





Taxonomic circumscription and distribution of a glandular Eurasian entity from the *Eragrostis pilosa* complex (Poaceae)

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Abstract

Eragrostis amurensis (type from Amur Oblast, Russian Far East) and *E. voronensis* (type from Tambov Oblast, Middle Russia) were separated from *E. pilosa* by the presence of glandular pits. The location of glands along with spikelet details was studied on specimens from Europe and N Asia; and *E. voronensis* is considered conspecific with *E. amurensis*. The newly circumscribed *E. amurensis* is a species of riverside habitats and is widely distributed in temperate Eurasia. It is recorded for the first time for Ukraine, Kazakhstan, and Mongolia. *Eragrostis amurensis* has recently invaded some areas of Eastern Europe and is still colonizing new watercourses. It is not synonymous with the robust glandular North American *E. perplexa* (type from South Dakota, U.S.A.) which has longer lemmas and more florets in each spikelet.

Резюме

Eragrostis amurensis (описана из Амурской обл., Российский Дальний Восток) и E. voronensis (описана из Тамбовской обл., Средняя Россия) отличали от E. pilosa наличием погруженных железок. Расположение железок и строение колоска были изучены на образцах из Европы и Северной Азии – E. voronensis и E. amurensis признаны конспецифичными. В новом понимании E. amurensis – это широко распространенный в умеренных районах Евразии вид приречных местообитаний. Он впервые приводится для Украины, Казахстана и Монголии. Eragrostis amurensis за последнее время освоила некоторые территории Восточной Европы, продолжая заселять берега все новых рек. Этот вид не является синонимом высокой железистой североамериканской E. perplexa (описана из Южной Дакоты, США), имеющей более длинные нижние цветковые чешуи и большее число цветков в колоске.

Key words: Eragrostideae, Gramineae

Introduction

Eragrostis Wolf (1776: 23), a large genus of Poaceae tribe Eragrostideae, includes ca. 350 species distributed mainly in tropical and subtropical regions (Peterson 2007; Peterson *et al.* 2010). Russia is situated in temperate and Arctic climate zones, and *Eragrostis* diversity is fairly low here. There are 15 species in the last checklist for the whole territory of the former U.S.S.R. (Czerepanov 1995). Also, *E. pectinacea* (Michaux 1803: 69) Nees von Esenbeck (1841: 406) and *E. virescens* J.Presl in Presl (1830: 276) were reported as aliens from Udmurtia (Baranova *et al.* 1992), *E. albensis* Scholz (1995: 74) described from Germany was discovered in the City of Volgograd (Scholz *et al.* 2002), and native *E. voronensis* Scholz (2010: 84) was described from Tambov Oblast.

Reviewing *Eragrostis* specimens for the forthcoming *Flora of Vladimir Oblast, Russia* (Seregin 2012, in press.), I tried to revise the taxonomy of *E. voronensis*. This species is said to grow everywhere in Middle Russia instead of *E. pilosa* auct. (Scholz 2010). Further studies of literature and herbarium collections revealed that three temperate species (i.e., *E. perplexa* Harvey (1954: 409), *E. amurensis* Probatova in

Probatova & Sokolovskaya (1981: 1591), and *E. voronensis*) were described as glandular entities closely related to *E. pilosa* (Linnaeus 1753: 68) Palisot de Beauvois (1812: 71).

Eragrostis perplexa from the U.S.A.:—The name *E. perplexa* first appeared in Harvey's (1948) Ph.D. dissertation. He validly published it later (Harvey 1954) with a holotype from South Dakota and paratypes from North Dakota, Minnesota, Nebraska, Kansas, Colorado, and Texas, all from states with a continental climate. Presence of glandular pits on sheaths and panicle branches was the only diagnostic character given in the protologue to separate the new species from *E. pilosa*. Chase accepted *E. perplexa* in the *Manual of the grasses of the United States* (Hitchcock 1951). She indicated "introduced from Europe" for *E. pilosa*, although *E. perplexa* was presumed to be native in the U.S.A. Koch (1974) regarded *E. perplexa* as "a minor evolutionary offshoot of *E. pilosa* var. *pilosa*", because "the only morphological difference between the two is in the distribution of glands". He subordinated *E. perplexa* to the alien *E. pilosa* as *E. pilosa* var. *perplexa* (L.H.Harv.) Koch (1974: 28). This taxonomic and phytogeographical decision was widely adopted in recent American floras and *Eragrostis* revisions (Peterson 2007 is the latest one).

Eragrostis amurensis from Russian Far East:—Voroshilov (1968) noticed glandular depressions on plants known as *E. pilosa* on the Amur River bars (Russian Far East). Probatova (in Probatova & Sokolovskaya 1981) described them as *E. amurensis* without acknowledging Voroshilov's published data, although in another part of the article she cited his paper. Type of *E. amurensis* originated from the Zeya River, a major left tributary of the Amur River (Amur Oblast, Russia). Probatova and Sokolovskaya (1981) indicated sand bars of the Amur River to be a typical habitat for the newly described species. According to Probatova, the only diagnostic character to distinguish *E. amurensis* from *E. pilosa* is the presence of glands. She specified in the description: "The whole plant (i.e., panicle rachis and branches, stems below panicle or all along, sheaths and lower blade surface on the keel and nerves) dotted by goblet glands". Probatova presumed a hybrid origin for *E. amurensis* from *E. pilosa* and *E. minor* Host (1809: 15). A record from Novosibirsk Oblast, Western Siberia, Russia (Lomonosova 2000) is believed to be the westernmost native locality of *E. amurensis*.

Hybrid presumption and an unpublished record of *E. pilosa* **var.** *perplexa*:—Paczoski (1914) was the first to notice glands on the European specimens of *E. pilosa*. He decided that these plants from the Dnepr River sands (Ukraine) should be treated as hybrids between glandular *E. suaveolens* A.Becker ex Claus (1851: 266) and eglandular *E. pilosa* (Paczoski 1914: 178–179; specimens in LE). This observation by Paczoski was later forgotten. Dr. Yuri Alexeev left an unpublished critical note on specimen by *Lukina* & *Khazova s.n.* (MW!) dated back to October 1989: "This specimen as well as some other specimens from Middle Russia fits main characters of *E. pilosa* except for crateriform glands on some nerves of leaves... This note is absent in *Floras*". Alexeev marked a folder with a selection of glandular specimens in MW as "*E. pilosa* var. *perplexa* provisionally", but this idea was not developed by him. An option to identify glandular *E. pilosa* is lacking in his keys (Alexeev 2006ab), and some specimens were misidentified as *E. suaveolens* by various authors after these keys.

An invasion of *E. amurensis* in Germany:—Scholz and Ristow (2005) reported *E. amurensis* as an established alien from the Oder River where it was first recorded in 2003. After viewing specimens provided by Probatova, they considered the density of glands to be variable on East Asian and German plants. Specimens from Western Siberia collected by Ristow were attributed to *E. amurensis*, as well as an unpublished specimen from Belarus.

Eragrostis voronensis H.Scholz from Middle Russia:—Scholz (2010) described Middle Russian glandular *E. pilosa* auct. as *E. voronensis*. The species protologue is very short consisting of 19 lines including eight lines of specimen citations. The main points are: 1) *E. voronensis* should be distiguished from eglandular *E. pilosa* by sheath keels with (usually) submerged small glands, well-developed panicle branches, and pronounced lemma nerves; 2) *E. voronensis* is a Middle Russian alluvial species with some localities in Western Siberia; 3) a closely allied Asian *E. amurensis* should be separated from *E. voronensis* by greater number of glands which are present on culm internodes and panicle branches, and longer lower glumes covering the lower half of the lowest lemma. Scholz (2010) did not mention *E. perplexa* at all, but earlier he

considered this species to be exclusively American (Scholz 1988; Scholz & Ristow 2005). Unfortunately, Scholz (2010) did not discuss his own records of *E. amurensis* in Germany and Belarus nor Ristow's specimens from Western Siberia.

Thereby, glandular pits on temperate plants allied to *E. pilosa* were recorded repeatedly by some taxonomists independently throughout Eurasia as well as in the U.S.A.

Materials and methods

I studied ca. 830 specimens of the *E. pilosa* complex: *E. pilosa*, *E. imberbis* (Franch.) Probatova (1985: 353), *E. amurensis*, *E. voronensis*, *E. multicaulis* Steudel (1855: 426), and *E. albensis*, in Russian and Ukrainian herbaria (LE, MW, MHA, KW, CWU, and YALT).

Eragrostis amurensis was studied in 27 localities on the sand bars of the Klyazama and Oka Rivers in Vladimir Oblast, Russia. Another collecting site was situated in the Altai Republic (South Siberia, Russia) where *E. amurensis* is a rapidly spreading alien.

Helicon Focus 4.50.3 software (*Helicon Soft Ltd.*, 2000–2008) was used to merge a series of photographs into one clear picture (figs. 1 and 2).



FIGURE 1. Location of glands on leaf blades and sheaths of *Eragrostis amurensis* from various regions. 2A–C—**European Russia:** 2A—Nizhny Novgorod Oblast: Nizhegorodsky uyezd, Borskaya volost, between Borsky and Soshniki, dry pine forest, 3 August 1927, *Stankov & Levi s.n.* (MW); 2B—Ryazan Oblast: Spassky district, near Krasny Kholm landing stage, sand bar on the left bank of the Oka River, 21 August 1975, *Tikhomirov et al.* in FPM 10200–1 (MW); 2C—Yaroslavl Oblast: Yaroslavl, 1880, *Petrovsky 621* (MW 23254). 2D–F—**Mongolia:** 2D—Bayan-Uul Aimag: Mongolian Altai, the Bulgan River valley, 35 km below Bulgan, sand, elev. 1900 m, 13 August 1982, *Gubanov 5376* (MW); 2E&2F Bayankhongor Aimag: Valley of the Lakes, 25 km to N from Lake Buuntsagaan Nur, irrigated field margin, 8 km to E from Baydrach-Gol River, elev. 1400 m, 11 August 1984, *Gubanov 8924* (MW, with a duplicate). 2G–I—**Asiatic Russia:** 2G—Krasnoyarsk Krai: Turukhansky District, vicinity of Mirnoye, left bank floodplain of the Yenisey River, sands, 1 September 1989, *Novokhatsky s.n.* (MW); 2H—Altai Republic: Ongudaysky district, 50°22'00"N, 87°02'30"E, SE outskirts of Bely Bom, right bank of the Chuya River, limestone highway margin, elev. 920 m, 2 August 2008, *Seregin & Seregina S-591* (MW); 2I—Buryat Republic: 51°06'N, 114°32'E, Aginskoye, by roads and sandy places in the Aga River valley, 9 August 1931, *Nasarow 14234* (MW 112877).

Column 1—glands on both the keel and nerves (such specimens bear also glands on inflorescence branches and culms below panicles) (2A, 2D, 2G); column 2—glands on the keel (2B, 2E, 2H); column 3—few glands on the keel near the junction of blades and sheaths (2C, 2F, 2I).



FIGURE 2. Spikelet details of *Eragrostis amurensis* from European and Asiatic Russia showing lower glume covering lower 1/4 to 1/3 of the lowest floret: 3A—Vladimir Oblast: Muromsky District, 55°49′20″N, 42°24′20″E, 34 km to NE from Murom, 4 km to E from Aleshunino, left bank floodplain of the Oka River near the mouth of Chinkhir cut-off lake, denuded sand on road margin, 18 August 2006, *Seregin 2762* (MW); 3B—Zabaykalsky Krai: Nerczynsk, an Ufer der Nercz, 1892, *Karo s.n.* (MW 112871); 3C—Sakha Republic: Bolshoy Peleduy on the left bank of the Lena River, rough ground along abandoned path, 6 August 1953, *Kuvayev 106* (MW).

Results

The diagnostic characters of *E. voronensis* and *E. amurensis* were tested on the material from Eastern Europe, Mongolia, Kazakhstan, and Asiatic Russia.

Intensity and location of glands:—I found some specimens from European Russia with numerous glands along the veins of the sheaths, culms, and some panicle branches. For instance, collections from Nizhny Novgorod (3 August 1927, *Stankov & Levi s.n.*—MW), Vladimir (*Seregin & Khokhlov 2367*—MW), Perm (August 1922, *Syuzev s.n.*—LE), Vasilsursk (16 July 1885, *Korshinsky s.n.*—LE), and Yaroslavl (17 August 1924, *Fedchenko et al. 306*—LE) are particularly glandular. This is typical for *E. amurensis* according to Scholz (2010).

On the other hand, there are many specimens from Transbaikalia (i.e. Upper Amur basin) that bear a few glands only on the keel. This is a diagnostic character of *E. voronensis* (Scholz 2010). Some of these specimens were tested as *E. amurensis* by Probatova (MW). I noted the following gland pattern:

1) Glands on the keel and nerves (sheath and lower blade surface), culms below panicles, and inflorescence branches;

2) Glands on the keel and nerves, and culms below panicles;

3) Glands on the keel and nerves;

- 4) Glands on the keel (sheath and lower blade surface);
- 5) Glands on the keel (sheath and lower part of lower blade surface);

6) Glands on the sheath keel.

Images of some specimens arranged according to their origin and gland location are given in Fig. 1.

Glandular and eglandular plants are growing together on riverside sands on the Amur River and in Transbaikalia. Also, glands are obscure on immature plants. There is confusion by some authors and specimens with pronounced glands are generally determined as *E. amurensis*, plants with no glands as *E. pilosa*, and individuals with only a few or obscure glands as "transitions" (Yenushchenko in Malyshev 2008).

Length of the lower glume:—Following Scholz (2010), long lower glume covering the lower half of the lowest lemma is the second character to distinguish *E. amurensis* from *E. voronensis*. The absolute length of glume was not indicated by Scholz.

Asian specimens of *E. amurensis* tested by Probatova have uniformly short lower glumes not exceeding 0.5 mm long; and these cover the lower 1/3 or 1/4 of the lowest floret (10 September 1954, *Eim & Belyayeva s.n.*; *Nasarow 14046*; *Karo MW 112871*; 15 Aug 1954, *anonymous s.n.*; *Kuvayev 106*; 21 July 1951, *Karavayev s.n.*; 15 August 1973, *Pospelova s.n.*; 2 September 1978, *Kharkevich & Buch s.n.*, all in MW). Fig. 2 shows no difference between plants from European Russia (3A) and *E. amurensis* from Transbaicalia verified by Probatova (3B & 3C).



FIGURE 3. Native range of *Eragrostis amurensis*. Alien records in Germany cited by Scholz & Ristow (2005) are out of the left map frame.

Discussion

In Siberia, completely eglandular *E. imberbis* is rare. It was collected in mountains of the Southern Siberia and Transbaikalia. Another eglandular species, *E. multicaulis*, was collected in Siberia once along railway. I disagree with Lomonosova's (1990, 2000) concept of *E. amurensis*. She recorded both *E. pilosa* auct. and *E. amurensis* from many places throughout Siberia, determining specimens with obscure or sparse glands as *E. pilosa*. Probatova (1985) was more consistent since there was a complete absence of glands from the Far Eastern plants of *E. pilosa*.

Distribution patterns of glandular and eglandular plants are less complicated in European Russia. Keeping aside some eglandular *Eragrostis* species recorded from railway habitats, true *E. pilosa* is present in the Caucasus and southernmost regions—Lower Don (Rostov Oblast) and western part of the Kalmyk Republic. Glandular plants, i.e. from "typical" *E. amurensis* to individuals with a few glands on leaf sheath keels are widely distributed throughout European Russia on riverside bars. Plants with diverse grades of gland density can be seen in one population and represent a single taxon.

The location and density of glands are variable both in Asian and European parts of Russia. Westernmost (Middle Russia) and easternmost (the Amur River) populations consist of individuals with various degrees of gland density which can be referred to either *E. amurensis* or *E. voronensis* following Scholz (2010). Gland density and location should not be regarded as diagnostic characters for the delimitation of *E. amurensis* and *E. voronensis*.

Probatova did not specify the length of the lower glume for *E. amurensis* (Probatova & Sokolovskaya 1981, Probatova 1985). I did not find long lower glumes covering the lower half of the lowest lemma on Siberian or Far Eastern glandular specimens. Using characters indicated by Scholz (2010), I failed to separate specimens referred to as *E. voronensis* and *E. amurensis*. I believe these two names refer to a single species

widely distributed in Eurasia. *Eragrostis voronensis* was described from the locality in the western part of the range and based on plants with a few glands on leaf sheath keels, whereas plants with numerous glands were named *E. amurensis*.

Harvey's (1954) protologue of *E. perplexa* matches the above mentioned Eurasian plants in many details. Peterson's (2003, 2007) circumscription of *E. pilosa* var. *perplexa* differs from that of Harvey (1954). A plant illustrated in Peterson (2003, 2007) has a spikelet with 14 florets (vs. 7–11-flowered; indicated in Harvey 1954) and glumes subequal, ca. 1.5 mm long (vs. glumes unequal, the first 0.2–0.4 mm long, the second 1–1.2 mm long; Harvey 1954). Peterson (2007) recorded *E. pilosa* var. *perplexa* for five states (Wyoming, North Dakota, Nebraska, Colorado, and northwestern Texas) instead of seven states indicated by Harvey (1954). It was discovered recently in Mexico (Peterson & Valdés-Reyna 2005).

Harvey (1954) indicated a lemma 2.0–2.2 mm long while Peterson (2007) reduced it to 1.8–2.0 mm. Lemmas of Eurasian *E. amurensis* are usually 1.5–1.6 mm long. Study of *Hitchcock 931* from Kansas (US) and high-resolution images of holotype and isotype are further evidence that *E. perplexa* represents a separate taxon worthy of specific rank. It is more robust than *E. amurensis*, has longer lemmas, and more florets in each spikelet.

Colonization of *E. amurensis* on some rivers of Middle Russia in 20^{th} century is noteworthy. Middle Russia is a territory with the longest history of botanical exploration in Russia. *Eragrostis* species were completely absent in many provinces nearby Moscow in the second half of 19^{th} century (Zinger 1886) and I can outline some obvious features of *E. amurensis* recent colonizations. One should be cautious in such reconstructions because old collection data are incomplete.

A high-quality checklist, *Sbornik svedeniy* ['data book' in Russian] by Zinger (1886), is a good foundation for the study of the floristics dynamics in Middle Russia. All known plants were accurately compiled by Zinger including vast collections made by amateurs on his behalf (now preserved in MW). Earlier collection information are too fragmentary for historical analysis, but it should be noted that all pre-1850 collections were made in the Lower Volga.

Until 1886, *E. amurensis* was recorded from the Volga River (from Yaroslavl to its delta), the Ural River, and the Don River (from Khlevnoye) including some tributaries (i.e. Vorona, Chembar, and Medveditsa). I assume that *E. amurensis* was absent before 1886 in the Oka basin on the Sura and Vetluga Rivers. *Eragrostis amurensis* (sub nom. *E. pilosa* auct.) was recorded for the first time on the Oka River in 1891 by Bulatkin (1895) from one locality opposite Dmitrievy Gory (Melenkovsky District, Vladimir Oblast). He noted a few flowering individuals. In the 1910's, the species became abundant from the Gus River mouth to Zhaysk (Nazarov 1916; specimens in MW). In 1969, it was discovered by Metlov near Spassk-Ryazansky (Novikov 1975) in the upper locality on the Oka River. Until now, no localities of *E. amurensis* were found further up the Oka River.

The Klyazma River is the longest Oka tributary with large seasonal sand bars. First Klyazma record of *E. amurensis* (sub nom. *E. pilosa* auct.) in former Vladimirsky Uyezd is well-documented: "It was discovered in 1901 and 1903 on sands of the Klyazma River on damp places nearby water not far from Lunevo and Patakino in abundance. Evidently, it spread during last 10 years, because it was not observed anywhere before" (Kazansky 1904; *B. Kazansky* 27—MW 23245). It had been recorded further up the Klyazma River in Petushinsky District in 1954 (*Khokhryakov* s.n.—MHA).

Floristic data from other major watercourses of European Russia are incomplete for proper reconstruction, but I conclude that in many localities throughout this territory the plant appeared since mid-19th century. Recent invasion of *E. amurensis* (sub nom. *E. pilosa* auct.) along roads in the Altai Republic, South Siberia, Russia are well-documented (Studenikina 1999, Pyak & Ebel 2001, Shaulo *et al.* 2010).

One could reinterpret recent records of *E. amurensis* from Germany. The range along the western border (Fig. 3) is fairly young, and *E. amurensis* is still colonizing banks of new watercourses. It is noteworthy that the species was first recorded in Germany from the easternmost river, and is still under-recorded in Poland (for modern interpretation of *E. pilosa* records in Poland see Nobis & Nobis 2009).

Many Volga, Kama, and Don localities of *E. amurensis* were flooded by newly constructed dams in the mid-20th century. For instance, *E. amurensis* (sub nom. *E. pilosa* auct.) was not recorded recently on the Volga River in Saratov Oblast (Elenevsky *et al.* 2008). A specimen collected in vicinity of Kazan (*Solntseva & Sokolova s.n.*—MW) confirms the only *E. amurensis* record from a bank of a major reservoir.

Taxonomy

Eragrostis amurensis Probatova in Probatova & Sokolovskaya (1981: 1591). *E. pilosa* var. *amurensis* (Prob.) Voroshilov (1985: 149). Type:—RUSSIA. Amur Oblast: ad ripam fl. Zeja contra ostium fl. Bekeldeul Major, in loco inundato arenoso, 31 July 1914, *Prochorov & Kuzeneva 574* (holotype LE!).—Fig. 4.

Eragrostis voronensis Scholz (2010: 84). Type:—RUSSIA. Tambov Oblast: Distr. Mutschkap, ad ripam sinistram fluminis Vorona apud pagum Korosteljovo, in arena copiosissime, 22 August 2003, *Sukhorukov s.n.* (holotype MW!).



FIGURE 4. General habit of *Eragrostis amurensis* (RUSSIAN FEDERATION: Vladimir Oblast: Sobinsky District, the Klyazma River).

Habitats:—It is a pioneer species growing in open ground especially on riverside sands of larger watercourses (Fig. 5). The species shifts in southern regions from floodplains to inland open habitats such as sand massifs, sparse steppe and desert communities, and rock outcrops and crevices. Also, it grows well on railway beds and highway margins.

Distribution:—Native range of newly circumscribed *E. amurensis* is lying in a vast interior region of temperate Eurasia influenced by a continental climate. It includes SE Belarus, Central and Eastern Ukraine, major part of Russia, Kazakhstan, and Mongolia (Fig. 3). Also, *E. amurensis* was reported from North-East China by Probatova (1985), but this record was neglected in recent *Flora of China* (Chen & Peterson 2006). It

was recorded in Germany as an alien from the Oder River banks together with *E. albensis*, presumed to be present in Poland, and indicated for Belarus without specimen details (Scholz & Ristow 2005). A record for Japan by Scholz and Ristow (2005) is based on erroneous interpretation of distribution data by Probatova (1985).



FIGURE 5. Seasonal sand bar of the Klyazma River (RUSSIAN FEDERATION: Vladimir Oblast: Sobinsky District), a typical habitat of *Eragrostis amurensis*.

Selected specimens (one per country subdivision; asterisk (*) denotes new national or regional records):—RUSSIAN FEDERATION: *Altai Republic: Ongudaysky District, 50°22'00"N, 87°02'30"E, SE outskirts of Bely Bom, right bank of the Chuya River, limestone highway margin, elev. 920 m, 2 August 2008, *Seregin & Seregina S-591* (MW).—Altaisky Krai: Kamensky District, the Ob River floodplain, high bank of the Nizhnyaya Zalamnoya anabranch, sandy road, 29 July 2006, *Taran s.n.* (LE).—*Astrakhan Oblast: the Volga River delta, wet sandy loam places on the left bank of the Volga River above Streletskoye, 3 August 1965, *Tzvelev & Kolesnikova 171* (LE).—*Bashkortostan: Dyurtyulinsky District, right bank of the Belaya River opposite Sergeyevka, alluvial sand, 9 July 1955, *Zhudova et al. s.n.* (MW).—*Belgorod Oblast: Veydelevsky District, 50°02.5' N, 38°37' E, 14.3 km to SE from Veydelevka, to NW from Bely Kolodez, large sand plot in middle part of valley slope, 12 October 2007, *Mamontov s.n.* (MHA).—*Chuvash Republic: sand of flood meadows of the Sura River near Yadrin, 14 July 1885, *Korshinsky s.n.* (LE).—*Ivanovo Oblast: Yuryevetsky District, bank of the Volga River, near mouth of the Unzha River, silty sand, 15 July 1935, *Pchelkin s.n.* (MW 34938).—*Kaluga Oblast: 10–12 km to W from Kaluga, railway bed near Kaluga–2 station, 5 September 1979, *Volosnova s.n.* (MW).—Kemerovo Oblast: Tashtagol District, vicinity of Kondoma, pebble sediments, 2 August 1945, *Kuminova & Reverdatto s.n.* (MHA).—*Kirov Oblast: Vyatka

[=Kirov], near Dymkovo, damp sandy places, 21 August 1916, Selezhinsky s.n. (MW 23171, LE).—Khabarovsk Krai: vicinity of Imeni Poliny Osipenko, 2 September 1978, Kharkevich & Buch s.n. (MW).—Khakassia: Ust-Abakansky District, vicinity of Kapchaly Station, square, 13 August 1967, Neyfeld & Chesnokova s.n. (LE).—*Kostroma Oblast: Sharyinsky District, right bank of the Vetluga River, Konyovo, sand bar in the central floodplain, 2 August 1997, Yugay s.n. (MW).—Krasnoyarsk Krai: Turukhansky District, vicinity of Mirnoye, left bank floodplain of the Yenisei River, sands, sparse grass on the bank, abundant, 1 September 1989, Novokhatsky s.n. (MW).-*Kurgan Oblast: Kurgansky District, vicinity of Forest School, chernozem nursery, 21 July 1904, Dolgiy 211 (LE).—*Kursk Oblast: Solntsevsky District, railway station Solntsevo, railway bed, 26 June 1996, Poluyanov s.n. (MW).—*Lipetsk Oblast: Zadonsky Uyezd, Khlevnoye, 1884, Melgunov s.n. (MW 23260 & 23261).-*Mari El Republic: opposite Kozmodemyansk, denude dense sand soil along road on the left bank of the Volga River, 18 Jul 1885, Korshinsky s.n. (LE).—*Moscow Oblast: Sergiyevo, railway embankment, abundant, 23 August 1923, Ivanova 767 (MW 23235, LE).-*Nizhny Novgorod Oblast: Vetluzhsky District, vicinity of Ryazanovo, left bank floodplain of the Vetluga River, sand, 30 July 1981, Lukina & Khazova s.n. (MW).—*Orenburg Oblast: Ileksky District, sand dunes between Ranny [=Ranneye] and Irtetsky [=Irtek], 28 August 1928, Borisova s.n. (LE).—*Penza Oblast: Penza, sands in the Sura River valley near Svinukha anabranch, 24 July 1931, Sprygin s.n. (LE).—*Perm Krai: bank of the Kama River, beach near Nizhnyaya Kurya, August 1922, Syuzev s.n. (LE).—Primorsky Krai: Sredniy Sikhote Alin, Khrystalnyy, by roads and paths, weedy, 15 August 1973, Pospelova s.n. (MW).-Republic of Buryatia: Khorginsky District, 2 km to E from Bayan-Gol along road, grass and wormwood dry steppe, 10 September 1954, Eim & Belyayeva s.n. (MW).—*Republic of Mordovia: Bolshebereznikovsky District, 12 km to S from Simkino, left bank of the Sura River, sand bank, 16 July 1997, Mayorov & Daragan 97-049 (MW).—*Rostov Oblast: vicinity of Kamensk, sands of second terrace on left bank of the Seversky Donets River, 20 September 1940, Bogdan s.n. (LE).-*Ryazan Oblast: Kasimov, left bank of the Oka River, sand bar, 19 July 1991, Tikhomirov et al. s.n. (MW).—Sakha Republic: Lensky District, Bolshoy Peleduy on the left bank of the Lena River, rough ground along abandoned path, 6 August 1953, Kuvayev 106 (MW).—*Samara Oblast: 1 km from Staro-Semeykino, the Sok River left bank floodplain, meadows, forest glade with saline soil, 5 August 1940, *illegible sign s.n.* (MHA).—*Saratov Oblast: Marxstadt Canton, the Volga River valley, sands of the second terrace near Shayergauzen, 12 August 1932, Rodin & Lebedev 631 (LE).-*Sverdlovsk Oblast: Talizki Sawod, 1847, Schell in Herb. Trautvetter 502 (LE).—Tambov Oblast: riverside sands of the Vorona River between Khoroshavka and Karaul, July 1879, Litvinov 2886 (MW 23259).—*Tatarstan: Kuybyshev Reservoir, right bank opposite Kazan, sand island, riverside sand bank, 11 August 1958, Solntseva & Sokolova s.n. (MW).-Tomsk Oblast: Chainsky District, vicinity of Bokchar [=Bakchar], meadows, 3-20 July 1934, Balabayev s.n. (MHA).—*Tula Oblast: Aleksinsky District, Aleksin, railway station, railway bed, 21 August 1998, Sheremetyeva & Shcherbakov s.n. (MW).—Tuva Republic: left bank of the Ulu-Khem River near Chakul, pasture on the sand bank of anabranch, 11 September 1916, Miklashevskaya s.n. (LE).—*Tver Oblast: Konakovsky District, vicinity of Redkino railway station of Oktyabrskaya railway, railway embankment, 25 September 1988, Notov s.n. (MW).—*Udmurt Republic: Chiganda [=Cheganda], bank of the Kama River near the Belaya River mouth, 5 August 1926, Petrova s.n. (LE).—*Ulyanovsk Oblast: Melekessky Uyezd, Bely Yar, bank of the Volga River, 29 July 1926, Petrova s.n. (LE).—*Vladimir Oblast: Muromsky District, 55°40'30"N, 42°10'40"E, 14 km to NE from Murom, left bank of the Oka River, sand bank with Petasites spurius and Salix acutifolia, 17 August 2006, Seregin & Khokhlov 2728 (MW).—*Volgograd Oblast: 48°40'N, 44°31'E, Volgograd, Island Golodnyi, place of evaporation [of] sewage water, 25 July 1993, Bochkin & Ilminskih s.n. (MHA).—*Voronezh Oblast: Khopyorsky Reserve, left bank of the Khopyor River, 16–17 km to NNE from Novokhopyorsk, Dolgiye Paly locality to NW from Varvarino, sand height, 3 July 1979, Tzvelev 977 (LE).—*Yaroslavl Oblast: Rybinsky Uyezd, bechevnik along the Volga River near Chernaya Gryada hills, 16 August 1925, Vasilkova & Smirnov 51 (LE).—Zabaykalsky Krai: between the Nercha River and the Kuenga River, saline plot on the slope of the Pad Bakbay valley near Bolshaya Bronnikovka, 18 August 1911, Sukaczev & Poplavskaja 4998 (LE, MHA).—*BELARUS: Gomel Oblast: Iolcha, floodplain of the Dnepr River, 12 August 1892, Paczoski s.n.

(LE).—*UKRAINE: Cherkasy Oblast: Kanevsky forest-steppe reserve, vicinity of Pekari and of the Reserve, sand island of the Dnepr River, opposite Kaliberda, wet sand near spring, 9 August 1931, Kotov s.n. (KW).—Chernihiv Oblast: vicinity of Oster, loose sand on the left bank of the Desna River, 14 July 1970, Kotov s.n. (KW).—Dnipropetrovsk Oblast: Tomakovsky District, vicinity of Vysshetarasovka, the Dnepr River floodplain, 18 July 1948, Afanasyev s.n. (KW).—Donetsk Oblast: Volodarsky District, Kamennye Mogily Reserve, Eastern ridge, granite outcrops, gravelly plot, 20 August 1962, Tveretinova s.n. (CWU).--Kharkiv Oblast: Novo-Vodolazhsky District, Rakityanskaya branch of the Lyubotinskoye forestry on the Mozh River, sands with Kochia arenaria, 5 September 1928, Transhel 189 (LE).--Kherson Oblast: Berislavsky District, vicinity of Krasnyy Mayak, the Dnepr River floodplain, 14 July 1947, Afanasyev s.n. (KW).-Kiev Oblast: Ivankovsky District, vicinity of Ivankovo, nearterrace part of the Teterev River floodplain, 17 June 1958, Barbarich s.n. (KW 86026).-Luhansk Oblast: Stanitsa Luganskaya, sands of the second terrace of the Seversky Donets River to NW from stanitsa, 2 August 1925, Lavrenko s.n. (KW).—Odessa Oblast: Pestchansky District, Pestchanaya, sands in the Savran River valley, 7 July 1934, Bivyk s.n. (KW).—Poltava Oblast: Poltava, bank of the Vorskla River, sand, 17 July 1924, Illichevsky s.n. (KW).—Sumy Oblast: Lebedinsky District, Budylka, pine forest, frequent, 7 August 1964, illegible sign s.n. (MW). —Zaporizhia Oblast: arena Kamenkensis, to NE from Vodyanoye, slope above the Dnepr River anabranch, 23 August 1930, Kozlov s.n. (KW).-*KAZAKHSTAN: Akmola Oblast: Mount Kokshetau, foot of rocks, 22 August 1957, Karamysheva 2483 (LE).—Aktobe Oblast: 48°55'N, 59°13'E, Tas-Oba granite hills (E offshoot of Mugodzhar Hills), 28 July 1934, Sokolova s.n. (MW).-Almaty Oblast: [former] Lepsinsky Uyezd, riverside pebbles of the Tokty River near Tokty [=Kokty], near water, 11 August 1928, *Lipschiz 1031* (MW, LE).—Atyrau Oblast: kir fields between Kara-Murat and Munayle-Mola, 21 September 1949, Vostokova s.n. (MW).-East Kazakhstan Oblast: [former] Semipalatinsk Oblast, sand banks of the Irtysh River island below Zaton, 1 August 1942, Pavlov 45 (MW).-Karaganda Oblast: Ortau Mountains, SW stony slopes, 26 August 1935, Mironov & Paziy 713 (LE).-Kostanay Oblast: Kustanaysky Uyezd, Nemtsov's garden, weedy, Jul 1922, Rusanov s.n. (LE).-Pavlodar Oblast: Kaganovichsky District, left bank of the Irtysh River opposite boat bridge near Pavlodar, 8 July 1955, Tzvelev et al. 856 (LE).—West Kazakhstan Oblast: vicinity of Uralsk, agricultural secondary school, steppe on plain, frequent, 15 May 1923, Weruschkin 258 (LE).—*MONGOLIA: Middle Khalkha: Khentii Aimag, the Kerülen River valley, 5 km above Ondorkhaan, right bank floodplain meadow, 9 August 1989, Dariymaa et al. 404 (MW).-Mongol-Daurian: Töv Aimag, 40 km to SW from Ulan Bator, left bank of the Tuul Gol River, 14 August 1981, Gubanov 3980 (MW).—Mongolian Altai: Bayan-Uul Aimag, the Bulgan River valley, 35 km below Bulgan, sand, elev. 1900 m, 13 August 1982, Gubanov 5376 (MW).-Valley of Lakes: Bayankhongor Aimag, 25 km to N from Lake Buuntsagaan Nur, irrigated field margin, 8 km to E from Baydrach-Gol River, elev. 1400 m, 11 August 1984, Gubanov 8924 (MW).

In Russia, *E. amurensis* was also reported from Amur Oblast (Probatova & Sokolovskaya 1981); Chelyabinsk Oblast (Kulikov 2005 sub nom. *E. pilosa* auct.); Irkutsk Oblast (Lomonosova 1990); Novosibirsk Oblast (Lomonosova 2000); Tyumen Oblast (Zarubin *et al.* 1979 sub nom. *E. pilosa* auct.). For Mongolia, floristic subdivisions are given instead of first-level administrative units. They are based on Grubov & Yunatov (1952) scheme slightly transformed by Gubanov (1996).

Chromosome numbers:—2n=40 reported from Bogorodskoye, Khabarovsk Krai, Russia (Probatova & Sokolovskaya 1984) and from Khilok Station, Zabaykalsky Krai, Russia (Probatova *et al.* 2009).

Key:—A key includes four taxa of the *E. pilosa* complex known to occur in Russia.

1.	Plant with glands (minute round or elongate depressions) at least on the sheath keel	E. amurensis
-	Plant without glands on the sheath keel although glands are present at the base of panicle branches	
2.	Panicle nodes without hairs; base of leaf blade rarely with solitary long hairs	E. multicaulis
-	Panicle nodes and base of leaf blade with long hairs	
3.	Lemma of lower florets 1.2-1.5 mm long; panicle branches glabrous to scabrid	E. pilosa s.str.
-	Lemma of lower florets (1.5–)1.7(–2.0) mm long; panicle branches densely scabrid	
		ncl. E. albensis).

Conclusion

Eragrostis amurensis and *E. voronensis* are conspecific. The name *E. perplexa* is not applicable to Eurasian glandular plants. *Eragrostis voronensis* was described from the area where it was apparently absent 150 years ago. Many *E. pilosa* auct. records in Russia were misidentified and should be attributed to *E. amurensis* (plants with glands) and to some extant to *E. imberbis* (eglandular plants from Asiatic Russia). *Eragrostis amurensis* should be considered an expanding colonizer in Central Europe penetrated from Eastern Europe, and not an Asian alien.

There are four or five species from the *E. pilosa* complex in Russia—true *E. pilosa* (Caucasus, S European Russia), *E. amurensis* (riverside sands throughout), *E. multicaulis* (Russian Far East and casual records elsewhere), and *E. imberbis* (Russian Far East, S Siberia). The latter species is probably conspecific with *E. albensis*, an established alien in European Russia.

Acknowledgments

I had a lucky opportunity to discuss *E. pilosa* group with Dr. Yuri Alexeev (Moscow University). I highly appreciate his assistance and generous knowledge. Also, he asked me to acknowledge his permanent coauthor on *Eragrostis* Dr. Evgeny Mavrodiev (University of Florida). Dr. Mikhail Ignatov (Main Botanic Garden, Russian Academy of Sciences) helped me to produce extensional photographs. Draft map was kindly produced by Sergey Dudov (Moscow University).

The earlier version of manuscript was reviewed by Prof. Hildemar Scholz (Botanischer Garten und Botanisches Museum Berlin-Dahlem, Freie Universität, Berlin). He supplied me with additional references and generated some ideas on how to improve the paper. I am deeply indebted to him, although his taxonomic position is strongly argued here and I did not follow all his kind instructions.

I acknowledge co-operation of Dr. Paul M. Peterson, Curator of grasses in US herbarium. He sent me spikelets of *E. perplexa*, made thorough linguistic checking of the manuscript and as a reviewer suggested many improvements. The second reviewer, Dr. Nina S. Probatova (Institute of Biology & Soil Science, Russian Academy of Sciences, Vladivostok), provided additional references and pointed out some bugs. My current work on Vladimir Oblast flora is supported by RFBR grant 11–04–97502.

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