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## New records and deletions of Cruciferae for Russia and some neighbouring countries

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**Summary.** Based on the study of collections of LE, RV and RWBG, information on occurrence (or absence) of certain Cruciferae (Brassicaceae) species in Russia and some neighbouring states is updated. *Camelina hispida* is first recorded from Russia, *Camelina sativa* from Turkmenistan and *Goldbachia torulosa* from Ukraine as alien species apparently not naturalized in relevant countries. In contrast, *Isatis armena*, a novelty for the flora of both Russia and Europe, along with *Plagioloba persica* for the first time recorded from Kyrgyzstan, appears to be aboriginal elements in the newly revealed localities. At the same time, occurrence of *Isatis cardiocarpa* in Europe, as well as an introduction of *Goldbachia laevigata* in Ukraine does not get support. In addition, the combination *Plagioloba perfoliata* is validated.

## К видовому составу крестоцветных (Cruciferae) России и некоторых сопредельных стран

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**Ключевые слова:** аборигенные и чужеродные виды, Кыргызстан, распространение, Туркменистан, Украина, Brassicaceae, *Camelina*, *Conringia*, *Goldbachia*, *Isatis*, *Plagioloba*, *Sameraria*.

**Аннотация.** По материалам гербариев LE, RV и RWBG приводятся новые данные о нахождении (или ненахождении) некоторых видов крестоцветных (Cruciferae, или Brassicaceae) в России и ряде соседних стран. В качестве заносных и, по-видимому, не удержавшихся во флоре соответствующих регионов, указанных в скобках, впервые приводятся *Camelina hispida* (Россия), *Camelina sativa* (Туркменистан) и *Goldbachia torulosa* (Украина). *Isatis armena* является новинкой для России и Европы, а *Plagioloba persica* – для Киргизии; оба вида относятся, по всей видимости, к элементам естественной фракции флоры. Не получает подтверждения произрастание *Isatis cardiocarpa* в Европе, а также факт заноса *Goldbachia laevigata* на Украину. Кроме того, обнаружена комбинация *Plagioloba perfoliata*.

Further treatment of Cruciferae (Brassicaceae) collections from northern Eurasia resulted in revealing some more state records and deletions. In this communication, the novelties related to

Kyrgyzstan, Russia, Turkmenistan and Ukraine and based on the materials kept in LE and, to a lesser degree, RV and RWBG, are reported.

## 1. Records

### *Camelina hispida* Boiss.

**Russia:** “Udmurt Republic, Sarapul; in the yard of the groats factory, wasteland. Grain cleaning waste dump. The single much branched specimen. 29 VI 1993. A. N. Puzyrev. Probably introduced with barley from Turkey / Удмуртская Республика, г. Сарапул; во дворе крупозавода, пустырь. На свалке отходов зерноочистки. Один сильно ветвящийся экземпляр. А. Н. Пузырёв. Вероятно, занесено с зерном ячменя из Турции” (LE [LE01108570]).

The specimen bears collector’s identification “*Camelina laxa* C. A. Mey.”, which is probably preliminarily as I failed to find any publication reporting relevant finding. Such characters as abbreviated (vs. pronounced) proximal attenuated part of fruit, straight (vs. zigzag-flexuous) inflorescence axis and stout (vs. filiform) pedicels 3–6 (not (6)8–18(25)) mm long exclude the possibility of the mentioned determination and argue for also SW Asian *C. hispida* s. l. Further peculiarities, viz. glabrous axis and (obovate-pyriform) silicles along with ascending to subappressed pedicels point to the exclusively Anatolian var. *grandiflora* (Boiss.) Hedge sometimes treated as a distinct species (e. g., Al-Shehbaz, Barrera, 2019; Dorofeyev, 2019).

Unlike a number of congeners possessing wide secondary areas, *C. hispida* s. l. does not seem to reveal invasive potential and apparently stays within the limits of its natural SW Asian distribution range. Its records from outside this area are rare and include a few old collections made in Germany that belong to vars. *stiefelhagenii* (Bornm.) Yıld. and *grandiflora* (Parolly et al. in: Parolly, Eren, 2007). The only report for Russia and adjacent countries (the former USSR), from Uzbekistan (Mirek, 1988), turned out to be the result of mislabeling (German, 2021a), and the present finding, to the best of my knowledge, is the first documented case of occurrence of *C. hispida* in this macroregion. Having in mind the scarcity and ephemeral character of all known secondary findings of *C. hispida* s. l., it is clear that the new one is also casual and not leading to establishment of *C. hispida* in Udmurtia and Russia as a whole.

### *Camelina sativa* (L.) Crantz

**Turkmenistan:** “Central Kopet-Dag, 40 km south of Bakharden. Subapls near the Sarymsakly border post. № 902. 18 V 1963. I. A. Gubanov / Центральный Копет-Даг, 40 км южнее Бахарде-

на. Субальпы близ заст. Сарымсаклы. И. А. Губанов” (LE [LE01072833]).

Contrary to the previous species, distribution area of *C. sativa* is highly modified and even predominantly shaped by human activity due to its domestication, long history of cultivation (Al-Shehbaz, 1987; Francis, Warwick, 2009) and ability of being weedy. According to POWO [2022], the species occurs in Turkmenistan as a native plant, and this information is obviously based on the mention of the country in the general distribution of *C. sativa* by Zhou et al. (2001), which, in return, possibly takes roots in the information of Hultén and Fries (1986). The latter authors, however, applied very broad concept of *C. sativa* that included *C. microcarpa* Andr. ex DC. and their Turkmenian localities apparently belong to *C. sylvestris* Wallr. morphologically closest to *C. microcarpa*. There are also some old unspecified reports for “the whole territory of USSR except for the tundra zone” (Yarmolenko, Vassilczenko, 1934; Saltykovsky, 1941 [though on the map a much less distribution is shown]), none of which, however, is confirmed by subsequent region-focused accounts (Vassilczenko, 1948; Vinogradova, 1974; Gudkova, 1985; Nikitin, Geldikhanov, 1988; Kamakhina, 2005) and broad-scale works (Vassilczenko, 1939; Nikitin, 1983), where distribution is mentioned more precisely. In full accordance with these data, no gatherings, except for the above-mentioned one, of *C. sativa* from Turkmenistan are known to me.

The specimen initially identified as *C. rumelica* Velen. was found among materials of *C. sylvestris*. However, moderate to sparse indumentum composed almost exclusively of small branched trichomes and fruits 8–9.5 × 4–5.5 mm with rounded apex and styles ca. 2 mm long do not fit either of the above species but are indicative of *C. sativa*. Alien nature of this finding is indubitable; most likely currently the species is extinct in Turkmenistan.

### *Goldbachia torulosa* DC.

**Ukraine:** “Kiev, railway station Kiev-Tovarnyi, along railway, single. 15 VI 1990. S. L. Mosyakin / Киев, ж/д станция Киев-Товарный, вдоль ж/д путей, единично. С. Л. Мосякин” (LE [LE01072834]).

This is the only gathering based on which the genus *Goldbachia* DC. is known in Ukraine (Mosyakin, 1991: 57; 1992: 38; Iljinska et al., 2007: 128–129). It is characterized by sepals without crisped trichomes and cauline leaves widest in the middle (not in proximal part) with minute (vs. well

developed) acute auricles and thus cannot belong to *G. laevigata* (M. Bieb.) DC., as reported by the above authors. Combination of the mentioned peculiarities along with the fruits forming a distinct angle with pedicel proves that it is *G. torulosa*, a more widespread species (Botschantzev, 1963; German, Chen, 2009) known as ruderal and segetal weed (Nabiev, 1974).

Similar to another case of finding of *G. torulosa* far away from its natural Irano-Turanian distribution area, in the south of Boreal zone of European Russia (Izhevsk: Ilminskikh et al., 1998; Baranova, Puzyrev, 2012), it obviously behaves as an ephemero-phyte and can be found again only in case of repeated introduction, likely as a crop seed or food contaminant.

*Isatis armena* L. (*Sameraria armena* (L.) Desv.)

**Russia/Europe:** “[Rostov Prov., near Manych]: The Province of the Don Cossack Host. Salsk Distr., Wagner Manych-Gruz resort. Slope of Big Liman. № 824. 27 V 1917. K. M. Zalessky / Область Войска Донского. Сальский округ. Вагнеровская Манычско-Грузская санитарная станция. Склон Б. Лимана. К. М. Залесский” (RV); “Rostov Prov., Orlovsky Distr., 1.5 km to the west of Manych, northern shore of the lake Gruzskoye, Rostov Nature Reserve, protected area, steppe slope. 28 IV 2001. A. N. Shmarayeva / Ростовская обл., Орловский р-н, 1,5 км зап. пос. Маныч, северный берег оз. Грузского, охранная зона государственного заповедника «Ростовский», остепнённый склон. А. Н. Шмараева” (ALTB [ALTB1100044854, ALTB1100045528], LE [LE01072835], RWBG); “Rostov Prov., Orlovsky Distr., near Manych, Rostov Nature Reserve, protected area (northern shore of the lake Gruzskoye). 28 IV 2014. A. N. Shmarayeva / Ростовская обл., Орловский р-н, окр. пос. Маныч, охранная зона заповедника (сев. бер. оз. Грузского). А. Н. Шмараева” (LE [LE01109398]).

All the above gatherings refer to the same locality situated in the south-easternmost part of the Rostov region. The considered plant was first collected there by K. M. Zalessky over a century ago and identified by him as *Tauscheria lasiocarpa* Fisch. ex DC. (Zalessky, 1918: 148). Relevant specimen has been revised by A. V. Bogdan in 1940 as *Sameraria cardiocarpa* Trautv. [*Isatis cardiocarpa* (Trautv.) Al-Shehbaz, Moazzeni et Mumm.] and since then, plants from Manych are being reported under this name by all authors (e. g., Flerov, 1984; Dorofeyev, 2002, 2003, 2007, 2012a, b; Shmarayeva et al., 2004,

2016). Based on the fact that the site in focus is situated considerably (over 500 km) apart from the main area of this predominantly Caucasian species and in view of the absence of confirming gatherings in subsequent decades, the plant was initially believed to be occasional alien in Rostov Region (Flerov, 1984: 129). However, upon its re-discovery in the same place it was reconsidered as native in this sole European locality as occurring and self-reproducing in natural communities and not exhibiting any tendency of spreading into secondary habitats and was included in both editions of the regional Red Book (Shishlova, 2004; Dorofeyev, Shishlova, 2014).

Despite revealing the overall similarity with *I. cardiocarpa*, all specimens from Manych are characterized by oblanceolate-spathulate petals up to  $4.5 \times 1.2$  mm, ca. 1.5 times exceeding sepals and hence fit *I. armena* [*Sameraria armena* (L.) Desv.] and not *I. cardiocarpa* that has obovate petals  $5-7 \times 2.2-2.8$  mm, ca. twice as long as sepals (Botschantzev, 1980; Boczantzeva, 1985, both as *S. cardiocarpa*). Besides, all leaves of relevant specimens are entire while in plants of *I. cardiocarpa* lowermost ones are often serrulate. Finally, as clarified by Botschantzev (1980), *I. cardiocarpa*, contrary to various previous reports, is confined in its distribution to Caucasus and adjacent Turkey and consequently is an exclusively montane species while a more widespread (but being absent from Caucasus) *I. armena* also occurs in more or less plain regions such as deserts and steppe deserts, often saline, of central and western Kazakhstan. In view of the present revision, a disjunct position of Manych locality turned out to be even more pronounced since it is situated 850–1000 and more km apart from the closest localities of relevant species in western Kazakhstan (Ustyurt, Emba floristic region – LE), beyond the Caspian Sea and/or Depression. Based on the above-mentioned assumption of the native status of *I. armena* in Rostov Province (Dorofeyev, Shishlova, 2014, as *S. cardiocarpa*), the relict character of this exclave can be supposed. It seems logic to connect its formation with the last spread of the Caspian Sea affected the Kuma-Manych Strait, viz. Kvalynian Transgression (Minoransky, Podgornaya, 2002) of the late Pleistocene, unless other (e. g., birds- or nomads-mediated) ways of introduction are proven. Anyway, protection of the species in Rostov Oblast appears reasonable despite the changed identification.

*Plagioloba persica* (Boiss.) Khosravi et Eslami-Farouji (*Conringia persica* Boiss.)

**Kyrgyzstan:** “Osh Prov., Ala-Buka distr. Chatkal Range, southern slope, near Sumsar, talus slope. 12 V 1977. B. Sultanova, N. Ledovskaya, S. Batalov / Ошская обл. Ала-Букинский р-н. Чаткальский хр., южный склон, окр. пос. Сумсар, каменная осыпь. Б. Султанова, Н. Ледовская, С. Баталов” (LE [LE01072840]).

This Irano-Turanian species faces its north-eastern distribution limit in Middle Asia, where it is known, in particular, from neighbouring Uzbekistan and Tajikistan (Botschantzev, Vvedensky, 1955; Kovalevskaya, 1974; Yunusov, 1978; POWO [2022]). The Kirghisian locality is situated near the border with Uzbekistan. It was correctly (as *Conringia persica*) determined already by V. P. Botschantzev (i. e. before or at latest in 1990), but this information remained hitherto uncounted (cf. Lazkov, Sultanova, 2014).

Besides *P. persica*, the recently resurrected (German, 2021b) and further revised (Khosravi et al., 2022) genus *Plagioloba* Reichenb. is represented in Kyrgyzstan (and Middle Asia as a whole) by one more, also native, species – *Plagioloba perfoliata* (C. A. Mey.) D. A. German et Al-Shehbaz, **comb. nov.** (*Sisymbrium perfoliatum* C. A. Mey., 1831, Verz. Pfl. Cauc. Casp. Meer: 188).

Noteworthy, POWO [2022] does not report *P. persica* for Turkmenistan, although relevant records are available (Proskurjakova, 1961; Kovalevskaya, 1974; Nikitin, Geldikhanov, 1988 – all as *C. persica*) and supported by herbarium material (LE).

## 2. Deletions

*Goldbachia laevigata* (M. Bieb.) DC.: finding in **Ukraine** is not confirmed because of re-identification of the single hitherto known gathering from this country (see comment to *G. torulosa* above). *Goldbachia torulosa* is merged with *G. laevigata* in some accounts and databases (e. g., Coode, Cullen, 1965; Rechinger, 1968; Freiberg et al., 2020; Francis et al., 2021), which might hamper identification, but, as shown by Botschantzev (1963), these are two morphologically distinct species with overlapping, but different ecological preferences and geographic distribution.

*Isatis cardiocarpa* (Trautv.) Al-Shehbaz, Moazzeni et Mumm.: the species does not occur in **Europe** since all European collections (from the single locality in the Rostov Region) belong to *I. armena* (discussed under this species).

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