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Contribution to the flora of Asian and European countries: new national and regional vascular plant records, 8

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Contribution to the flora of Asian and European countries: new national and regional vascular plant records, 8

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ABSTRACT

The paper presents new records of 24 vascular plant species from 11 Eurasian countries. One taxon (*Orobanche laxissima*) is reported from Armenia; one (*Epipactis condensata*) from Azerbaijan; two (*Phragmites americanus*, *Polygala multicaulis*) from Belarus; one (*Stipa caucasica*) from Egypt; one (*Puccinellia hauptiana*) from Kyrgyzstan; three (*Aquilegia xinjiangensis*, *Geranium saxatile*, *Ranunculus songaricus*) from Mongolia; one (*Stipa roborowskyi*) from Pakistan; three (*Echinochloa muricata*, *Erigeron acris* subsp. *podolicus*, *Hypericum majus*) from Poland; six from Russia, whereof one (*Zanthoxylum armatum*) from the European part of Russia and five (*Chaerophyllum aureum*, *Elsholtzia densa*, *Poa compressa*, *Ranunculus subrigidus*, *Viola sororia*) from the Asian part of Russia; two (*Ludwigia repens*, *Sagittaria latifolia*) from Slovakia; and three (*Rubus ambrosius*, *Rubus camptostachys*, *Rubus perrobustus*) from Ukraine. For each species, synonyms, general distribution, habitat preferences, taxonomy with remarks on recognition and differentiation of the species from the most similar taxa occurring in a given country, as well as a list of recorded localities (often far from the previously known areas), are presented.

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Introduction

During field exploration across the vast area of 11 European and Asian countries as well as during taxonomic revisions based on herbarium materials of different groups of vascular plants, the authors found some species that are new to the floras of particular countries or their significant regions (provinces or republics). The paper is the continuation of the previous works (Nobis et al. 2014a, 2014c, 2015a, 2015b, 2016, 2017, 2018), which similarly to the works of Sukhorukov et al. (2016) and Sukhorukov et al. (2017) are dedicated to new national and regional vascular plant records, to broaden our knowledge on their distribution and taxonomy. The aim of this paper is to report new

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records of 24 vascular plant species from 11 Eurasian countries.

New records to the flora of Asian countries

Aquilegia xinjiangensis Erst (Ranunculaceae)

Contributors – Andrey Erst, Kunli Xiang, Wei Wang

Distribution and habitat

The species was recently described from Xinjiang (Altay Prefecture, Qinghe and Fuhai Counties), China (Erst et al. 2017). A review of the genus *Aquilegia* in Mongolia included seven species (Erst et al. 2016). *Aquilegia xinjiangensis* is a new native species to Mongolia. It occurs in subalpine meadows and mountain coniferous forests, 2000–2500 m a.s.l.

Taxonomic notes

From a morphological point of view, *Aquilegia xinjiangensis* belongs to *Aquilegia* sect. *Glandulosae* Vassiljeva (Vassiljeva 1996) and is morphologically similar to *A. daingolica* from NW Mongolia having two-coloured petals and dark anthers. However, *A. xinjiangensis* has thin spurs, which are slightly shorter than the laminae and slightly curved at the top, whereas *A. daingolica* has basally inflated, almost straight spurs longer than or equal in length to the laminae. These two species are distinguished from others by the tuberculate seed surface (Erst et al. 2017).

Examined specimens (new record)

MONGOLIA: Khovd province, Bulgan Sum, Indertiin gol, Yarakh mountain, 95 km from sum centre, slope of mountain, 3 September 1990, *Ch. Sanchir* (UBA).

Chaerophyllum aureum L. (Apiaceae)

Contributor – Vyacheslav V. Byalt

Distribution and habitat

The species' primary area covers the Caucasus, Central and West Europe, the Mediterranean region, Asia Minor and Iran (Cannon 1968; Vinogradova 2004; Pimenov and Ostroumova 2012). In the West Caucasus, the natural habitats of *Chaerophyllum aureum* are edges of deciduous and mixed forests and herbgrass subalpine meadows near the upper forest border in mountains. In several European areas, the species is regarded as an alien, invasive species, occurring in natural and semi-natural as well as anthropogenic habitats (Vinogradova 2004; Tikhomirov 2006; Nobis and Nobis 2015). In European Russia, it has been noted as an alien species in numerous provinces and cities. The revision of herbaria materials showed that the species was found in the following regions: Tver, Vladimir, Moscow, Leningrad, Tambov, Pskov, Saratov Provinces and territory of St Petersburg and Moscow (Petrova 2016). According to other published data, *C. aureum* was also noted in Bashkiria, Karelia, Kursk, Rostov and Saratov Provinces (Vinogradova 2004; Pimenov and Ostroumova 2012).

It is very probable that the species will continue its spread across Russia (Mayorov et al. 2012; Petrova 2016). Our finding of *C. aureum* in Yamal-Nenets Autonomous Region supports this hypothesis. The species was collected during its flowering season in Gubkinsky town. This is a new record of *C. aureum* spontaneous spread in Siberia.

Taxonomic notes

Chaerophyllum L. includes ca. 35 species that are widely spread in Europe, Asia, North Africa and North America (Spalik and Downie 2001; Pimenov and Ostroumova 2012). Eleven species were recorded in Russia (Pimenov and Ostroumova 2012). They are mainly herbaceous biennial plants with a tuber or perennials with a rhizome.

Phylogenetic reconstruction inferred from molecular data corroborated the division of the genus *Chaerophyllum* into four monophyletic sections: *Chaerophyllum*, *Dasypetalon* Neilr., *Physocaulis* DC. and *Chrysocarpum* Spalik & S.R.Downie (Spalik and Downie 2001; Piwczyński, Puchałka, and Spalik 2015). Most members of the genus, including *C. aureum*, belong to the last section. *Chaerophyllum aureum* differs from morphologically similar *Chaerophyllum hirsutum* L. by having non-ciliated petals on their edges, styles bent to the dorsal side of mericarps and stems usually red-dotted; whereas *C. hirsutum* has ciliated petals, protruding styles and stems without red dots.

Examined specimens (new record)

RUSSIA (Siberia): Yamal-Nenets Autonomous Region, Purovsky District, Gubkinsky town, on the roadside, 10 August 2013, *V. Byalt, S. Ivanov 101* (LE).

Elsholtzia densa Benth. (Lamiaceae)

Contributors – Aleksandr L. Ebel, Alla V. Verkhozina

Distribution and habitat

Elsholtzia densa is an annual plant species native to Asia. It is distributed in Afghanistan, China, India, Kyrgyzstan, Nepal, Pakistan and Tajikistan (Kovalevskaya 1987; Li and Hedge 1994). Within native area it grows in forest margins, alpine meadows, hills, waste areas, riverbanks, forests; in China

it occurs in a wide altitudinal range – from 1000 m up to 4100 m (Li and Hedge 1994). Along with other species of this genus, *E. densa* is used as an aromatic and medicinal plant, and for this reason it is grown beyond the native area.

The specimens of *E. densa* were found in the Asiatic part of Russia (Baikal Siberia) during a field trip in 2017. There were ca. 20 blooming plants growing on the bank of the small river, near the motorway on the southern outskirts of the town of Petrovsk-Zabaykalsky.

Taxonomic notes

The genus *Elsholtzia* comprises about 40 species, most of which occur in Southern and Eastern Asia. In Russia, only four species of this genus have been known so far. These include the widely distributed *Elsholtzia ciliata* (Thunb.) Hylander, and two species restricted to the southern part of the Russian Far East: *Elsholtzia amurensis* Probat. and *Elsholtzia pseudocristata* H. Lev. All three species have secondary spikes. The clear-cut *Elsholtzia serotina* Kom. has very dense short-cylindrical spikes and large bracts with a long point at the apex (Probatova 1995). *Elsholtzia densa* is characterized by cylindrical spikes, sometimes interrupted at the base at anthesis and more or less densely villous throughout, and relatively small bracts without a prominent point. This is rather a polymorphic species in terms of leaf blade shape, grade of pubescence, and density of spikes. Some forms were described as varieties or even separate species, e.g. *Elsholtzia calycocarpa* Diels (= *Elsholtzia densa* var. *calycocarpa* [Diels] C.Y.Wu & S.C.Huang), *Elsholtzia ianthina* (Maximowicz ex Kanitz) Dunn (= *Elsholtzia densa* var. *ianthina* [Maximowicz ex Kanitz] C.Y.Wu & S. C.Huang), *Elsholtzia manshurica* (Kitagawa) Kitagawa.

Elsholtzia densa is a new alien species to Russia, and second species of the genus *Elsholtzia* noted in Siberia.

Examined specimens (new record)

RUSSIA: Zabaykalsky Krai, Petrovsk-Zabaykalsky, 51°15′12.4″ N, 108°50′13.5″ E, 770 m a.s.l., bank of the river Balyaga near road, 21 August 2017, *A. Verkhozina, A. Ebel et al.* (IRK, TK).

Epipactis condensata Boissier ex D.P.Young (Orchidaceae)

Contributors – Attila Molnár V., Miklós Óvári, Gábor Sramkó

Distribution and habitat

Epipactis condensata was described based on specimens collected by Balansa in 1854, near Pinarbaşi (Izmir, Turkey) (Boissier 1859). Currently, it is known from Turkey, Syria, Lebanon, Cyprus and the Aegean archipelago of Greece (Samos) (Gügel et al. 2011). Plants found in the Crimean Peninsula originally identified as *E. condensata* (Efimov 2008) were later described as a separate, obligatory self-pollinating species, *Epipactis krymmontana* Kreutz, Fateryga & Efimov (Fateryga et al. 2014). *Epipactis condensata* grows in xerotherm habitats with sparse vegetation (edges and clearings of pine and oak forests), mostly on calcareous or marly soils, between 800 and 1900 m a.s.l. (Gügel et al. 2011; Delforge 2006).

Taxonomic notes

It is supposed that the closest relatives of *Epipactis condensata* are *Epipactis purpurata* Sm. and *Epipactis rechingeri* Renz (Young 1970; Renz 1978; Renz and Taubenheim 1983; Meikle 1985). The first species differs from the two others by having much more pubescent rachis and ovary, greyish to yellowish green (not violet-tinged) leaves and yellowish green flowers and by the habitat (sparse woodlands instead of shady forests) (Efimov 2008). *Epipactis condensata* is similar (and probably closely related) to obligate autogamous *E. krymmontana*, from which it differs by its relatively dense and usually much longer inflorescence, much darker epichile with more protruding bosses and presence of a viscidium (Fateryga et al. 2014).

Examined specimens (new record)

AZERBAIJAN: Khizi (Xızı) Rayon, near Tikhli (Tıxlı) (40.90562° N, 49.10251° E, 583 m alt.), on the open soil surfaces of a smoke tree (*Cotinus coggygria*) plantation, a few hundred flowering stems, 7 June 2010, *A Molnár V., M. Óvári, G. Sramkó* (DE).

Geranium saxatile Kar. & Kir. (Geraniaceae)

Contributors – Victoria I. Troshkina, Baasanmunkh Shukherdorj, Andrey Erst

Distribution and habitat

Geranium saxatile was described by G.S. Karelin and I.P. Kirilov (1842) in *Bulletin de la Société Impériale des Naturalistes de Moscou* from Dzhungarskiy Alatau (East Kazakhstan). The species is distributed in the territory of Tajikistan, Kyrgyzstan, Kazakhstan and Western China in the Pamir-Alai, Tien-Shan, Tarbagatay and Dzhungarskiy Alatau (Fisun 1963; Nabiev 1983; Novosselava 1996). This species has not previously been found within the territory of Mongolia. It grows in alpine and subalpine meadows,

sometimes in the upper part of the tree-shrub zone, in damp places.

Taxonomic notes

Geranium saxatile belongs to taxonomically difficult section *Recuvata* Knuth and it is a part of the group of kinship of ancient-Mediterranean species *Geranium collinum* Steph. ex. Willd. *Geranium saxatile* has strong erect stems; shallow (3/4–1/2) separate leaf blades; umbellate inflorescence concentrated in the upper part of the stem; a relatively large blue-purple corolla. However, *Geranium collinum* is characterized by a weak ascending dissection almost to the base of the leaf blades; axillary peduncles, arranged along the entire length of the stem; and pinkish-purple corolla (Fisun 1966; Novosselava 1996). According to our observation, these species differ in size and structure of the sculpture of pollen grains (Troshkina and Ovchinnikova 2017; Troshkina 2017).

Examined specimens (new records)

MONGOLIA: Mongolian Altai, basin of the river Bulgangol, river gorge Elastyngol, the left-bank tributaries in the riverheads, 11 July 1984, *Sh. Dariymaa, R. V. Kamelin №359* (LE); Alashansky ridge, river gorge Yamata, eastern slope, on humus soil, 5 May 1908, *S.S. Chetyrkin №97* (LE); Khovd Province, Bulgan Sum, Baitag Bogd Mountain, riverside, 90°55'49"E, 45° 14'0"N, 2314 m a.s.l., 6 June 2013 and 12 August 2017, B. Oyuntsetseg, *Sh. Baasanmunkh* (UBU).

Orobanche laxissima Uhlich & Rätzel (Orobanchaceae)

Contributor – Renata Piwowarczyk

Distribution and habitat

Orobanche laxissima is known only from Russia, Turkey and Georgia (Rätzel and Uhlich 2004; Piwowarczyk, personal observation, 2014–15), and Azerbaijan (Piwowarczyk and Tatanov 2013; Raab-Straube and Raus 2013). It is a polyphagous, probably endemic, Caucasian root parasite of trees: mainly *Fraxinus* L., *Fagus* L., *Carpinus* L., *Corylus* L., *Ligustrum* L. and *Acer* L. The species prefers moist, shady or semi-shady places in deciduous forests, in the submontane and montane zone (Rätzel and Uhlich 2004; Piwowarczyk and Tatanov 2013; Raab-Straube and Raus 2013; Piwowarczyk, unpublished, 2014–17).

New localities of *O. laxissima* have been found in moist, deciduous forests and shrubs in Syunik Province in Armenia. The species is a new, native taxon to the flora of this country. Populations of the species differ in abundance, comprising from 100 to 300 shoots.

Taxonomic notes

The holoparasitic Orobanchaceae in Armenia are represented by one species of *Cistanche*, two *Diphelypaea*, 15 *Phelipanche* and 18 *Orobanche* (Piwowarczyk et al. 2019). Several species have been also included in regional contributions (Aghababyan 2013; Nobis et al. 2016, 2018; Piwowarczyk et al. 2017a) and new species have been described as well (Piwowarczyk, Sánchez Pedraja, and Moreno Moral 2017b; Piwowarczyk et al. 2017c, 2018a, 2018b, 2018c).

Orobanche laxissima can be confused with other Caucasian species – *Orobanche owerinii* (Beck) Beck, especially in the herbarium materials if there are no details about the host. *Orobanche owerinii*, like *Orobanche crenata* Forssk., is reported as a parasite mainly of *Vicia* L., *Lathyrus* L., *Trifolium* L. However, typical *O. crenata* parasitizes usually cultivated species of Fabaceae (e.g. *Vicia faba* L.) or Apiaceae (e.g. *Daucus carota* L.). The most typical form of *O. owerinii* is the one parasitizing *Trifolium canescens* Willd. (Novopokrovskij and Tzvelev 1958; Piwowarczyk, unpublished, 2015).

Orobanche laxissima and *O. owerinii* differ in morphology. The first species has a longer shoot (25–80 cm versus 15–60 cm); longer inflorescence (up to 40 cm, lax, many flowered, usually as long as or longer than the remaining stem versus up to 20 cm, short cylindrical or oval, lax, often few flowered, shorter than or equalling the remaining part of the stem); calyx segments usually bidentate versus entire or rarely bidentate; corolla usually 22–24 cm versus 18–30 cm; anthers and style usually with glandular hairs versus subglabrous; usually longer, broader, semi-orbicular and more crenate lobes than in *O. owerinii*. They also parasitize different hosts (roots of trees metioned above versus herbaceous Fabaceae), and habitat preferences (moist, shady or semi-shady shrub and deciduous forests versus subalpine meadows).

It is worth emphasizing that both taxa are very polymorphic, especially in coloration, size, number and density of flowers. It is very often much more difficult to distinguish them in herbaria (especially if only single specimens are available) than in the field, because on dried plant material some characters are not clearly visible. *Orobanche owerinii* is probably closely related to *O. crenata* and replaces it in the upper montane zone (Novopokrovskij and Tzvelev 1958; Tzvelev 2015). This issue requires further study, including revision of all herbarium materials labeled as *O. crenata*, or *O. owerinii*, as well as the

whole subsections *Speciosae* (Beck) Teryokhin and *Minores* (Beck) Teryokhin, supported by field research and determination of hosts, especially in the Caucasus.

Examined specimens (new records)

ARMENIA: Southeastern Armenia, Syunik province: Lichk S, road to waterfall, woody thicket on the slope, on *Fraxinus*, alt. 1705–1740 m, 17 June 2017, *R. Piwowarczyk* s.n. (ERCB, KTC); Lichk SE, behind the Meghri river towards waterfalls, mixed forests and scrubs, on *Fraxinus*, alt. 1750–1760 m, 17 June 2017, *R. Piwowarczyk* s.n. (ERCB, KTC).

Poa compressa L. (Poaceae)

Contributor – Marina Olonova

Distribution and habitat

Poa compressa (Canada bluegrass or flattened meadowgrass) is distributed in the temperate zone of Eurasia, being widespread grass in Europe and in the Pacific area (Tzvelev 1976). In spite of being recorded in numerous places in European Russia, it is considered to be a rare plant in the forest zone. It is quite rare in Siberia. Until 2000, there was only one recorded locality near the agricultural experimental station in Eastern Siberia (Olonova 2003). Later, it was found in other regions of the most populated southern part of Western Siberia (Ebel 2013; Olonova and Gao 2014). The species is known in the USA as an invasive one (Whitson et al. 1996; Heffeman et al. 2001) and seems to spread easily in Siberia as well (Olonova et al. 2016). Nevertheless, the species has been reported neither from Arctic Siberia, nor from Krasnoyarsk Kari stretching from the Arctic Ocean southwards to 52°N. In summer 2016, it was collected in Arctic Siberia, in the vicinity of Dudinka on the Yenisei River, in a disturbed plant community near the road in the port.

Taxonomic notes

Poa compressa together with two other species, *Poa rehmannii* (Aschers. & Graebn.) Woloscz. and *Poa taurica* H.Pojark., belongs to subsection *Tichopoa* (Aschers. & Graebn.) Maire of section *Stenopoa* Dum. (Tzvelev 1976). *Poa compressa* is the most common and widespread, whereas *P. rehmannii* and *P. taurica* are endemic to Carpathians and Crimea, respectively. The species of subsect. *Tichopoa* differ from other *Stenopoa* by having strongly compressed culms and nodes, and by being rhizomatous. In spite of being a morphologically variable species, *P. compressa* can be distinguished from the most similar *P. rehmannii* and *P. taurica* by having smooth and glabrous culms under the panicle and a tuft of hairs on the lemma callus. For comparison, the culm of *P. rehmannii* is hairy under the panicle, and its lemma callus is glabrous; the culm of *P. taurica* is scabrous.

Examined specimens (new record)

RUSSIA: Krasnoyarsk Krai, Dudinka, the bank of the Yenisei River, near the road in the port, 4 September 2016, *M. Olonova* s.n. (TK).

Puccinellia hauptiana (Trin. ex V.I.Krecz.) Kitag. (Poaceae)

Puccinellia distans subsp. *hauptiana* (Trin. ex V.I. Krecz.) W.E.Hughes

Contributors – Marcin Nobis, Anna Wróbel, Ewelina Klichowska, Arkadiusz Nowak

Distribution and habitat

Puccinellia hauptiana is distributed in Eurasia (mainly Russia and China) and North America (Alaska) where it occurs on sandy, stony or saline sites, usually near watercourses or marshes (Hughes and Halliday 1980; Liang and Tzvelev 2006). During the field research in Middle Asia in 2017, the species was for the first time observed in Kyrgyzstan. Two localities of this taxon were discovered in the central Tian-Shan Mountains where several dozen individuals grew mainly on gravel-stony roadsides and partly spread into directly adjacent meadow communities. Including other *Puccinellia* species previously noted in Kyrgyzstan (Lazkov and Sultanova 2014), newly found *P. hauptiana* is the tenth *Puccinellia* species observed so far in this country.

Taxonomic notes

The genus *Puccinellia* still requires modern integrative taxonomic revision to verify and clarify the systematic position of many taxa, including *Puccinellia hauptiana*. Some authors classified this taxon as a separate species (Krechetovich 1934; Tzvelev 1976; Liang and Tzvelev 2006), while others incline to the view that it should be treated rather as a subspecies – *Puccinellia distans* subsp. *hauptiana* (Hughes and Halliday 1980; Davis and Consaul 2007). *Puccinellia hauptiana* differs from the most morphologically similar *Puccinellia distans* agg. (including *Puccinellia glauca* (Regel) V.I.Krecz.) mainly in the length of anthers (0.3–0.5 mm long vs. 0.6–1.0 mm long respectively) and lemmas (1.5–1.8 mm long vs. 1.8–2.8 mm long respectively). According to our preliminary revision of selected *Puccinelia* taxa from Eurasia (Nobis and Wróbel, unpublished data) these

diagnostic characters are stable and allow to distinguish *P. hauptiana* from *P. distans* agg. very well.

Examined specimens (new records)

KYRGYZSTAN: Tian Shan Mts, ca. 40 km E from Songköl lake, 41°52'29.59" N, 75°43'36.80" E, 2765 m a.s.l, roadside, 6 July 2017, *M. Nobis, E. Klichowska, A. Wróbel* & *A. Nowak* (KRA 0475398; KRA 0473804); Tian Shan Mts, ca. 8.5 km NE from Kara-Unkur, 41°49'33.80" N, 75°46'55.16" E, 2795 m a.s.l., roadside, 7 July 2017, *M. Nobis, E. Klichowska, A. Wróbel* & *A. Nowak* (KRA0475925); Tian Shan Mts, ca. 8.5 km NE from Kara-Unkur, 41°49'33.80" N, 75° 46'55.16" E, 2795 m a.s.l., meadow, 7 July 2017, *M. Nobis, E. Klichowska, A. Wróbel* & *A. Nowak* (KRA 0475926; KRA 0475927).

Ranunculus songaricus Schrenk (Ranunculaceae)

Contributors – Andrey Erst, Oyuntsetseg Batlai, Hyeok Jae Choi

Distribution and habitat

The species was firstly described from Tastau and Dschabyk (Tarbagatai Ridge) in Kazakhstan (Schrenk 1842). In Central Asia this taxon was reported from Kyrgyzstan (Lazkov and Sultanova 2014), Kazakhstan (Gamayunova 1961) and China (Wang and Gilbert 2001). From the territory of Mongolia, *Ranunculus songaricus* has not been reported yet (Gubanov 1996). However, for the first time *Ranunculus songaricus* has been recently found in Mongolia and should be now regarded as a new native species to this country. The species is distributed in the alpine zone and grows in meadows and on stony slopes.

Taxonomic notes

According to the "Conspectus of Flora of Outer Mongolia", 25 species representing the genus *Ranunculus* occur in all provinces (Gubanov 1996). *Ranunculus arschantynicus* Kamelin, Schmakov & S. Smirnov and *Ranunculus sapozhnikovii* Schegoleva have been described from the Mongolian Altai (Kamelin, Shmakov, and Smirnov 2004; Schegoleva 2006a, 2006b). Recently five species, namely *Ranunculus schmakovii* Erst, *Ranunculus pseudomonophyllus* Timokhina, *Ranunculus smirnovii* Ovcz., *Ranunculus turczaninovii* (Luferov) Vorosch. and *Ranunculus tuvinicus* Erst, have been recorded in Mongolia (German et al. 2009; Nobis et al. 2015b, 2017). The last critical analysis of the species composition of the genus in Mongolia revealed 33 species. *Ranunculus songaricus* morphologically belongs to Sect. *Auricomus* Schur. This section consists of 45–60 species (additionally ca. 600 agamospecies in the Eurasian *R. auricomus* complex [Hörandl et al. 2009], and several other species of uncertain taxonomic status [Hörandl and Emadzade 2012]). Representatives of the subsection *Altimontana* Schegoleva are distinguished from the species from the subsection Cassubici Tzvel. (e.g. *R. monophyllus* Ovcz.) by the lack of filmy scale-like leaves at the shoot base, three to five separate rosette leaves with wedge-shaped, incised segments and glabrous achenes (Schegoleva 2006a, 2006b). *Ranunculus songoricus* differs from the closely related *Ranunculus trautvetterianus* Regel ex Ovcz. in dissection and shape of the leaf blades.

Examined specimens (new record)

MONGOLIA: Khovd Province, Bulgan Sum, Baitag Bogd Mountain, Buduun Khargaitiin Gol, Riverside, 90°55'49"E, 45°14'06"N, 2314 m a.s.l., 3 July 2013, *Oyuntsetseg Batlai, Hyeok Jae Choi, B. Shukherdorj* (UBU).

Ranunculus subrigidus W.B.Drew (Ranunculaceae)

Batrachium subrigidum (W.B.Drew) Ritchie

Contributor – Laura M. Kipriyanova

Distribution and habitat

Ranunculus subrigidus is widely distributed in North America: along the eastern coast from New England in USA to Ontario and Newfoundland in Canada, the Mississippi valley and the Great Lakes region, the western coast of North America and the Rocky Mountains from Mexico (Chihuahua) to Alaska (Crow and Hellquist 2000; Wiegleb, Bobrov, and Zalewska-Gałosz 2017). In Asia the species occurs in North East and Central Asia: Siberia (Republic of Sakha [Yakutia], Republic of Tuva), Russian Far East, Mongolia and China (Bobrov and Mochalova 2014; Bobrov et al. 2017; Ivanova et al. 2017; Wiegleb, Bobrov, and Zalewska-Gałosz 2017). In Europe, it is known from the most northeastern area (Polar Ural) (Wiegleb, Bobrov, and Zalewska-Gałosz 2017).

Ranunculus subrigidus is absent in the main floristic lists of Siberia (Baikov 2005, 2012). Our research presents the first documented location of this species in Altai Territory. Recently, this species was found in the Novosibirsk Region (Kipriyanova 2018). The species mostly shows a continental temperate distribution. It occupies mostly inland areas from arid to subarctic regions, and occurs in lakes, ponds, streams with hard water and even brackish waters (Wiegleb, Bobrov, and Zalewska-Gałosz 2017).

Ranunculus. subrigidus was confirmed by us in the Kulunda main canal in Altai Territory (West Siberia) in 2014. It formed dense and vast communities with projective cover more than 75% in the depth 0.5–0.8 m. Plants were blooming; many of them had fruits. *Chara globularis* Thuill. (det. R. Romanov), *Hydrilla verticillata* (L. fil.) Royle, *Potamogeton perfoliatus* L., *Potamogeton compressus* L. and other submerged species were also found in the *R. subrigidus* community.

Taxonomic notes

Ranunculus subrigidus W.B.Drew has been merged in *Ranunculus circinatus* Sibth. for a long time, in spite of having specific characters such as pyriform nectar pits, hairy leaves, stipules and upper part of stems, as well as softer and sparser leaves. Evidently, both make up a pair of allopatric species. *Ranunculus subrigidus* W.B. Drew has also been treated as a synonym or a lower rank taxon within *Ranunculus aquatilis* L. In the last review on aquatic *Ranunculus* species (Wiegleb, Bobrov, and Zalewska-Gałosz 2017) the authors distinguish four clades based on morphology, geography, molecular evidence and chromosome number counts, in which *R. subrigidus* and *R. aquatilis* are placed in the different clades. *Ranunculus subrigidus* also differs from *Ranunculus longirostris* Godr. by larger and wider petals, which have a distinct yellow claw, and pyriform nectar pits. The style of the carpel is less pronounced and sometimes subterminal. In Central Asia *R. subrigidus* is very similar to *Ranunculus sphaerospermus* Boiss. & C.I.Blanche; both species have large flowers with pyriform nectar pits and similar general appearance, so frequently they can be distinguished only by size and number of fruits: *R. sphaerospermus* has numerous (> 50) small fruits (< 1 mm), contrary to *R. subrigidus* which has less abundant and bigger fruits (Wiegleb, Bobrov, and Zalewska-Gałosz 2017).

Examined specimens (new record)

RUSSIA: Altai Region, Tyumentsevsky District, Kulunda main canal in 2.5 km to the E from Gryaznovo village, 53°22'45.6" N, 81°18'28.6" E, 5 July 2014, *L.M. Kipriyanova* (NS).

Stipa caucasica Schmalh. (Poacaeae)

Contributor – Polina D. Gudkova

Distribution and habitat

Stipa caucasica is widely distributed in the mountains of Asia, from Minor Asia (Caucasus, Northern Iran) through Turkmenistan, Uzbekistan, Kazakhstan, Kyrgyzstan, Tajikistan, Afghanistan, Pakistan, Kashmir up to China (Tzvelev 1968, 1976; Freitag 1985; Wu and Phillips 2006). It is an important component of different mountainous, subalpine semi-deserts and woodland communities from about (1200–) 1400 m up to 3500 (–4000) m a.s.l. (Freitag 1985). During revision of collections of the genus *Stipa* L. in LE herbarium, specimens of *S. caucasica* from Sinai collected by G.W. Schimper in 1835 were found. *Stipa caucasica* has not been previously noted in that region. Sinai is a mountain in the Sinai Peninsula of Egypt and this place is far from the previously known localities of this species in Caucasus. To date, the genus *Stipa* in Egypt has been represented by two species *Stipa lagascae* Roem. & Schult. noted in the northern Egypt and *Stipa arabica* Trin. & Rupr. known from the Sinai Mt (Ibrahim, Hosni, and Peterson 2016). *Stipa caucasica* is a new species to the flora of Egypt.

Taxonomic notes

The examined herbarium specimen had previously been determined as *Stipa barbata* Desf. although it significantly differs from *S. barbata* in having unigeniculate awns, hairs on seta 4–6 mm long vs bigeniculate awn with seta hairs c. 1.1 mm long and ligules at the vegetative leaves up to 0.2 mm long, densely ciliated by hairs vs 1–2 mm long ciliate. According to Ibrahim, Hosni, and Peterson (2016), in the locality of Sinai Mt *Stipa arabica* grows as well. *Stipa caucasica* and *S. arabica* differ by the character of awn (unigeniculate, with seta hairs 4–6 mm long vs. bigeniculate, with seta hairs 2–2.5 mm long) and ligules at the vegetative shoots (up to 0.2 mm long, densely ciliated by 1.5–2 mm long hairs vs 4–8 (15) mm long acute, usually short ciliolate).

Examined specimens (new record)

EGYPT: Unio itiner. Inter lapides ad radices montis Sinai (Between the stones at the foot of Mount Sinai), 15 May 1835, *W. Schimper* (LE).

Stipa roborowskyi Roshev. (Poaceae)

Contributors – Marcin Nobis, Agnieszka Nobis

Distribution and habitat

Stipa roborowskyi is known only from China (western Himalayas). Due to previous misidentification of *S. roborowskyi* with *Stipa klimesii* M.Nobis (syn. *Stipa basiplumosa* var. *longearistata*; Nobis et al. 2014b, 2015), distribution range of the last species requires detailed examination. After revision of a large number of specimens determined previously as *S. roborowskyi*, it appears that most of them, collected from China, India, Nepal, Buthan and Pakistan, refer to *S.*

klimesii and only few specimens collected from western China can be identified as *S. roborowskyi*.

During revision of *Stipa* species from Pakistan preserved at GOET, we found specimens of *S. roborowskyi*, and this is the first confirmed record of this species in the country.

Taxonomic notes

As a result of recent taxonomic revision of species belonging to *Stipa roborowskyi* group, *Stipa klimesii* has been distinguished as a new species to science. It is morphologically most similar to *S. roborowskyi*, but it differs mainly in the character of ligules of vegetative shoots, which in *S. klimesii* are always longer ((2–)3.5–7.5(–9) mm versus 0.5–1.5(–2) mm). Additionally, *S. klimesii* has a longer anthecium ((7–)8.3–9.5(–10.5) mm versus (6.0–)6.5–7.5(–7.7) mm) and longer hairs on seta ((1–)1.3–2(–2.3) mm versus (0.3–)0.5–1.1(–1.4) mm) (Nobis et al. 2014b; Nobis, Nowak, and Gudkova 2015).

Examined specimens (new record)

PAKISTAN: (Karakorum) Upper Bradlu tributary, above Chikor, 36°22–24'N/75°22–24'E, alpine steppe, dominated by Gramineae and flat cushions of *Oxytropis* spp., near drainage line (water surplus), alt. 4100–4200 m, 17 August 1991, *G. & S. Miehe* 6221 (M).

Viola sororia Willd. (Violaceae)

Contributors – Elena Yu. Zykova, Aleksandr L. Ebel

Distribution and habitat

Viola sororia, known as the common blue violet, is a species with a natural range in North America. It is distributed in the east of the continent from Canada to Mexico, where it occurs in forests, thickets, moist prairies, on stream banks and coastal shoals, as well as in pastures and on disturbed ground (Britton and Brown 1970; Little and McKinney 2015). It was introduced to the Eurasian countries as an ornamental shade-tolerant species and now is considered as established. The species prefers friable fertile soils. In the European part of Russia, it is known beyond culture in the Moscow region (Mayorov et al. 2012) and in the Republic of Karelia (Kravchenko and Fadeeva 2014). In the Asian part of Russia, *V. sororia* was for the first time recorded as escaped from culture. In the discovered locality the species is quite acclimatized, forming continuous abundantly blooming tufts.

Taxonomic notes

Viola sororia is a new representative of the genus *Viola* in Asiatic Russia, where ca. 70 species have been observed so far (Zuev 2012). *Viola sororia* is a short-stemmed herbaceous perennial rhizomatous plant with heart-shaped long-petioled leaves assembled into a basal rosette and exceeding their length by peduncles with large single flowers. Petal colour of this species in native populations is usually light to dark blue-violet. In culture *V. sororia* has white petals (sometimes with violet veins), and often much larger flowers. *Viola sororia*, as well as many other violets, can form cleistogamous flowers (Little and McKinney 2015), therefore the species multiplies successfully not only vegetatively, but also gives a rich self-sowing.

Examined specimens (new record)

RUSSIA: Novosibirsk Oblast, Novosibirsk Akademgorodok, Akademicheskaya st., 54°59' N, 83°00' E, wasteland, 24 May 2017, *E. Yu. Zykova* (NS, TK).

New records to the flora of Europaean countries

Echinochloa muricata (P.Beauv.) Fernald (Poaceae)

Contributors – Marcin Nobis, Ana Terlević

Distribution and habitat

Echinochloa muricata has been a long-overlooked alien which is now more or less widely naturalized in Europe (Hoste 2004). It is a North American species most common in the western part of the United States, where it grows mainly in wet habitats, e.g. in. ditches, sloughs and pond-margins (Fernald 1915). To date, *E. muricata* has been reported from Austria, Belgium, Corsica, Czech Republic, Denmark, France, Germany, Great Britain and Ukraine (DAISIE 2018; Euro+Med Plantbase 2018). The first locality of *E. muricata* in Europe was recorded from Belgium in 1887, but the history of introduction and naturalization of this species is unknown (Hoste 2004).

To date, there are five non-native species from the genus *Echinochloa* that have been noted in Poland (Pacyna 2005). Of this number, only *Echinochloa crus-galli* (L.) P.Beauv. has been known as established/naturalized and invasive in Poland (Tokarska-Guzik et al. 2012). The other species, *Echinochloa colonum* (L.) Link, *Echinochloa esculenta* (A. Braun) H. Scholz, *Echinochloa frumentacea* Link and *Echinochloa microstachya* (Wiegand) Rydb. have also been recorded in Poland, but not as permanently

established (ephemerophytes) (Tokarska-Guzik et al. 2012). Recently, *E. muricata* has been found in Poland. Its occurrence in Poland was suggested by Pacyna (2005), but only two years ago (in 2016) we found large and established populations of this species in the Vistula River Valley. *Echinochloa muricata* and *E. crus-galli* resemble each other ecologically; however, *E. muricata* performs slightly better on moister and heavier soils (e.g. in river valleys). Both species are also found on arable land and ruderal, recently disturbed sites, or sometimes in shallow ditches along fields that run dry in summer (Hoste 2004).

Taxonomic notes

Echinochloa muricata is morphologically a rather variable species and at the same time very similar to *Echinochloa crus-galli. Echinochloa muricata* is characterized by subacuminate fertile lemma with a firmer tip, whereas in *E. crus-galli* the fertile lemma is subacute or obtuse, with a withering tip (Wiegand 1921). Furthermore, *E. crus-galli* has a line of minute hairs between body and tip of the fertile lemma, whereas in *E. muricata* hairs are absent (Fassett 1949).

Hoste (2004) stated that, although *E. muricata* and *E. crus-galli* are morphologically variable species, identification is not a serious problem when mature material is available. By carefully looking at the lemma of the fertile flower in *E. crus-galli*, the distinction between the membranous tip and the coriaceous part is usually clear-cut and visible with a hand lens. Furthermore, a good first indication in the field is provided by the uppermost leaf, which in *E. muricata* shows a line in the form of an "upside-down U" between blade and sheath. In smaller plants this structure generally results in a stiff, upright position of the blade, whereas in *E. crus-galli* the upper blade is generally patent to reflexed (Hoste 2004).

There are two varieties of *E. muricata: E. muricata* var. *microstachya* Wieg. (= *E. microstachya*) with spikelets 2.5–3.8 mm long and lower lemmas unawned or with awns to 6 (–10) mm long, and *E. muricata* var. *muricata* with spikelets 3.5–5 mm long and lower lemmas with 6–16 mm long awns. However, a distinction between *E. muricata* var. *muricata* and *E. muricata* var. *microstachya* is not always evident. *Echinochloa muricata* var. *microstachya* is gradually spreading and is by far the most common variety, whereas *E. muricata* var. *muricata* is only known as a rare casual (Hoste 2004). The collected specimens of *E. muricata* in Poland represent *E. muricata* var. *microstachya.*

Examined specimens (new records)

POLAND: Karpaty Zachodnie – Beskid Makowski (Średni) – central part; Myślenice (Myślenicki district, Małopolskie province), disturbed ground with gravel near playing field LZS "Orzeł", on the left side of the Raba river, abundant; ca. 280 (285) m a.s.l., DF 9904 (ATPOL grid), 18 August 2006, *W. Bartoszek* (KRA 0304069, 0303793, 0304707, 0303801–0303804); Vistula River Valley, muddy bank of the river, Słupia Nadbrzeżna near Zawichost, FE62 (ATPOL grid), 10 September 2016, *M. Nobis* (KRA 0479990, 0479988); Vistula River Valley, muddy bank of the river, Nasiłów, FE13 (ATPOL grid), 28 September 2016, *M. Nobis* (KRA 0479989, 0479987, 0479986).

Erigeron acris subsp. *podolicus* (Besser) Nyman (Asteraceae)

Erigeron podolicus Besser

Contributor – Artur Pliszko

Distribution and habitat

Erigeron acris subsp. *podolicus* is native to Central, Southeastern and Eastern Europe and Western and Central Asia (Botschantzev 1959; Šída 1998). Its geographical range extends from the steppe and woodland-steppe zone of Russia and Ukraine to the Caucasus in the south, and to the Pannonian Basin in the west (Botschantzev 1959; Šída 1998). In Europe, it was reported from Austria, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Macedonia, Serbia, Bulgaria, Hungary, Romania, Moldova, Germany, the Czech Republic, Slovakia, Ukraine and Russia (Greuter 2006). In Poland, *E. acris* subsp. *podolicus* has not been recorded so far (Šída 1998; Pliszko 2015, 2018); however, considering new data presented herein, it most likely reaches a northern limit of its native range in the southern part of this country. *Erigeron acris* subsp. *podolicus* occurs on sandy, saline soils, gravel beds, grassland slopes, forest glades and edges, as well as on outcrops of chalk and limestone (Botschantzev 1959; Šída 1998). According to Šída (2004), it is associated with xerothermic grassland vegetation of *Festucion valesiacae*.

Taxonomic notes

Erigeron acris subsp. *podolicus* is an accepted name for one of the members of *Erigeron acris* L. s.l., following taxonomic treatment of Astereae by Greuter (2003). It belongs to *Erigeron* sect. *Trimorpha* (Cass.) DC. which consists of annual, biennial or perennial plants with trimorphic flowers within each capitulum, namely outer female ray flowers with erect filiform lamina, inner female ray flowers without lamina, and typical inner bisexual disc flowers (Nesom 2008). *Erigeron acris* subsp.

podolicus resembles *Erigeron acris* subsp. *baicalensis* (Botsch.) A. Pliszko, *Erigeron acris* subsp. *serotinus* (Weihe) Greuter and *Erigeron acris* subsp. *droebachiensis* (O. F. Müll.) Arcang. by having numerous cauline leaves; however, its outer ray flowers possess longer ligules (Pliszko 2015, 2016). Moreover, similarly to *E. acris* subsp. *baicalensis* and *E. acris* subsp. *serotinus, E. acris* subsp. *podolicus* is densely covered with unbranched multicellular uniseriate non-glandular trichomes on stems, leaves and involucral bracts, in contrast to glabrous or sparsely covered *E. acris* subsp. *droebachiensis* (Pliszko 2015, 2016, 2018). It should be pointed out that taxa included in *E. acris* s.l. show a great morphological variation in the number and shape of cauline leaves, and size and arrangement of capitula, as well as in indumentum (Halliday 1976; Šída 1998, 2000, 2004; Pliszko 2015, 2016, 2018; Olander and Tyler 2017), and they easily hybridize with each other (Šída 1998, 2000, 2004) or other closely related taxa (Pliszko 2015; Mundell 2016; Pliszko and Jaźwa 2017; Pliszko and Kostrakiewicz-Gierałt 2018). Determination key for *Erigeron acris* s.l. occurring in Poland is presented below:

(1) Stems and leaves densely villous, involucral bracts abaxially densely villous and sparsely short-stipitate glandular … 2
(2) Stems and leaves glabrous or sparsely villous at the base, involucral bracts abaxially densely short-stipitate glandular, glabrous or sparsely villous … 3
(3) Outer ray flowers with short, usually white or lilac ligules, exceeding the involucre by up to 2 mm … 4
(4) Outer ray flowers with long, usually pink ligules, exceeding the involucre by up to 4 mm … *Erigeron acris* subsp. *podolicus*
(5) Basal leaves with acute apex; cauline leaves narrowly lanceolate to linear; peduncles sparsely short-stipitate glandular or glabrous; capitula in racemiform synflorescence … *Erigeron acris* subsp. *angulosus*
(6) Basal leaves with obtuse apex; cauline leaves lanceolate; peduncles densely to sparsely villous and short-stipitate glandular; capitula in paniculiform synflorescence … *Erigeron acris* subsp. *droebachiensis*
(7) Cauline leaves 4–16, flat, usually erect; internodes 1.0–8.0 cm; capitula in paniculiform synflorescence … *Erigeron acris* subsp. *acris*
(8) Cauline leaves 12–36, broadly undulate, recurved; internodes 0.2–3.8 cm; capitula in racemiform or paniculiform synflorescence … *Erigeron acris* subsp. *serotinus*

Examined specimens (new record)

POLAND: West-Beskidian Piedmont, Sułkowice, 49° 50.624' N, 19°47.048' E, alt. 316 m, roadside slope, 7 October 2017, *A. Pliszko s.n.* (KRA 0475616, 0475617, 0475618).

Hypericum majus (A.Gray) Britton (Hypericaceae)

Contributor – Stanisław Rosadziński

Distribution and habitat

Hypericum majus is a perennial (or annual) species native to North America whose range includes south-eastern Canada and northeastern parts of the USA (Robson 1990, 2015). In Europe it was recognized for the first time in Germany (Tutin et al. 1968; Robson 1990); later, it was observed in several other countries: France (Bouchard 1954; Tutin et al. 1968; Prince and Aniotsbehere 2012), Belarus (Dubowik, Skuratowicz, and Trietjakow 2012, 2014; Dubowik et al. 2015) and Italy (Airale et al. 2017). This species has also been introduced in eastern Asia (Robson 1990; Mito and Uesugi 2004). In the area of natural range *H. majus* grows on fens, marshes, ditches, lake and stream margins and other damp habitats up to 1200 m a.s.l. (Robson 2015). In Europe, the species grows mainly on anthropogenic habitats, such as edges of ponds and ditches (Bouchard 1954; Tutin et al. 1968), in humid depressions in heatherlands (Prince and Aniotsbehere 2012), disturbed peatlands and in peat-bog pools (Dubowik, Skuratowicz, and Trietjakow 2012, 2014; Dubowik et al. 2015) and post-mining excavations (Merxmüller and Vollrath 1956; Nezadal 1984). *Hypericum majus* was probably introduced to Europe unknowingly by American soldiers during World War I (Bouchard 1954; Merxmüller and Vollrath 1956; Westhoff 1971). To Poland, *H. majus* was probably introduced from Brandenburg with the participation of waterfowl. The invasion of species by this dispersal mode took place in the territory of Belarus (Dubowik, Skuratowicz, and Trietjakow 2012).

Hypericum majus has been found in western Poland in several ponds within three active or abandoned fish farms. The whole area of local populations ranges about 2500 m^2. They are very abundant, with estimated number of tens of thousands of individuals. The floristic composition of *H. majus* patches has been studied, with relevés using a standard Braun-Blanquet method. The phytosociological documentation of phytocoenosis in the pond in Rościce is presented below. Area of 25 m^2, cover of the herb layer c: 80%, cover of the moss layer d: 5%, number of species in the relevé: 31.

Hypericum majus (A.Gray) Britton 4; *Eleocharis acicularis* (L.) Roem. & Schult fo. *annua* 3; *Juncus effusus* L. em. K.Richt. 3; *Echinochloa crus-galli* (L.) P.Beauv. 2; *Epilobium adenocaulon* Hausskn. 1; *Gnaphalium uliginosum* L. 1; *Phragmites australis* (Cav.) Trin. ex Steud. 1; *Alisma plantago-aquatica* L. +; *Alnus glutinosa* (L.) Gaertn. +; *Alopecurus aequalis* Sobol. +; *Bidens frondosa* L. r; *Carex bohemica* Schreb. +; *Dicranella varia* (Hedw.) Schimp. +; *Elatine hexandra* (Lapierre) DC. +; *Eleocharis palustris* (L.) Roem. & Schult. +; *Galium palustre* L. +; *Hydrocotyle vulgaris* L. +; *Juncus filiformis* L. +; *Juncus articulatus* L. em. K.Richt. +; *Leersia oryzoides* (L.) Sw. +; *Leptobryum pyriforme* (Hedw.) Wilson +; *Lycopus europaeus* L. +; *Plantago intermedia* Gilib. +; *Polygonum amphibium* L. +; *Polygonum hydropiper* L. +; *Polygonum lapathifolium* L. subsp. *lapathifolium* +; *Riccia cavernosa* Hoffm. +; *Riccia canaliculata* Hoffm. +; *Rorippa palustris* (L.) Besser r; *Rumex maritimus* L. +.

The floristic composition of the phytocoenosis with *H. majus* corresponds with the phytosociological preferences of this species in western Europe (Bouchard 1954; Prince and Aniotsbehere 2012; Nezadal 1984). In Poland the species develops optimally on periodically exposed pond bottoms. It forms dense phytocoenoses, thus hindering the development of small terophytes from the *Isoëto durieui-Juncetea bufonii* class. On overgrown and uncultivated ponds, it was also observed in communities of *Molinio-Arrhenatheretea, Phragmitetea australis* and *Scheuchzerio-Caricetea fuscae* classes. In comparison to pioneer habitats, the species was there less abundant and grew in small groups.

In France *H. majus* was recognized as a regional invasive agriophyte (Fried 2010). The species has equal status in western Poland and it is a threat to natural and semi-natural plant communities. From 2009 to 2012, in the fish ponds in Rościce, detailed studies of communities from the class of *Isoëto durieui-Juncetea bufonii* were conducted (Rosadziński 2016), during which a few individuals of *H. majus* were observed. Since 2017, the species has significantly enlarged its area, occupying habitats on the bottom of fish ponds; therefore it should be pointed out that it has high invasive potential.

Taxonomic notes

In Poland, the genus *Hypericum* comprises eight native species: *Hypericum maculatum* Crantz, *Hypericum perforatum* L., *Hypericum elegans* Stephan *ex* Willd., *Hypericum tetrapterum* Fr. (section *Hypericum*), *Hypericum humifusum* (sect. *Oligostema*), *Hypericum hirsutum* L., *Hypericum pulchrum* L. (sect. *Taeniocarpium*) and *Hypericum montanum* (sect. *Adenosepalum*). In Europe *Hypericum majus* (A. Gray) Britton (sect. *Trigynobrathys*) used to be confused with closely related *Hypericum canadense* (e.g. in France, cf. Jonker 1960). *Hypericum majus* differs from the *H. canadense* by broader leaves, larger flowers and usually has more-congested inflorescence (Robson 2015). In order to avoid mistakes in distinguishing the species from native taxa that may occur in similar habitats in Poland (mainly *H. tetrapterum* and less often *H. perforatum*), a simplified key is shown below.

(1) Red or black glands absent, stems 4-lined, leaves lanceolate to oblong … *Hypericum majus*
– Red or black glands present at least on leaves, sepals and anthers … 2
(2) Stems round with 2 raised lines, leaves ovate to linear … *Hypericum perforatum*
– Stems narrowly 4-winged, leaves orbicular to ovate … *Hypericum tetrapterum*

Examined specimens (new records)

POLAND: western Poland, Wzniesienia Żarskie hills, Rościce village, 51°36'24" N, 14°59'38" E, alt. 160 m, in 3 ponds on a fishing farm, 2 August 2017, *S. Rosadziński* (POZ); western Poland, Wzniesienia Żarskie hills, Miłowice village, 51°36'5.37" N, 15° 3'18.26" E, alt. 147 m, in the overgrowing pond, 3 August 2017, *S. Rosadziński* (POZ); western Poland, Bory Dolnośląskie Forest, near Bobrowice village, 51° 31'17" N, 15°31'30" E, alt. 137 m, in the overgrowing pond, 18 August 2017, *S. Rosadziński* (POZ).

Ludwigia repens J.R.Forst. (Onagraceae)

Contributor – Richard Hrivnák

Distribution and habitat

Ludwigia repens is a native species to North and Central America and alien to several continents including Europe. In Europe, occurrence of this species is reported from several countries (DASIE 2018, http://www.europe-aliens.org/speciesFactsheet.do?speciesId=9770#) such as Spain (Rodríguez-Merino, Fernández-Zamudio, and García-Murillo 2017), Germany (GEFD 2018, http://www.kp-buttler.de/florenliste/), Austria (Fischer, Oswald, and Adler 2008) and Hungary (Lukács et al. 2016). To date, this alien species has not been included in the flora of Slovakia (cf. Medvecká et al. 2012). A population of this species was found in thermal water (temperature > 40 °C, pH 6.55–7.15 and electrical conductivity ~765 µS/cm) with numerous individuals growing in a thermal pond, and scattered occurrence was detected in a ditch directly connected with the pond, with still and quickly flowing water, respectively. The species was planted in the past

and recently successfully spontaneously spread in thermal pond and mentioned ditch with thermal water. In native areas such as North America, *L. repens* grows in a broad scale of freshwater habitats, shallow, still or flowing, slightly acidic to alkaline waters at elevations up to 1372 m (Les 2018). On the contrary, this alien species was found in thermal waters in Slovakia, as well as in Hungary (Lukács et al. 2016).

Taxonomic notes

Ludwigia repens belongs to the sect. *Dantia* as a polyploid complex including five species. All species occur in North America in wet habitats. As these species generally lack well-developed pre- or post-zygotic barriers to hybridization, they commonly form natural hybrid populations (Peng et al. 2005).

Examined specimens (new record)

SLOVAKIA: Hornonitrianska kotlina basin, Bojnice spa, a thermal pond and an adjacent ditch connected with the pond, N 48°46'21.4", E 18°34'10.4", alt. 310 m, 2 August 2017, *Richard Hrivnák* (SAV).

Phragmites americanus (Saltonstall, P.M. Peterson, & Soreng) A.Haines (Poaceae)

Phragmites australis (Cav.) Trin. ex Steud. subsp. *americanus* Saltonstall, P.M.Peterson, & Soreng

Contributors – Valery N. Tikhomirov, Maxim A. Dzhus

Distribution and habitat

Phragmites Adans. (subfam. *Arundineae*, tribe Moliniae) comprises from 4 to 20 species occurring in wetland habitats of temperate and tropical regions of the world (Clayton 1967; Tzvelev 1976; Clevering and Lissner 1999; Tzvelev 2011). In Belarus *Phragmites* is represented by two species: widespread native *Phragmites australis* (Cav.) Trin. ex Steud. and sparsely distributed invasive *Phragmites altissimus* (Benth.) Mabille (Tretjakov 2013). In October 2012 specimens belonging to *Phragmites americanus*, species previously not reported from Europe, were collected from Minsk Ringroad. In this locality, *P. americanus* was probably introduced by accident and occurs in dense stand (5 x 15 m) along the roadside near agricultural fields.

Phragmites americanus is native to North America. This species is widespread throughout Canada and most of the United States except of the Southeast (Texas, Florida, North and South Carolina). In North America it grows in tidal and non-tidal wetlands, inland marshes and fens as well as lacustrine and riparian systems (Saltonstall 2002, 2010; Saltonstall, Peterson, and Soreng. 2004; Saltonstall and Hauber 2007; Swearingen and Saltonstall 2010).

Taxonomic notes

Unfortunately, herbarium specimens of *Phragmites* are rarely collected, not only because of their large size and late flowering, but also because most botanists used to treat all individuals of *Phragmites* as belonging to one common species, *P. australis*. However, recent molecular investigations have shown a very wide range of genotypic variability in this complex (Koppitz 1999; Kühl et al. 1999; Pellegrin and Hauber 1999; Saltonstall 2002, 2003; Lambertini et al. 2006). In the temperate zone of North America *P. australis* s.l. consists of two co-occurring lineages: introduced Eurasian *P. australis* s.str. and native to North American lineage *P. americanus* (Haines 2010) (syn. *P. australis* subsp. *americanus*; Saltonstall 2002, 2003). Since these two taxa differ in distribution patterns, vegetative and generative characters, it is more appropriate to treat them as separate species. *Phragmites americanus* and European populations of *P. australis* s.l. can be distinguished by many morphological features. *Phragmites americanus* has longer ligules (1.0–1.7 mm vs. 0.4–0.9 mm in *P. australis* s.str.), lower glumes (3.0–6.5 mm vs. 2.5–5.0 mm, respectively) and upper glumes (5.5–11.0 mm vs. 4.5–7.5 mm, respectively), lemmas (8.0–13.5 mm vs. 7.5–12.0 mm, respectively). Leaf sheaths of *P. americanus* become loose with age whereas *P. australis* has tightly enclosing culm even at later stages. The most easily noticeable characters of *P. americanus* are smooth, shiny and red-brown to dark red-brown middle and lower stem internodes (similarly to *Phragmites japonicus*), whereas *P. australis* s.str. is characterized by ribbed and dull green to tan-coloured middle and lower stem internodes.

Examined specimens (new records)

BELARUS: Minsk Province, Minsk District, southwestern outskirts of Minsk, on the slope of the Minsk Beltway, on the area 5 × 15 m, 53°50'22,97" N, 27°29'30,77" E; alt. 240 m a.s.l., 13 October 2012, *M. Dzhus 843* (MSKU), Minsk District, southwestern outskirts of Minsk, on the slope of the Minsk Beltway, 53°50'22,97" N, 27°29'30,77" E; alt. 240 m a.s.l., 19 October 2017 *Val. Tikhomirov 04912* (MSKU, LE).

Polygala multicaulis Tausch (Polygalaceae)

Polygala oxyptera Reichenb.; *Polygala vulgaris* L. subsp. *oxyptera* (Reichenb.) Dethard.

Contributors – Valery N. Tikhomirov, Igor I. Shimko

Distribution and habitat

Polygala multicaulis is the Central and Southeast European species. The range of geographic distribution of this species extends from the western part of Russia on the east, throughout the Polish Uplands, up to Denmark via the Lower Rhine Plain, southward via Luxembourg and the Saarland to the area of eastern and southern Switzerland on the west. In the south, extends through southeastern parts of Austria to the borders of Bosnia and Montenegro (Heubl 1984). In Central and Eastern Europe the species is relatively rare; although it occurs in numerous localities in the southern and western regions of Poland, in the north and east parts of the country it is rare (Pawłowski 1958, 1959; Zając and Zając 2001); similarly in Lithuania, where it is known only from the south parts of the country (Kask, Plotniece, and Lekavičius 1996) and in Ukraine where it is known only from a few locations in the Ukrainian Carpathians (Transcarpathian, Ivano-Frankivsk and Lviv provinces) (Tikhomirov 2004, 2013b). It grows on grasslands and heaths or in sparse pine forests, mostly on shallow humus or sandy soils with low nutrient content. This species has been recently found in the northwestern part of Belarus and it is considered a new native species to the Belarusian flora.

Taxonomic notes

Polygala vulgaris L. s.l. is one of the most problematic groups of wasteland species in Europe. Within this group, over eight species and intraspecific taxa have been distinguished so far (Heubl 1984; Tikhomirov 2004, 2013a, 2013b; Arrigoni 2014). In Belarus this group is represented by three species: *Polygala vaillantii* Bess. (widespread), *P. vulgaris* L. s.str. (rare, mainly in the western and central regions of Belarus) and *P. multicaulis* Tausch (rare, known only from two localities in the northwestern part of the country). Differences between these species are given as a short key for their identification, which includes the main diagnostic features of these species. This key can be used to determine this group in territories surrounding Belarus.

(1) Wing-like sepals at flowering stage (6–)6.5–7.5 mm long, 7–8.5 mm long at fruiting stage, and the same width as the mature capsule or slightly wider than it, 1.1–1.25 times longer than capsule; flowers usually blue. *Polygala vulgaris*
– Wing-like sepals at flowering stage 4.5–6(–6.5) mm long, 6–7.5 mm long at fruiting stage, narrower than mature capsule..... 2

(2) Wing-like sepals at fruiting stage 3–3.7 mm wide, 10–30% narrower than mature capsule, of the same length as capsule or slightly longer (no more than 1.15 times); flowers are blue, crest of keel 14- to 26-lobed. *Polygala vaillantii*
– Wing-like sepals at fruiting stage 2–3 mm wide, 30–50% narrower than mature capsule, of the same length as capsule or slightly shorter; flowers are light blue to dirty white, crest of keel 8- to 16-lobed. *Polygala multicaulis*

Examined specimens (new record)

BELARUS: Minsk Province, Valožyn District, near Dolevichy village. Mesophytic grassland on the slope of an abandoned sand pit, 12 July 2001, *Val. Tikhomirov 00619* (MSKU-41,273, MSKU-41,274); Viciebsk Province, Vierchniadzvinsk District, island on the Asvejskaje Lake. Dry meadow, frequent, 9 June 1998, *I. Shimko* (private collection).

Sagittaria latifolia Willd. (Alismataceae)

Contributors – Richard Hrivnák, Kateřina Bubíková, Judita Kochjarová, Helena Oťaheľová

Distribution and habitat

Sagittaria latifolia is an American species frequently occurring in several European countries as an alien (Hussner 2012). Although more distribution data are known from neighbouring countries of Slovakia (Czech Republic, Austria, Ukraine), it has not yet been reported from the territory of Slovakia (cf. Medvecká et al. 2012). In Europe, *S. latifolia* grows in shallow and eutrophic waters within littoral marshland vegetation; the ecological conditions are similar to native European species *Sagittaria sagittifolia* L. which prefers slightly wetter habitats (Casper and Krausch 1980). Two of the newly discovered localities had similar ecological conditions: eutrophic, still or slowly flowing, shallow water. In both cases, the individuals of *S. latifolia* grew in the littoral zone. We suppose that the species was probably planted or dispersed by waterflow in the past in the first locality and than it spontaneously spread throughout the littoral zone. In the second locality, its origin seems to be unknown. In both cases, *S. latifolia* grows there within typical native marshy vegetation and localities are without direct human impact.

Taxonomic notes

Seven species of the genus *Sagittaria* are known from the Central European flora, but only one species is native to Slovakia, *S. sagittifolia*. *Sagittaria latifolia* is quite similar to *S. sagittifolia*, but both taxa are relatively well recognizable. *Sagittaria sagittifolia* has smaller, narrower and more elongated leaves comparing to *S. latifolia*; both species have white petals, but in the case of *S. sagittifolia* with a red spot on the petal base (Casper and Krausch 1980).

Examined specimens (new records)

SLOVAKIA: Krupinská planina Mts, Horný Badín village, Lazy settlement, on the margin of an artificial pond, N 48°17'24.7", E 19°05'21.9", alt. 341 m, 7 August 2013, *Richard Hrivnák, Judita Kochjarová & Helena Oťaheľová* (without herbarium specimen); Lučenská kotlina basin, Kalonda village, on the bank of the Ipeľ river, N 47°53'12.3", E 18°45'45.3", alt. 105 m, 4 September 2017, *Kateřina Bubíková* (without herbarium specimen).

Rubus ambrosius Trávn. & Oklej. (Rosaceae)

Contributor – Gergely Király

Distribution and habitat

Rubus ambrosius is a relatively recently described (Trávníček, Oklejewicz, and Zieliński 2005) bramble species form eastern Central Europe, widespread in the Northern Carpathians and on their foothills in Slovakia and Poland, with rather scattered localities in the Czech Republic. Later (Kurtto et al. 2010) it was given also from the eastern part of Germany and northern Hungary, beside an isolated, supposedly non-native occurrence in western Ukraine (near to Lviv). Finally, it was also found at a single locality in Lower Austria (Király and Hohla 2015). *Rubus ambrosius* is a bramble of submontane-montane regions with beech and mixed oak-hornbeam forests. It prefers forest fringes, woody pastures, and open forests mainly on mesic or semi-dry, neutral or slightly acidic soils.

During the recent herbarium revisions in BP, I found several specimens of *R. ambrosius* in the material collected mainly by Antal Margittai in the 1920s–1930s in the mountain ranges around Mukacevo (at that time Czechoslovakia, today the Transcarpathian region of Ukraine). These specimens reveal that *R. ambrosius* is native to Ukraine, connected to the already known abundant occurrence from the bordering part of Slovakia in the Northeastern Carpathians.

Taxonomic notes

Rubus ambrosius belongs to the relatively few triploid representatives of *Rubus* ser. *Rubus* (Krahulcová, Trávníček, and Šarhanová 2013). It is a majestic bramble, morphologically similar to the widespread tetraploid *Rubus sulcatus* Vest, but it differs by having deeply furrowed first-year stems (*R. sulcatus*: stem sides sulcate to almost flat), it has somewhat longer, stronger and denser prickles, petiole usually longer than the lower leaflets (*R. sulcatus*: petiole usually shorter than the leaflets), leaflets shallowly toothed (teeth up to 2.5 mm deep, for *R. sulcatus* up to 4 mm), and petals relatively short (up to 13 mm long, for *R. sulcatus* up to 17 mm) – for more identification details, see Trávniček and Zázvorka (2005) and Király and Hohla (2015).

Examined specimens (new records)

UKRAINE: Transcarpathia (Zakarpattia Oblast): "Mt. Csesznek ad Munkács" (= Mt Csesznek, Mukacevo), 1 July 1927, *A. Margittai* (BP85077) (as "*R. sulcatus* Vest var. *subvelutinus* Borb. et Waisb."), and *A. Margittai* (BP470156) (as "*R. candicans* Wh. et N. var. *thyrsanthus* Focke"); "Kopinovce, Bereg" (= Kopynivtsi, Bereg County), July 1928, *A. Margittai* (BP85075, BP470678) (as "*R. sulcatus* Vest"); "Szólyva és Hársfalva közt, Bereg megye" (= between Svaljava and Helipino, Bereg County), 6 July 1892, *L. Richter* (BP434561) (as "*R. Menyhazensis*"); "in silvis ad Novoe Selo, Bereg" (= Beregujfalu, Bereg County), 24 July 1935, *A. Margittai* (BP463300) (as "*R. sulcatus* Vest", revised erroneously by Krassovskaja L., 2001, as "*R. plicatus* Wh. et N."); "Mt. Nefelejts ad Munkács" (= Mt Nefelejts, Mukacevo), July 1928, *A. Margittai* (BP85076) (as "*R. sulcatus* Vest"); "in valle Viznice at Puznyákfalva, Bereg" (= Viznice Valley, Puznjakyvci, Bereg County), 26 July 1927, *A. Margittai* (BP85070) (as "*R. sulcatus* Vest"); "Lohó, Bereg" (= Lohovo, Bereg County), July 1928, *A. Margittai* (BP85177) (identified erroneously by Hruby as "*R. plicatus* Wh. et N.").

Rubus camptostachys G.Braun (Rosaceae)

Contributors – Krzysztof Oklejewicz, Mateusz Wolanin, Vitaliy Honcharenko, Jolanta Marciniuk, Paweł Marciniuk

Distribution and habitat

Rubus camptostachys is a widespread European bramble species. The species is most common in Germany, Netherlands, and Denmark, moreover it is also given from Belgium, Luxemburg, southern Sweden, Czech Republic and southern Poland (Kurtto et al. 2010). This species grows mainly in forest margins and thickets, in plant communities of the classes

Rhamno-Prunetea, Querco-Fagetea and *Artemisietea vulgaris* (Holub 1995; Holub and Kučera 2001), however, in southwest Poland it was also observed in pine and oak-pine forests (Maliński 2001). In southeast Poland this species grows most often in sunny and moderately transformed places such as forest margins, overgrowing wastelands and roadsides, together with species of the classes *Artemisietea vulgaris, Epilobietea angustifolii, Querco-Fagetea, Molinio-Arrhenatheretea, Agropyretea intermedio-repentis* and *Stellarietea mediae* (Oklejewicz 2006; Wolanin 2015).

During the field expedition to western Ukraine in 2017, three localities of *R. camptostachys* were discovered. We found this species in forest and scrub margins. This plant should be accepted as native to Ukraine.

Taxonomic notes

Rubus camptostachys is a tetraploid (Boratyńska 1996) classified to the series *Subsilvatici*. The main diagnostic characters of this species are: stem low-arching, terete, glabrous, with scattered stalked glands and numerous slender prickles; leaves (3–)4–5-foliolate, leaflets with slightly sunken venation, densely pubescent beneath; inflorescence irregular, usually few-flowered; petals white or rarely pinkish, 10–12 mm long; anthers densely hairy (Holub 1995; Zieliński 2004).

Examined specimens (new records)

UKRAINE: Lviv region: Pustomyty Distr., v. Lapaivka, shrubs in the forest margin, together with *Rubus orthostachys*, N 49°48'28.4", E 23°54'07.5", 8 August 2017, lg. *Wolanin M.* (KRA), lg. *Oklejewicz K.* (KRA); Yavoriv Distr., v. Vereshchytsia, sunlit forest edge, N 49°59'48.8", E 23°38'12.2", 9 August 2017, lg. *Oklejewicz K.* (KRA), lg. *Wolanin M.* (KRA); Yavoriv Distr., v. Vereshchytsia, on outskirt, N 49°59'48.8", E 23°38"12.2", VH 4048. 9 August 2017, lg. *Honcharenko V., Oklejewicz K., Wolanin M.* (LW); Zhovkva Distr., v. Kozulka, shrubs margin, in the roadside, N 50°02'25.3", E 23°46'53.2", VH 4105, 11 August 2017, lg. *Honcharenko V., Oklejewicz K., Wolanin M., Marciniuk J., Marciniuk P.* (LW).

Rubus perrobustus Holub (Rosaceae)

Contributors – Krzysztof Oklejewicz, Mateusz Wolanin, Vitaliy Honcharenko, Jolanta Marciniuk, Paweł Marciniuk

Distribution and habitat

Rubus perrobustus is a widespread eastern Central European bramble species reported from N Austria, Czech Republic, Slovakia, northern Hungary, southeast Poland, and from somewhat distant localities in southern Germany (Kurtto et al. 2010). Recently, it has also been found in northern Italy (Pagitz 2016). It occurs mostly in submontane and upland regions in thickets, forest margins and clearings in plant communities of the classes *Quercetea robori-petreae, Rhamno-Prunetea, Epilobietea angustifolii, Querco-Fagetea, Artemisietea vulgaris* and *Trifolia-Geranietea sanguinei* on mesic to semi-dry and slightly acidic to slightly alkaline soils (Holub 1995; Holub and Kučera 2001; Zieliński 2004; Oklejewicz 2006).

In 2017, 11 localities of *R. perrobustus* were found during the field expedition to western Ukraine. The species grew most often in the pine forest margins and roadsides. Herbarium specimens of this species were also found during the herbarium revision in LW. In view of the species occurrence in the bordering part of Poland (Oklejewicz 2006; Wolanin 2014) and nature character of habitats, this plant should be considered as native to Ukraine.

Taxonomic notes

Rubus perrobrustus is a triploid classified to the series *Rhaminifolii* (Holub 1995; Krahulcová and Holub 1998). However, based on morphology, it stays between subsect. *Rubus* and ser. *Discolores* (Trávniček and Zázvorka 2005). The main diagnostic characters of this species are: stem high-arching, glabrous and furrowed with uniform prickles on angles; leaves 5-foliolate, leaflets relatively slender with straight teeth, loosely pubescent beneath; inflorescence subcylindrical, narrow, leaflets of lower flowering branches leaves deeply serrate; petals pink, 10–13 mm long (Holub 1995; Zieliński 2004).

Examined specimens (new records)

UKRAINE: Lviv Region: Horodok Distr., v. Sukhovolia, pine forest, N 49°50′36.0′′, E 23°51'21.6", 8 August 2017, lg. *Oklejewicz K.* (KRA); Yavoriv Distr., v. Lelekhivka, on the roadside in pine forest, N 49°57'02.3", E 23°41'24.7", 8 August 2017, *Oklejewicz et al.* (field notes); Yavoriv Distr., v. Vereshchytsia, pine forest margin, N 49°59'23.6", E 23°38'23.6", VH 4133, 9 August 2017, lg. *Honcharenko V., Oklejewicz K., Wolanin M.* (LW); Yavoriv Distr., v. Vereshchytsia, ~ 4 km on to the southeast, on the roadside in pine-hornbeam forest, on felling N 49°58'21.9", E 23°40'55.9", VH 4047. 9 August 2017, lg. *Honcharenko V., Oklejewicz K., Wolanin M.* (LW); Yavoriv Distr., c. Novoiavorivsk, railway embankment, N 49°55'27.", E 23°35'06.2", 10 August 2017, *Oklejewicz et al.* (field notes); Yavoriv Distr., Stradch, on the roadside in pine forest, N 49°53'44.4", E 23°45'29.7", 10

August 2017, lg. *Wolanin M.* (KRA); Yavoriv Distr., v. Lozyna, a pine copse margin, N 49°56'37.9", E 23°48'19.3", VH 4071, 11 August 2017, lg. *Honcharenko V., Oklejewicz K., Wolanin M., Marciniuk J., Marciniuk P.* (LW); Yavoriv Distr., v. Serednii Horb, hornbeam forest margin, N 49°57'46.3", E 23°47'22.4", 11 August 2017, *Oklejewicz et al.* (field notes); Yavoriv Distr., v. Serednii Horb, ~ 1.1 km on to northwest, overgrown wasteland, N 49°58'21.9", E 23°46'40.1", VH 4089, 11 August 2017, lg. *Honcharenko V., Oklejewicz K., Wolanin M., Marciniuk J., Marciniuk P.* (LW); Yavoriv Distr., v. Dubrovytsia, ~ 2.2 km on the way to the testing ground, roadside, N 49°59'10.2", E 23°47'12.3", VH 4095, 11 August 2017, lg. *Honcharenko V., Oklejewicz K., Wolanin M., Marciniuk J., Marciniuk P.* (LW); Zhovkva Distr., v. Kozulka, roadside, N 50°02'25.3", E 23°46'53.2", VH 4108, 11 August 2017, lg. *Honcharenko V., Oklejewicz K., Wolanin M., Marciniuk J., Marciniuk P.* (LW); Lviv, the mountain Khomec, near the railway track, 11 July 2001, lg. *Honcharenko V.*, rev. *Oklejewicz K.* 7 August 2017 (LW); Mostyska Distr., v. Kostylnyky, south-eastern outskirts, in hornbeam-oak forest, 5 July 2009, lg. *Kuziarin O.T.*, rev. *Oklejewicz K.* 7 August 2017 (LWS 114,267, 114,270, 114,273); Yavoriv Distr., v. Dubrovytsia, ~ 3.3 km on to northwest, ur. Mochari, roadside, N 49°59'40.7", E 23°46'37.0", VH 4098. 11 August 2017, lg. *Honcharenko V., Oklejewicz K., Wolanin M., Marciniuk J., Marciniuk P.* (LW); Yavoriv Distr., v. Serednii Horb, ~ 0.9 km on to the northeast, on outskirt, N 49°58'20.2", E 23°47'22.8", VH 4093, 11 August 2017, lg. *Honcharenko V., Oklejewicz K., Wolanin M., Marciniuk J., Marciniuk P.* (LW).

Zanthoxylum armatum DC. (Rutaceae)

Contributor – Alexey P. Seregin

Distribution and habitat

The native range of *Zanthoxylum armatum* lies in Tropical Asia and includes Pakistan, India, Nepal, Bhutan, Bangladesh, Laos, Myanmar, Thailand, Vietnam, Indonesia, Philippines, China, Taiwan, Korea and Japan (Hartley 1966; Zhang and Hartley 2008). The former reference includes specimen-based distribution map of the species. There are a few records of the species from Argentina and Italy outside the native range. Arana and Oggero (2009) reported four localities in Córdoba Province of Argentina where *Z. armatum* was first collected in 1994. Later on, Giorgis and Tecco (2014) supposed that the Argentinean records are still the only reports of *Z. armatum* naturalization in the world, but that was not perfectly correct.

In 2003, *Z. armatum* was photographed by G. Donzelli near Blevio in Lombardy, Italy and consequently collected here by G. Galasso in 2011–12 (Galasso and Banfi 2012). Later on, other episodes of naturalization have been recorded in Italy (Montagnani et al. 2016).

Being largely transformed by human activity, a narrow coastal strip of Sochi is full of abundant alien species. Due to mild winters, it is the only place in Russia where evergreen trees and shrubs had escaped from cultivation and are perfectly naturalized. Following Zernov (2006, 2013), these are *Laurus nobilis* L., *Quercus ilex* L., *Eriobotrya japonica* (Thunb.) Lindl., *Acacia dealbata* Link, *Berberis levis* Franch., *Pseudotsuga menziesii* (Mirb.) Franco, *Cedrus deodara* (Roxb.) G. Don fil., *Pinus pinea* L., and some others. Zernov (2006) especially mentioned forests in the vicinity of Khosta and Matsesta with noteworthy aliens of East Asian origin (i.e. *Trachycarpus fortunei* H.Wendl., *Elaeagnus pungens* Thunb., and *E. macrophylla* Thunb.) growing in *Carpinus betulus* L. forest. Recently, Zernov et al. (2017) reported another East Asian naturalized evergreen alien – *Pyracantha angustifolia* (Franch.) C.K. Schneid.

Zernov (2013) recorded the species from Sochi under the name *Z. alatum* Roxb. as an exclusively ornamental plant with no record on possible naturalization. In particular, *Z. armatum* grows in Sochi Arboretum, Donskaya Street (Tsentralny City District) and Lenina Street (Adlersky City District) (Soltani 2016).

Following Zhang and Hartley (2008), *Z. armatum* is a deciduous plant in its native range being a shrub, woody climber, or a tree to 5 m tall. Zernov (2013) mentioned that in cultivation it is a semi-evergreen small tree 2–4 m tall flowering in June. According to my observations confirmed by a specimen, *Z. armatum* was in bloom in late April in Khosta with most leaves on the plant being overwintered. Several individuals were growing along the road on hardwood forest margin on the west-facing slope of the hill. The forest is dominated by mature *Carpinus betulus, Fraxinus excelsior* L., and some *Acer campestre* L. Abundant *Hedera helix* L. covers ground, trunks and a shrub layer composed from *Ligustrum vulgare* L., *Ficus carica* L., and *Cornus spp*. The road is ca. 5 m wide, therefore the habitat is in shade all day long. Most probably, the seeds were dispersed by birds from nearby hotels or estates.

Habitats of *Z. armatum* in Lombardy are similar to those I have recorded in Sochi. They include mixed deciduous forests and margins of forest paths at the altitude of ca. 500 m a.s.l. (Galasso and Banfi 2012).

Taxonomic notes

Being a plant with a wide native range in Tropical Asia and a long history of cultivation in botanical gardens,

Zanthoxylum armatum had accumulated a number of synonyms. Galasso and Banfi (2012) gave a brief overview of the current species concept in the *Z. armatum* group. This plant is more familiar to pharmacists and horticulturists as either *Zanthoxylum alatum* Roxb. or *Zanthoxylum alatum* var. *planispinum* (Sieb. & Zucc.) Rehder & E.H.Wilson. Plants from Japan and most of China with a smaller number of leaflets are treated sometimes as a distinct variety *Zanthoxylum armatum* var. *subtrifoliolatum* (Franch.) Kitamura by the Japanese authors (Kitamura and Murata 1972; Ohba 1999). All these names were synonymized by Zhang and Hartley (2008) following earlier revision by Hartley (1966). I follow this concept in the absence of other revisions. In fact, Asian *Zanthoxylum* L. (ca. 50 species) are insufficiently studied and need complete revision in the molecular era. At the moment, no infrageneric classifications were introduced for Asian species, although some sectional names are available since the nineteenth century. Appelhans et al. (2014) published the only available molecular phylogenetic analysis of *Zanthoxylum* with a special reference to Hawaiian species based on 37 sampled species, including 20 taxa from Asia. In the tree based on ITS and one plastid intergenic spacer (*trnL–trnF*), a single accession of *Z. armatum* showed a basal sister position to a monophyletic group of three lineages, namely (1) *Zanthoxylum coreanum* Nakai + *Zanthoxylum simulans* Hance + *Zanthoxylum beecheyanum* K.Koch + genetically inconsistent *Zanthoxylum bungeanum* Maxim., (2) *Zanthoxylum piperitum* Benn. nom. illeg. + *Zanthoxylum planispinum* Sieb. & Zucc., and (3) *Zanthoxylum acanthopodium* DC. These results could not be interpreted properly because several Korean sequences (Lee et al., unpublished) taken by the authors from GenBank did not cite any vouchers.

Examined specimens (new record)

RUSSIA: Krasnodar Krai, Sochi, Khostinsky City District, Khosta, upper (old) road to Kudepsta, slope forest, along the road, 43°30'47" N, 39°52'27" E, alt. 40 m, 25 April 2017, *A. Seregin C-1446* (MW).

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