ap[ud] Ledeb. (– *pinnatifida* Bge in litt.). In deserto Kuraico legit Dr. Bunge, Julio 1826. Herb. C. A. Mey[er] (LE!).

Isolectotype: Herb. Ledebour Altai, 1826 (LE!). Mountain steppe, desert steppes along rivers.

Distribution in Siberia: **West. Sib.:** AL – Go; **Central Sib.:** TU.

General distribution: endemic.

Chromosome number: $2n = 2x$ (= ca. 34) (our data based on flow cytometry, Kosachev, Mayland-Quellhorst, Albach, unpublished).

Note: Based on our analysis of cpDNA, the species is similar to *V. incana* and *V. porphyriana* (Kosachev, Mayland-Quellhorst, Albach, unpublished). A relationship with *V. pinnata*, however, has not been demonstrated yet.

17. *V. × schmakovii* Kosachev, 2003, Turczaninowia, 6, 1: 16; Kosachev, 2010, Turczaninowia, 13, 1: 50; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 395.

Described from Altai.

Type: Republic of Altai, Kosch-Agatschskii district, Ukok plateau, lower stretch of river Kara-Bulak close to watch tower Ak-Alacha, 49°16', 87°28', AJUK No. 3321, 28 VII 1998. Kamelin R. V., Shmakov A. I., Smirnov S., Kosachev P., Tikhonov D., Antonjuk E. (ALTB).

Creek margins, dwarf birch scrub, forest margin, especially lark forest in high alpine regions.

Distribution in Siberia: **West. Sib.:** AL – Go; **Central Sib.:** TU.

General distribution: Western Mongolia. It may stay in China (Xinjiang).

Chromosome number: $2n = 2x$ (= ca. 34) (our data based on flow cytometry, Kosachev, Mayland-Quellhorst, Albach, unpublished).

Note: based on molecular phylogenetic analysis in the subgenus (Kosachev, Mayland-Quellhorst, Albach, unpublished) the species is related to

V. longifolia (AFLP) and *V. porphyriana* (cpDNA), confirming the hybrid origin of *V. × schmakovii*.

18. *V. × grisea* Kosachev et A. L. Ebel, 2010, Sist. Zаметki Mater. Gerb. Krylova 102: 9; Doronkin, 2012, Konspekt fl. Asiatskoi Rossii: 395. – *Veronica neglecta* Vahl, 1804, Enum. Pl. 1: 59, non F. W. Schmidt, 1795, Fl. Boem. 1: 12.

Described from Siberia.

Type: Herb. Copenhagen. No.78/11 (C).

Meadows.

Distribution in Siberia: **West. Sib.:** KU?, KR – Cha (Schirinskii district, in the vicinity of Efremkino village).

General distribution: Eastern Europe, Russia (southern part of European part).

Note: Based on the analysis of cpDNA, a close relationship with *V. incana* is confirmed (Kosachev, Mayland-Quellhorst, Albach, unpublished).

19. *V. × kolyvanensis* Kosachev et Shmakov, 2013, Turczaninowia, 16, 3: 11.

Described from western Altai.

Type (with isotypes): Altai province, Kuryinskiy distr., valley of Loktevka in 7 km downstream of Kolyvan, 51°17,5' N, 82°29' E, KOL 1957. 22 VI 2003. A. I. Shmakov, S. V. Smirnov, M. G. Kutzev, I. V. Naumov, A. V. Vaganov (ALTB).

Shrubs.

Distribution in Siberia: **West. Sib.:** AL – Ba.

General distribution: endemic.

Note: Likely a hybrid of *V. spuria* and *V. spicata*.

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