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## Cruciferae (Brassicaceae): Alternative treatment for the “Conspectus of the vascular plants of Mongolia” (2014)

## Cruciferae (Brassicaceae): альтернативная обработка для «Конспекта сосудистых растений Монголии» (2014)

D.A. German

Д.А. Герман

Центр исследований организмов, Гейдельбергский университет, Им Нойенхаймер Фельд, 345; D-69120, Гейдельберг, Германия; Южно-Сибирский ботанический сад, Алтайский государственный университет, пр-т Ленина, 61; 656049, Барнаул, Россия. E-mail: oreoloma@rambler.ru

Centre for Organismal Studies, Heidelberg University, Im Neuenheimer Feld 345; D-69120 Heidelberg, Germany;  
South-Siberian Botanical Garden, Altai State University, Lenina str., 61; 656049, Barnaul, Russia

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**Ключевые слова:** Центральная Азия, фиторазнообразие, флористические находки, новые комбинации, систематика, *Guenthera*, *Matthiola*, *Stevenia*.

**Summary.** The checklist of the mustards (Cruciferae, or Brassicaceae) of Mongolia supplied with the data on their distribution according to the phytogeographical regions of the country is presented which includes 141 species and 7 subspecies from 59 genera. Both taxonomic diversity and geography of Mongolian Cruciferae are critically revised with use of herbarium material, online resources, and published data. The genus *Matthiola* W. T. Aiton represented by the natively growing *M. superba* Conti is recorded from Mongolia for the first time and several regional floristic novelties are reported as well. On the other hand, newly and previously revealed erroneous state and regional records published mainly after 1996 are listed and commented. Finally, new combinations in the genera *Guenthera* Andrz. and *Stevenia* Fisch. are validated. The article can be regarded as an alternative treatment for the recent “Conspectus of the vascular plants of Mongolia” (2014).

**Аннотация.** Представлен конспект крестоцветных (Cruciferae, или Brassicaceae) Монголии, основанный на критической ревизии гербарных сборов, интернет-ресурсов и литературы, в том числе новейших работ по систематике семейства. Для всех 141 вида и 7 подвидов из 59 родов, отмеченных на данный момент во флоре страны, приведена краткая синонимика и данные по распространению (наличию

или отсутствию в каждом из 16-ти ботанико-географических регионов) в Монголии. Впервые для страны указан род левкой – *Matthiola* W. T. Aiton, представленный естественно произрастающим здесь *M. superba* Conti; некоторые виды отмечены в качестве новинок для отдельных районов. В то же время, перечислены и прокомментированы ошибочные указания представителей семейства для Монголии или определенных ее районов, обнаруженные в основном после выхода «Конспекта ...» И.А. Губанова (1996). Валидизированы новые комбинации в родах *Guenthera* Andrz. и *Stevenia* Fisch. Сообщение может считаться альтернативной обработкой крестоцветных для недавно вышедшего «Конспекта сосудистых растений Монголии» (2014).

Since long time Mongolia attracts scientists from different countries focusing on biodiversity studies. More or less regular floristic investigations on the territory of the country are being conducted since 1830ths (Grubov, 1955; Gubanov, Hilbig, 1989; Gubanov, 1996) continuously bringing new data on the diversity of Mongolian plants. The basic and most referenced treatments of last decades are those of Grubov (1982) and Gubanov (1996) which are

very useful as the key points reflecting the state of the knowledge on the flora of Mongolia at the end of XX century and still covering considerable portion of floristic diversity of the country and mirroring main peculiarities of its flora. At the same time, intensive field and herbarium studies of last years yielded so considerable amount of new data (summarized in Urgamal et al., 2013) that the necessity of preparing an updated checklist became absolutely evident which was done by Mongolian colleagues shortly afterwards (Urgamal et al., 2014). It is enough to mention that the new conspectus included 3127 species and subspecies of vascular plants compared to 2823 in Gubanov (1996), i. e., ca. 11% in addition, to demonstrate how important and timely work it has become.

Being a reflection of the current stage of knowledge on the floristic diversity and, often, taxa distribution of certain area, checklists represent the starting point for further studies in this field. Therefore, it is critical for such compilations to be maximally complete, up-to-date, and precise. The present communication was prompted by critical evaluation of the data on Cruciferae B. Juss. (Brassicaceae Burnett) – one of the leading families in Mongolian flora – presented in the new conspectus. According to Urgamal et al. (2014), it is the 5<sup>th</sup> biggest family in the country with 61 genera and 160 species, covering over 5% of the floristic diversity of Mongolia. Hence, adequate information on the diversity of Cruciferae is essential for reliability of the whole checklist. On one hand, the treatment of the family in the new conspectus takes into consideration most of the updates published during last two decades and reflects apparent progress in studies of both species diversity and distribution of Mongolian mustards compared to Gubanov (1996). On the other hand, some discrepancies and misinterpretations of the previously published data distort the whole picture and need to be corrected; most important of them are the following.

1. Generic delimitation and assignment of certain species appears in some cases rather messy. For instance, among three very closely related species of *Ptilotrichum* C. A. Mey., nowadays assigned by some authors to *Stevenia* Fisch. (*Stevenia canescens*, *S. dahurica*, and *S. tenuifolia*), the latter is treated as a member of *Alyssum* L. while other two – as representatives of *Ptilotrichum*. Similarly, one of the two Mongolian *Noccaea* Moench species, *N. ferganensis*, is given under this generic name while another species, *N. thlaspidioides*, is attri-

buted to *Thlaspi* L. as *Th. cochleariforme* although, like in previous case, both taxa are tightly related and often confused. The genus *Strigosella* Boiss. is accepted as distinct from *Malcolmia* W. T. Aiton but only one of the two species, *S. brevipes*, is given as *Strigosella* while another one, *S. africana*, is reported as *Malcolmia*. In the same way, the genus *Oreoloma* Botsch. is accepted as distinct from *Sterrigmostemum* M. Bieb., but very closely related to, if not conspecific with *O. violaceum* taxon is given as *S. regeliorum* and not as homotypic *O. sulphureum*. Listing *Erysimum flavum* under the generic name *Hesperis* L. is just beyond discussion.

2. Information on the species proven to be erroneously reported for Mongolia is not taken into account at all. In particular, all eight such species explicitly mentioned by German and Oyuntsetseg (2008) are included into the conspectus (with references to the publications where those species are excluded from Mongolian flora). Some further, most recent records (e. g., *Arabis amplexicaulis*, *Erysimum ledebourii*, *E. quadrangulum*) are based on various misinterpretations and cannot be confirmed.

3. Not all taxa reported as additions to Gubanov’s “Conspectus ...” are in fact novelties but were included there under other names. These are *Alyssum linifolium* and *Draba lanceolata* given in Gubanov (1996) as *Meniocus linifolius* and *Draba cana* auct., respectively.

4. Information on *loci classici* of narrowly distributed species as well as assignment of certain taxa to endemics and subendemics is often inaccurate. For example, the following taxa are mentioned as Mongolian endemics, although none of them actually are: *Crucihimalaya rupicola* (said to be described from Gobi-Altai, in fact from Russian Altai); *Galitzkyapotaninii* (occurs in neighboring Xinjiang; described from E Tian Shan); *Microstigma brachycarpum* (said to be described from “Transaltai Altai” [Transaltai Gobi], in fact from central Gansu). In cases of *Crucihimalaya rupicola* and *Microstigma brachycarpum*, indicated areas are type localities of their synonyms, *C. mongolica* and *M. junatovii*, respectively. Reported subendemics of Mongolia included some widely distributed taxa which at any rate (bearing in mind that definition of subendemic is rather relative) could not be treated as such, e. g.: *Dendroarabis fruticulosa* (distributed from Afghanistan through Middle Asia and Kazakhstan to NW China, W & N Mongolia, SW and SE Siberia); *Dontostemon micranthus* (except Mongolia, also W, Central & E Siberia, Far East, NW, N & NE China); *Draba altaica* (Tibet, Himalayas, Pamir Alai, Tian

Shan, Altai; one of the most widely distributed Asian alpine to subalpine *Draba* L. species); *D. mongolica* (N, NE & Central China, W & E Siberia, Far East, Mongolia); *Erysimum quadrangulum* (Central and E Europe, N Kazakhstan, SW Siberia, not occurring in Mongolia); *Eutrema altaicum* (mts. of S Kazakhstan, Kyrgyzstan, Tajikistan, W China (four provinces), and SW Siberia, not found in Mongolia); *E. edwardsii* (subcircumpolar and common in mts. of N Asia); *Goldbachia pendula* (Kazakhstan, Middle Asia, five western provinces of China, W Mongolia), *Sisymbrium brassiciforme* (Himalayas, Tibet, Pamir Alai, Tian Shan, southern part of Altai Mts.), common Irano-Turanian elements *Neotorularia brevipes* and *Isatis multicaulis*, etc. At the same time, true Mongolian endemic *Dontostemon gubanovii* is reported as subendemic; similarly, *Rhammatophyllum kamelinii*, if considered distinct from *Rh. erysimoides* (as done in the treatment) is not found outside W Mongolia. Examples of omitted subendemics are *Dontostemon perennis*, *Microstigma deflexum* or *Stevenia sergievskajae*, all having, except Mongolia, rather limited distribution in neighboring S Siberia (*D. perennis* also known from one gathering in Xinjiang). Location of the type material is given for 12 arbitrarily selected taxa out of the total of 38 assigned to endemics and subendemics and, for some reason, for one species not treated as endemic/subendemic – *Dontostemon dentatus* (“typus – MW”). In fact, no original material of this species is available at MW: lectotype of *D. dentatus* is in P and isolectotype in LE (German, 2012b).

5. Finally, distribution of some taxa in Mongolia (e. g., *Chorispora bungeana*, *Crucihimalaya rupicola*, *Dontostemon elegans*) is not accurately reported and needs to be corrected, in several cases just back to the information given by Gubanov (1996).

Taking into consideration the above concerns, it became evident that the data on Mongolian mustards presented in Urgamal et al. (2014) require correction. Hence, the main goal of this communication is providing the improved information on taxonomic diversity and distribution of representatives of this family in the country. Besides, it turned to be a good option to publish some floristic novelties including one state record, *Matthiola superba*, representing a new genus to the flora of Mongolia, and provide several taxonomic adjustments. For this purpose, available data were screened and critically evaluated including herbarium material from ALTB, BP, GAT, HAL, LE, MW, OSBU, PR, and TK; some images from UBA and UBU; online database “Flora

GREIF” (University of Greifswald ..., 2010 [continuously updated]; Rilke, Najmi, 2011; Rilke et al., 2012; Zemmrich et al., 2013) as well as relevant literature reports. The work is divided onto four parts: 1) conspectus itself with actual data on distribution of taxa; 2) enumeration of taxa occurrence of which either in Mongolia or in certain regions of the country was not confirmed; 3) floristic additions including one state and several regional records and 4) taxonomic remarks. In order to provide better comparison to the previous data, the way of presenting the information and basic symbols are the same as in the key reference point, i. e., Gubanov (1996), and in Urgamal et al. (2014). In particular, the taxa are arranged in the list alphabetically, for each species and subspecies an accepted name in italicized bold-face is provided along with the basynonym and basic synonyms (mainly referring to Mongolia), all with nomenclatural references. For the convenience, all names accepted in the checklists of 1996 and 2014 but not in the current one (because of either being treated as synonyms or proven to be misapplied to Mongolian plants), are also incorporated (italicized) and supplied, after the sign “=” or “≡”, with a reference to accepted (hetero- or homotypic, respectively), non-highlighted name. Explanation of mistreatments (taxa *sensu auct. fl. Mong.*, non orig.) are presented in the second part of this communication.

Distribution of species is given according to 16 number-coded phytogeographic regions of Mongolia elaborated by Grubov and Yunatov (1952) and subsequently corrected by Grubov (1963) and Gubanov et al. (1996) which are traditionally used in floristic works on Mongolia including Gubanov (1996) and Urgamal et al. (2014): 1 – Khubsugul (Hovsgol); 2 – Khentei; 3 – Khangai; 4 – Mongol-Daurian; 5 – Great Khingan; 6 – Khobdo (Khovd); 7 – Mongolian Altai; 8 – Middle Khalkha; 9 – East Mongolia; 10 – Depression of Great Lakes; 11 – Valley of Lakes; 12 – East Gobi; 13 – Gobi-Altai; 14 – Dzungarian Gobi; 15 – Transaltai Gobi; 16 – Alashan Gobi. The following signs indicate certain changes/updates compared to the previously published data:

“+” – addition after 1996 (before species/subspecies name – for Mongolia; after the number of phytogeographical region – for relevant region);

“#” – change of the taxon name compared to Gubanov (1996).

All updates of the distribution (country and regional records) are supplied with references to the sources where those updates were first reported; in case of nomenclatural changes, references are

provided to some recent publications introducing or proving relevant changes. Besides, number codes of records not given in Urgamal et al. (2014) (overlooked/misinterpreted or added in the present work) are given in boldface. Finally, like in previous checklists, endemics and subendemics are specified; classical locality and location of the type (holo- or lectotype) is reported for such taxa.

The second part of the article is focused on erroneous data on distribution of Cruciferae species in Mongolia. Relevant information is embedded in two tables, one enumerating state and another – regional records. In all cases references to both publications reporting occurrence of taxa in the country or some of its phytogeographical regions and those claiming the contrary are provided. Whenever possible, primary sources of records are referred to; otherwise, any of the key treatments (Grubov, 1955, 1982; Gubanov, 1996) are cited which in some cases are also the primary sources of relevant floristic data. Only information on taxa wrongly reported for Mongolia or some of its regions in Gubanov (1996)

or published later is taken into consideration as long as previous mistakes and discrepancies are corrected in earlier works (e. g., Grubov, 1955, 1972, 1982, etc.). Brief notes are provided for each entry.

The third part includes detailed documentation of new floristic records mentioned in the first part just with the sign “+” and reference “this study”. In few cases, noteworthy accessions not representing regional records are discussed in addition. Finally (part four), several taxonomic adjustments are also provided.

Despite the elucidating character of publication, the author is free from illusion that all possible gaps/mistakes are filled in/improved here and, furthermore, that this work itself does not introduce some further unintended/overlooked discrepancies or arguable taxonomic decisions, for which I beg readers’ pardon. However, I believe that it mostly improves available data rather than distorts them and provides most adequate picture of the current knowledge on taxonomic diversity and distribution of the Cruciferae of Mongolia.

### I. Conspectus of Mongolian Cruciferae (Brassicaceae)

The present conspectus includes 141 species and 7 subspecies from 59 genera which is comparable with other recent estimations, e. g., 139 species and 5 subspecies from 55 genera by German & Oyuntsetseg (2008) or 142 species from 58 genera by Rilke et al. (2012), but more sufficiently differs from 160 species [actually 159 species and one subspecies] from 61 genera by Urgamal et al. (2014) vs. 135 species and one subspecies from 58 genera reported by Gubanov (1996).

*Alyssum desertorum* Stapf = *A. turkestanicum*

*Alyssum lenense* Adams, 1817, Mém. Soc. Nat. Mosc. 5: 110. – 1, 2, 3, 4, 5, 7, 8, 9.

*Alyssum linifolium* Steph. ex Willd. ≡ *Meniocus linifolius*

*Alyssum obovatum* (C. A. Mey.) Turcz. ≡ *Odontarrhena obovata*

*Alyssum tenuifolium* Steph. ex Willd. ≡ *Stevenia tenuifolia* (German, 2010)

# *Alyssum turkestanicum* Regel et Schmalh., 1881, Izv. Imp. Obsc. Ljubit. Estestv. Moskovsk. Univ. 34, 2 [Descr. Pl. Nov. Rar. Fedtsch.]: 6. – *A. desertorum* Stapf, 1886, Denkschr. Acad. Wiss. (Math.-Naturw., Wien.), 51: 302. – 3, 6, 7, 10.

*Aphragmus involucratus* (Bunge) O. E. Schulz, 1924, in Engler, Pflanzenreich, 86 (4, 105): 198. – *Platypetalum involucratum* Bunge, 1836, Enum.: 58. – 7, 13.

*Arabidopsis mollissima* (C. A. Mey.) N. Busch ≡ *Crucihimalaya mollissima* (Al-Shehbaz et al., 1999).

*Arabidopsis thaliana* (L.) Heynh., 1842, in Holl et Heynh., Fl. Sachs. 1: 538. – *Arabis thaliana* L., 1753, Sp. Pl. 2: 665. – 6, 7.

# *Arabis borealis* Andrzej. ex C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 25. – *A. sagittata* auct. non (L.) Scop. – *A. sagittata* auct. non (Bertol.) DC. – 2, 3, 4, 5, 9.

*Arabis amplexicaulis* auct. non Edgew. = *Erysimum cheiranthoides*

*Arabis fruticulosa* C. A. Mey. ≡ *Dendroarabis fruticulosa* (German, Al-Shehbaz, 2008)

*Arabis mongolica* Botsch. = *Crucihimalaya rupicola* (German, Ebel, 2005).

*Arabis pendula* L. ≡ *Catolobus pendulus* (Al-Shehbaz, 2005).

*Arabis rupicola* Kryl. ≡ *Crucihimalaya rupicola* (German, Ebel, 2005)

*Arabis sagittata* auct. non (Bertol.) DC. [*A. hirsuta* auct. non (L.) Scop.] = *A. borealis* (Knapp, Sančir, 1986; Knjasev, 2010)

- Barbarea arcuata* (Opiz ex J. Presl et C. Presl) Reichenb. = *B. vulgaris*  
***Barbarea orthoceras*** Ledeb., 1824, Index Sem. Horti Dorpat.: 2. – *Barbarea stricta* auct. non Andrz. – 2+ (this study), 3, 4, 5, 9.  
*Barbarea stricta* auct. non Andrz. = *B. orthoceras* (German, 2009)  
 # ***Barbarea vulgaris*** W. T. Aiton, 1812, Hort. Kew., ed 2, 4: 109. – *B. arcuata* (Opiz ex J. Presl et C. Presl) Reichenb., 1822, Flora (Regensb.) 5 (1): 296. – 2, 3, 4, 5, 7.  
 + ***Berteroa incana*** (L.) DC., 1821, Reg. Veg. Syst. Nat. 2: 291. – *Alyssum incanum* L., 1753, Sp. Pl. 2: 650. – 2+ (Doronkin et al., 2015; referred as to “Doronkin et al., 2012” in Oyuntsetseg, 2014), 4+ (Neuffer et al., 2012).  
***Brassica campestris*** L., 1753, Sp. Pl. 2: 666. – *B. rapa* auct. non L. – 2, 3, 4, 6, 7, 8+ (Hilbig et al., 2012), 11.  
***Brassica juncea*** (L.) Czern., 1859, Consp. Pl. Charc.: 8. – *Sinapis juncea* L., 1753, Sp. Pl. 2: 668. – 3, 4, 7, 9, 10, 11, 13, 14, 15+ (Hilbig, Tungalag, 2006).  
*Brassica rapa* auct. non L. = *B. campestris*  
 Note. *Brassica oleracea* L. is known exclusively in culture in Mongolia.  
*Braya glabella* auct. non Richardson = *B. siliquosa*  
 # ***Braya humilis*** (C. A. Mey.) B. L. Rob., 1895, in A. Gray et S. Watson, Syn. Fl. N. Amer. 1 (1): 141. – *Sisymbrium humile* C. A. Mey., 1830, in Ledeb., Icon. Pl. Fl. Ross. 2: 16. – *Torularia humilis* (C. A. Mey.) O. E. Schulz, 1924, in Engler, Pflanzenreich, 86 (4, 105): 223. – *Neotorularia humilis* (C. A. Mey.) Hedge et J. Léonard, 1986, Bull. Jard. Bot. Natl. Belg. 56: 394. – *T. grubovii* Botsch., 1975, Bot. Zhurn., 60 (7): 948. – *N. grubovii* (Botsch.) Botsch., 1988, Bot. Zhurn. 73 (8): 1187. – *N. mongolica* Botsch. et Gubanov, 1988, Bot. Zhurn. 73 (8): 1186. – *N. maximowiczii* auct. non (Botsch.) Botsch. – 1, 3, 4, 6, 7, 8.  
***Braya rosea*** Bunge, 1839, Del. Sem. Horti Dorpat.: 7. – 1, 3, 6, 7.  
***Braya siliquosa*** Bunge, 1839, Del. Sem. Horti Dorpat.: 7. – *B. glabella* auct. non Richardson. – 1.  
*Bunias cochlearioides* Murr. ≡ *Leiocarpha cochlearioides* (German, Al-Shehbaz, 2010)  
***Bunias orientalis*** L., 1753, Sp. Pl. 2: 670. – 9.  
***Camelina microcarpa*** Andrz. ex DC., 1821, Reg. Veg. Syst. Nat. 2: 517. – 4, 14+ (German, 2009).  
***Camelina sativa*** (L.) Crantz, 1762, Stirp. Austr. 1: 17. – *Myagrum sativum* L., 1753, Sp. Pl. 2: 641. – 4. Probably nowadays *C. sativa* does not occur in Mongolia.  
***Capsella bursa-pastoris*** (L.) Medik., 1792, Pflanzengatt. 1: 85. – *Thlaspi bursa-pastoris* L., 1753, Sp. Pl. 2: 647. – 2+ (Dulamsuren, Mühlenberg, 2003), 3, 4, 6, 7, 10, 14.  
 + ***Capsella orientalis*** Klok., 1926, Byull. Obshch. Estestvoisp. Voronezhsk. Gosud. Univ. 1, 2–4: 122. – *C. bursa-pastoris* subsp. *orientalis* (Klok.) Tzvel., 2000, Novit. Syst. Pl. Vasc. 32: 184. – 3+ (this study), 7+ (German, Ebel, 2009), 10+ (this study).  
***Cardamine bellidifolia*** L., 1753, Sp. Pl. 2: 654. – 1, 2, 3, 7.  
 + ***Cardamine impatiens*** L., 1753, Sp. Pl. 2: 655. – 6+ (German, 2009).  
***Cardamine leucantha*** (Tausch) O. E. Schulz, 1903, Bot. Jahrb. Syst. 32 (2–3): 403. – *Dentaria leucantha* Tausch, 1836, Flora 19 (2): 404. – 5.  
***Cardamine macrophylla*** Willd., 1800, Sp. Pl. 3 (1): 484. – 1, 2+ (Doronkin et al., 2015; referred as to “Khan, 2012” in Oyuntsetseg, 2014), 6, 7.  
***Cardamine parviflora*** L., 1759, Syst. Nat. ed. 10, 2: 1131. – 2, 3.  
***Cardamine pratensis*** L., 1753, Sp. Pl. 2: 656. – 1, 2, 3, 4, 5, 7, 9.  
***Cardamine prorepens*** Fisch. ex DC., 1821, Reg. Veg. Syst. Nat. 2: 256. – 5.  
***Cardamine trifida*** (Lam. ex Poir.) B. M. G. Jones, 1964, Feddes Repert. 69: 57. – *Dentaria trifida* Lam. ex Poir., 1812, Encycl. Meth. Bot. Suppl. 2: 465. – *Sphaerotorrhiza trifida* (Lam. ex Poir.) A. Khokhr., 1985, Fl. Magadansk. Obl.: 235. – 5.  
*Cardaria pubescens* (C. A. Mey.) Jarm. ≡ *Lepidium appelianum* (Al-Shehbaz et al., 2002).  
 # ***Catolobus pendulus*** (L.) Al-Shehbaz, 2005, Novon, 15 (4): 521. – *Arabis pendula* L., 1753, Sp. Pl. 2: 665. – 1, 2, 3, 4, 5, 6, 9, 10+ (this study), 12, 13.  
*Carpoceras ceratocarpum* (Pall.) N. Busch ≡ *Thlaspi ceratocarpum* (Meyer, 1973, 2001).  
***Chorispora bungeana*** Fisch. et C. A. Mey., 1841, Enum. Pl. Nov. 1: 96. – 7.  
***Chorispora sibirica*** (L.) DC., 1821, Reg. Veg. Syst. Nat. 2: 437. – *Raphanus sibiricus* L., 1753, Sp. Pl. 2: 669. – 6, 7, 13, 14.

*Chorispora tenella* (Pall.) DC., 1821, Reg. Veg. Syst. Nat. 2: 435. – *Raphanus tenellus* Pall., 1776, Reise 3: 741. – 7, 14.

*Clausia aprica* (Steph. ex Willd.) Korn.-Tr. 1834, Index Sem. Horti Kazan.: sine pag. – *Cheiranthus apricus* Steph. ex Willd., 1800, Sp. Pl. 3: 518. – *Dontostemon apricus* (Steph. ex Willd.) D. A. German, 2010, Komarovia 6 (2): 85. – 1, 2, 3, 4, 6, 7, 9, 13.

*Clausia trichosepala* (Turcz.) Dvořák, 1966, Phytion (Horn) 11: 200. – *Hesperis trichosepala* Turcz., 1832, Bull. Soc. Nat. Mosc. 5: 180. – 4.

*Conringia planisiliqua* Fisch. et C. A. Mey., 1837, Index Sem. Horti Bot. Petrop. 3: 32. – 14.

# *Crucihimalaya mollissima* (C. A. Mey.) Al-Shehbaz, O’Kane et Price, 1999, Novon, 9 (3): 299. – *Sisymbrium mollissimum* C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 140. – *Arabidopsis mollissima* (C. A. Mey.) N. Busch, 1913, Fl. Sibir. Orient. Extr. 1: 136. – 6, 7, 13, 14.

# *Crucihimalaya rupicola* (Kryl.) A. L. Ebel et D. A. German, 2005, Turczaninowia 8, 3: 8. – *Arabis rupicola* Kryl., 1902, Acta Horti Petrop. 21, 1: 3. – *Arabidopsis rupicola* (Kryl.) A. L. Ebel, 2000, Turczaninowia 3, 3: 19. – *Arabis mongolica* Botsch., 1975, Bot. Zhurn. 60 (7): 947. – *Arabidopsis mongolica* (Botsch.) Měsíček et Soják, 1995, Folia Geobot. Phytotax. 30: 445. – *Arabidopsis mongolica* (Botsch.) A. L. Ebel, 2000, Turczaninowia 3, 3: 19, comb. superfl. – *Crucihimalaya mongolica* (Botsch.) Al-Shehbaz, O’Kane et Price, 1999, Novon 9 (3): 300. – 6+ (German, 2009), 7, 10, 11, 13, 14. – Subendemic; described from SW Siberia (SE Altai); lectotype (Polozhij, Balashova, 1989) – TK, isolectotypes – LE, TK.

# *Dendroarabis fruticulosa* (C. A. Mey.) D. A. German et Al-Shehbaz, 2008, Harvard Pap. Bot. 13 (2): 290. – *Arabis fruticulosa* C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 19. – *Rhammatophyllum fruticulosum* (C. A. Mey.) Al-Shehbaz, 2005, Novon, 15 (4): 522. – 1+ (Hayasaka, 2011, as *Arabis fruticulosa*), 7.

*Descurainia sophia* (L.) Webb ex Prantl, 1891, in Engler und Prantl, Nat. Pflanzenfam. 3, 2: 192. – *Sisymbrium sophia* L., 1753, Sp. Pl. 2: 659. – 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14.

*Dimorphostemon pectinatus* (DC.) V. Golubk. ≡ *Dontostemon pinnatifidus* (Al-Shehbaz, Ohba, 2000).

*Dontostemon crassifolius* Bunge, 1858, in Maxim., Prim. Fl. Amur.: 46. – 7, 10, 12, 13, 16. – Subendemic; described from East Gobi phytogeographical region; lectotype (Buzunova, 2000) – LE, isolectotypes – K, P.

+ *Dontostemon dentatus* (Bunge) Ledeb., 1841, Fl. Ross. 1: 145. – *Andreoskia dentata* Bunge, 1833, Enum. Pl. China Bor.: 6. – 5+ (Gubanov, 1999).

*Dontostemon elegans* Maxim., 1889, Enum. Pl. Mong.: 57. – 7, 11, 13, 14, 15, 16. – Subendemic; described from Chinese Dzungaria and SW Mongolia; lectotype from Mongolian Altai at the border with Transaltai Gobi phytogeographical region (Buzunova, 2000) – LE.

+ *Dontostemon gubanovii* (D. A. German) D. A. German, 2010, Komarovia 6 (2): 85. – *D. senilis* subsp. *gubanovii* D. A. German, 2007, Novon, 17 (2): 173. – 6+, 7+, 10+ (German, 2007). – Endemic; described from Khobdo phytogeographical region (lake Achit-Nuur); holotype – MW.

*Dontostemon integrifolius* (L.) C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 120. – *Sisymbrium intergifolium* L., 1753, Sp. Pl. 2: 660. – 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16.

*Dontostemon micranthus* C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 120. – *Sisymbrium lineare* DC., 1821, Reg. Veg. Syst. Nat. 2: 464, nom. rej. prop. (German, 2012d). – 1, 2, 3, 4, 5+ (German, 2009), 8, 9, 13.

*Dontostemon perennis* C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 121. – 3, 6, 7, 10, 11, 13. – Subendemic; described from SW Siberia (SE Altai); lectotype (German, 2005a) – LE, isolectotypes – B, BP, GOET, HAL, KW, LE, M, P, W.

# *Dontostemon pinnatifidus* (Willd.) Al-Shehbaz et H. Ohba, 2000, Novon, 10 (1): 96. – *Cheiranthus pinnatifidus* Willd., 1800, Sp. Pl. 3: 523. – *Dimorphostemon pinnatifidus* (Willd.) H. L. Yang, 2009, J. Desert. Res. 29 (3): 435. – *Sisymbrium pectinatum* DC., 1821, Reg. Veg. Syst. Nat. 2: 485, nom. illeg. superfl. – *Dimorphostemon pectinatus* (DC.) V. Golubk., 1974, Bot. Zhurn. 59 (10): 1453, comb. illeg. – 1, 4, 8, 13.

*Dontostemon senilis* Maxim., 1880, Bull. Acad. Sci. Pétersb. 26: 421. – 6, 7, 10, 11, 12, 13, 14, 15, 16. – Subendemic; described from China (Ordos and East Tian Shan); lectotype from Ordos (Grubov in Buzunova, 2000) – LE.

*Draba altaica* (C. A. Mey.) Bunge, 1841, Del. Sem. Horti Dorpat.: 8. – *D. rupestris* R. Br. [var.] *β altaica* C. A. Mey., 1831, in Ledeb. Fl. Alt. 3: 72. – 6, 7, 13+ (German, 2009; misprinted as “10+” in Oyuntsetseg, 2014).

***Draba baicalensis*** Tolm., 1939, Fl. URSS 8: 650. – *D. czuensis* Revuschk. et A. L. Ebel, 1998, Animadv. Syst. Herb. Kryl. Univ. Tomsk. 90: 4. – 3, 6+ (Ebel, 2002; Ebel, Rudaya, 2002, both times as *D. czuensis*), 7. – Subendemic; described from SE Siberia (lake Baikal); holotype – LE.

*Draba cana* auct. non Rydb. = *D. lanceolata*

*Draba czuensis* Revuschk. et A. L. Ebel = *D. baicalensis*

*Draba denserosulata* Pobed. = *D. lanceolata* (German, 2008)

***Draba eriopoda*** Turcz. ex Ledeb., 1841, Fl. Ross. 1: 154. – 1, 2, 3, 6.

***Draba fladnizensis*** Wulfen, 1779, in Jacq., Miscell. Austr. Bot. 1: 147. – 1, 2, 3, 6, 7, 13.

***Draba hirta*** L., 1759, Syst. Nat. ed. 10, 2: 1127. – *D. glabella* Pursh, 1814, Fl. Amer. Sept. 2: 434. – 1, 2, 3, 6, 7, 13.

The name *D. hirta* “appears to have been widely, though informally, rejected as confused or ambiguous” (The Linnaean Plant Name Typification Project: <http://www.nhm.ac.uk/research-curation/research/projects/linnaean-typification/>) as “the material at LINN is in bad condition and probably belongs to two species” (Al-Shehbaz et al., 2010). Instead, the binomial *D. glabella* is being often in use (e. g., Walters et al., 1993; Al-Shehbaz et al., 2010). On the other hand, there is no common practice of application of the name *D. hirta* in any other sense and it is persistently used in floristic literature, especially dealing with Northern Eurasia including all Mongolian treatments. Therefore, unless formal nomenclatural actions preventing further application of the name *D. hirta* are undertaken, it should be used in the current sense as having priority for this species.

***Draba kusnetzowii*** (Turcz. ex Ledeb.) Hayek, 1911, Beih. Bot. Centralbl. 27, 1: 172. – *Holargidium kusnetzowii* Turcz. ex Ledeb., 1841, Fl. Ross. 1: 156. – 1, 3, 6, 7, 13.

# ***Draba lanceolata*** Royle 1839, Illustr. Bot. Himal. Mts. 1: 72. – *Draba denserosulata* Pobed., 1935, Acta Mong. Comm. Acad. Sci. USSR 19: 55. – *D. cana* auct. non Rydb. – 1, 2, 3, 4, 6, 7, 13.

***Draba mongolica*** Turcz., 1842, Bull. Soc. Nat. Mosc. 15, 2: 256. – 1, 3.

***Draba nemorosa*** L., 1753, Sp. Pl. 2: 643. – 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13.

***Draba ochroleuca*** Bunge, 1835, Mém. Sav. Etr. Pétersb. 2: 574. – 1, 2, 3, 6, 7.

***Draba oreades*** Schrenk, 1842, in Fisch. et C. A. Mey., Enum. Pl. Nov. 2: 56. – 1, 3, 6, 7, 13+ (German, 2009).

***Draba pygmaea*** Turcz. ex N. Busch, 1918, Izv. Rossijsk. Akad. Nauk, ser. 6, 12: 1633, 1639. – 1, 3. – Subendemic; described from South-East Siberia (E Sayan and Transbaikal area); lectotype from Nuchu-Daban (German, 2011a) – LE, isolectotypes – K, KW, LE, MW.

***Draba sibirica*** (Pall.) Thell., 1906, Mitt. Bot. Mus. Zürich 28: 318. – *Lepidium sibiricum* Pall., 1776, Reise 3: 34. – 3, 7.

+ ***Draba stenocarpa*** Hook. fil. et Thoms., 1861, Journ. Proc. Linn. Soc. Bot. 5: 153. – 7+ (German, 2001).

***Draba subamplexicaulis*** C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 77. – 1, 2, 3, 6, 7, 13.

***Draba turczaninowii*** Pohle et N. Busch, 1918, Izv. Rossijsk. Akad. Nauk, ser. 6, 12: 1633. – 1+ (German, 2009), 6+ (Ebel, 2002; Smirnov et al., 2003), 7, 13+ (German, 2009).

***Eruca sativa*** Mill., 1768, Gard. Dict. ed. 8, no. 1. – *E. vesicaria* auct. non (L.) Cav. – 4, 6, 7, 11, 14.

*Eruca vesicaria* auct. non (L.) Cav. = *E. sativa*

*Erucastrum armoracioides* (Czern. ex Turcz.) Cruchet = *Guenthera persica*

# ***Erysimum andrzejowskianum*** Bess. ex DC., 1821, Reg. Veg. Syst. Nat. 2: 502. – *E. diffusum* auct. non Ehrh. – *E. canescens* auct. non Roth – 7.

*Erysimum canescens* auct. non Roth = *E. andrzejowskianum*

***Erysimum cheiranthoides*** L., 1753, Sp. Pl. 2: 661, s. str. – 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 14.

+ ***Erysimum cheiranthoides*** subsp. ***altum*** Ahti, 1961, Arch. Soc. Zool. Bot. Fenn. (Arch. Soc. “Vanamo”), 16, 1: 24. – *E. altum* (Ahti) Tzvel., 1997, Bot. Zhurn. 82, 12: 94. – *E. cheiranthoides* auct. non L., p. p. – ? (Ahti, 1961, without indication of regions or localities).

+ ***Erysimum cheiranthoides*** subsp. ***transiliense*** (M. Pop.) D. A. German, 2006, Animadv. Syst. Herb. Kryl. Univ. Tomsk. 97: 26. – *E. transiliense* M. Pop., 1940, Not. Syst. Herb. Inst. Bot. Acad. Sci. URSS 8: 74. – *E. virgatum* auct. non Roth, p. p. – 7+ (German, 2006).

***Erysimum flavum*** (Georgi) Bobrov, 1960, Not. Syst. Herb. Inst. Bot. Acad. Sci. URSS 20: 15. – *Hesperis flava* Georgi, 1775, Bemerk. Reise Russ. Reich 1: 225. – 1, 2, 3, 4, 5, 8, 9, 12+ (Darijmaa et al., 2004; cited from: Oyuntsetseg, 2014), 13.

+ ***Erysimum flavum*** subsp. ***altaicum*** (C. A. Mey.) Polozh. ex Doronkin, 1994, Fl. Sib. 7: 68. – *E. altaicum* C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 153. – *E. humillimum* (C. A. Mey.) N. Busch, 1939, Fl. URSS

8: 106, 638. – *E. altaicum* var. *humillimum* C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 153. – *E. flavum* subsp. *humillimum* (C. A. Mey.) A. L. Ebel, 2000, Turczaninowia 3, 3: 27. – 3+, 6+, 7+, 10+ (Ebel, 2000a, as *E. flavum* subsp. *humillimum*; German, Oyuntsetseg, 2008).

Delimitation of subsp. *altaicum* and subsp. *flavum* is not always obvious based on Mongolian material. Geographically, the former is restricted to the western and the latter – to the central and eastern parts of the country.

*Erysimum hieraciifolium* auct. non L. = *E. marschallianum*

+ ***Erysimum kotuchovii*** D. A. German, 2004, Turczaninowia, 7, 2: 14. – *Syrenia macrocarpa* auct. non Vass., p. p. – *E. vassilczenkoi* auct. non Polatschek, p. p. – *E. quadrangulum* auct. non Desf. – 7+ (German, 2005b). – Subendemic; described from East Kazakhstan (valley of Bukhtarma); holotype – ALTB, isotype – Herb. of Altai Botanical Garden, Ridder.

# ***Erysimum marschallianum*** Andr. ex M. Bieb., 1819, Fl. Taur.-Cauc. 3: 441. – *E. hieraciifolium* auct. non L. – *E. virgatum* auct. non Roth, p. p. – 2, 3, 4, 6, 7, 10, 13, 14.

+ ***Erysimum mongolicum*** D. A. German, 2005, Willdenowia, 35 (2): 307. – *Syrenia macrocarpa* auct. non Vass., p. p. – *E. vassilczenkoi* auct. non Polatschek, p. p. – 7+, 14+ (German, 2005b). – Subendemic; described from Mongolian Altai phytogeographical region (valley of Bodonchijn-gol); holotype – ALTB, isotypes – B, LE, MO, OSBU.

*Erysimum quadrangulum* auct. non Desf. = *E. kotuchovii* (German, 2012a)

***Erysimum sisymbrioides*** C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 150. – 6, 7, 15.

*Erysimum vassilczenkoi* auct. non Polatschek = *E. kotuchovii* et *E. mongolicum* (German, 2005b)

*Erysimum virgatum* auct. non Roth = *E. cheiranthoides* subsp. *transiliense* and *E. marschallianum*

*Eutrema altaicum* (C. A. Mey.) Al-Shehbaz et S. I. Warwick – not in the flora (Ebel, 2000a, as *Taphrospermum altaicum*)

***Eutrema edwardsii*** R. Br., 1823, Chloris Melvill.: 9, s. str. – 1, 2, 3, 6, 7, 13.

+ ***Eutrema edwardsii*** subsp. *compactum* (O. E. Schulz) A. L. Ebel, 2000, Turczaninowia 3, 3: 30. – *E. compactum* O. E. Schulz, 1922, in W. Limpricht, Feddes Repert. 12: 387. – *Braya heterophylla* W. W. Smith, 1919, Notes Roy. Bot. Gard. Edinburgh 11: 201. – *E. heterophyllum* (W. W. Smith) H. Hara, 1973, J. Jap. Bot. 48: 97. – *E. edwardsii* subsp. *heterophyllum* (W. W. Smith) D. A. German, 2010, Komarovia 6 (2): 82. – 7+ (German, 2001, as *E. heterophyllum*).

Identity of Mongolian specimens reported as *E. edwardsii* subsp. *compactum* might require further elucidation.

# ***Eutrema salsugineum*** (Pall.) Al-Shehbaz et S. I. Warwick, 2005, Harvard Pap. Bot. 10 (2): 134. – *Sisymbrium salsugineum* Pall., 1773, Reise 2: 740. – *Thellungiella salsuginea* (Pall.) O. E. Schulz, 1924, in Engler, Pflanzenreich, 86 (4, 105): 252. – 3, 4, 7, 8, 9, 10.

***Galitzkya macrocarpa*** (Ik.-Gal.) V. Bocz., 1979, Bot. Zhurn. 64 (10): 1442. – *Berteroa macrocarpa* Ik.-Gal., 1936, Acta Inst. Bot. Acad. Sci. URSS, ser. 1, 3: 189. – *Hormathophylla macrocarpa* (Maxim.) Kamelin, 1973, Florogenet. Analysis Nat. Fl. Mount. Middle Asia: 267. – 13, 15. – Endemic; described from Gobi-Altai phytogeographical region (Bayan-Tsagan-Nuruu); holotype and isotype – LE.

***Galitzkya potaninii*** (Maxim.) V. Bocz., 1979, Bot. Zhurn. 64 (10): 1442. – *Berteroa potaninii* Maxim., 1880, Bull. Acad. Sci. Pétersb. 26 (3): 422. – *Hormathophylla potaninii* (Maxim.) V. I. Dofor., 2012, Consp. Fl. Eur. Or. 1: 393. – 7, 14, 15. – Subendemic; described from China (Xinjiang, East Tian Shan); lectotype (Bocantzeva, 1979) – LE.

***Goldbachia ikonnikovii*** Vass. – 6+ (Gubanov, 1996, misprinted as 9; German et al., 2003); 7+ (Revushkin et al., 2001); 8+, 10+ (German, 2009), 11, 13, 14+ (German, 2009). – Subendemic; described from Gobi-Altai phytogeographical region (mt. Bayan-Boro-Nuruu); lectotype (Botschantzev, 1963) – LE, isotypes – LE, NS, TK.

*Goldbachia laevigata* auct. non (M. Bieb.) DC. = *G. pendula* (German, 2001) and *G. ikonnikovii* (German, 2009)

+ ***Goldbachia pendula*** Botsch., 1963, Not. Syst. Herb. Inst. Bot. Acad. Sci. URSS 22: 140. – 7+, 14+ (German, 2001).

# ***Guenthera persica*** (Boiss. et Hohen.) D.A. German, 2015, Turczaninowia 18, 2: 62. – *Brassica persica* Boiss. et Hohen., 1849, Diagn. Pl. Or. Nov. 8: 26. – *G. elongata* (Ehrh.) Andr. subsp. *integrifolia* (Boiss.) Gómez-Campo, 2003, Anales Jard. Bot. Madrid 60: 304. – *B. elongata* Ehrh. var. *integrifolia* Boiss., 1867, Fl. Or. 1: 394. – *B. obtusangula* (G. Haller ex Schleich.) Reichenb. subsp. *integrifolia* (Boiss.)



Arcang., 1894, Comp. Fl. Ital., ed. 2: 267. – *B. elongata* subsp. *integrifolia* (Boiss.) Breistr., 1944, Bull. Soc. Sci. Dauphiné 60: 139. – *Brassica armoracioides* Czern. ex Turcz., 1854, Bull. Soc. Nat. Mosc. 27 (2): 311. – *Erucastrum armoracioides* (Czern. ex Turcz.) Cruchet, 1902, Bull. Soc. Vaud. Sci. Nat.: 333. – *B. elongata* subsp. *armoracioides* (Czern. ex Turcz.) Asch. et Graebn., 1898, Fl. Nordostdeut. Flachl.: 360. – *B. elongata* auct. non Ehrh. – 4, 9.

*Hesperis flava* Georgi ≡ *Erysimum flavum* (Bobrov, 1960; German, 2012c)

*Hesperis matronalis* auct. non L. = *H. sibirica*

***Hesperis sibirica*** L., 1753, Sp. Pl. 2: 663. – *H. pseudonivea* Tzvel., 1959, Not. Syst. Herb. Inst. Bot. Acad. Sci. URSS 19: 131. – *H. sibirica* subsp. *pseudonivea* (Tzvel.) A. L. Ebel, 2000, Turczaninowia 3, 3: 32. – *H. matronalis* auct. non L. – 1, 2, 3, 4, 7.

# ***Hornungia procumbens*** (L.) Hayek, 1925, Feddes Repert. 30: 480. – *Lepidium procumbens* L., Sp. Pl. 2: 643. – *Hymenolobus procumbens* (L.) Nutt., 1838, in Torr. et A. Gray, Fl. N. Amer. 1: 117. – 3, 6+ (Smirnov et al., 2003, as *Hymenolobus procumbens*), 7, 10, 11, 14.

*Hymenolobus procumbens* (L.) Nutt. ≡ *Hornungia procumbens* (Appel, Al-Shehbaz, 1997)

***Isatis costata*** C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 204. – *I. tinctoria* auct. non L. – 2, 3, 4, 6+ (German, 2009), 7, 8, 9, 11, 12, 13, 14.

# ***Isatis gymnocarpa*** (Fisch. ex DC.) Al-Shehbaz, Moazzeni et Mummenhoff, 2012, Taxon 61 (5): 948, non *I. lasiocarpa* Ledeb., 1841. – *Tauscheria gymnocarpa* Fisch. ex DC., 1821, Reg. Veg. Syst. Nat. 2: 564. – *T. lasiocarpa* Fisch. ex DC., 1821, Reg. Veg. Syst. Nat. 2: 563. – 14.

+ ***Isatis multicaulis*** (Kar. et Kir.) Jafri, 1973, Fl. West Pakistan 55: 72. – *Pachypteris multicaulis* Kar. et Kir., 1842, Bull. Soc. Nat. Mosc. 15 (1): 159. – *Pachypteris multicaule* (Kar. et Kir.) Bunge, 1843, Del. Sem. Horti Dorpat.: 8. – 14+ (Smirnov et al., 2003).

***Isatis oblongata*** DC., 1821, Reg. Veg. Syst. Nat. 2: 471. – *I. tinctoria* L. subsp. *oblongata* (DC.) N. Busch, 1913, Fl. Sibir. Orient. Extr. 1: 156, 158. – 1, 3, 4, 8, 9, 13.

*Isatis tinctoria* auct. non L. = *I. costata* (Smirnov et al., 2003)

# ***Leiocarpha cochlearioides*** (Murr.) D. A. German et Al-Shehbaz, 2010, Nordic J. Bot. 28 (6): 648. – *Bunias cochlearioides* Murr. 1777, Novi Comment. Gotting. 8: 42. – 1.

***Leiospora exscapa*** (C. A. Mey.) Dvořák, 1968, Spisy Prirod. Fak. Univ. Brno 497: 357. – *Parrya exscapa* C. A. Mey. 1829, in Ledeb., Icon. Pl. Fl. Ross. 1: 21. – 1, 6, 7.

***Lepidium affine*** Ledeb., 1821, Index Sem. Horti Dorpat.: 22. – *L. sibiricum* Schweigg., 1812, Enum. Pl. Horti Regiomont.: 43, non Pall., 1776. – *L. latifolium* L. subsp. *sibiricum* Thell. 1906, Neue Denkschr. Schweiz. Ges. Naturw. 4: 161. – *L. latifolium* auct. non L., p. p. – 4, 7+ (Smirnov et al., 2003, as *L. latifolium* subsp. *sibiricum* Thell.), 8+ (this study), 9, 14.

***Lepidium amplexicaule*** Willd., 1800, Sp. Pl. 3 (1): 436. – 3, 7, 8, 9?, 10, 11, 14, 15. – A record from 9 (Neuffer et al., 2012) is based on two specimens one of which (OSBU 20713) represents *L. affine* and another (OSBU 20481) is somewhat intermediate between the latter and *L. amplexicaule* though still closer to *L. affine*. It is likely that *L. amplexicaule* does not occur in East Mongolian region.

# ***Lepidium apetalum*** Willd., 1800, Sp. Pl. 3 (1): 439. – *L. densiflorum* auct. non Schrad. – *L. ruderales* auct. non L. – 1, 2, 3, 4, 5, 6+ (this study), 7, 8, 9, 10, 11, 12, 13, 14, 15.

# ***Lepidium appelianum*** Al-Shehbaz, 2002, Novon, 12 (1): 7, non *L. pubescens* Desv. (1815), nec Tineo (1827). – *Hymenophysa pubescens* C. A. Mey., 1830, in Ledeb., Icon. Pl. Fl. Ross. 2: 20. – *Cardaria pubescens* (C. A. Mey.) Jarm., 1934, Weed Fl. USSR 3: 29. – 7, 10, 11, 14, 15, 16.

# ***Lepidium cartilagineum*** (J. Mayer) Thell., 1906, Viert. Naturf. Ges. Zürich 51: 173. – *Thlaspi cartilagineum* J. Mayer, 1786, Abh. Böhm. Ges. Wiss. (Math.-Nat.) 2: 235. – *L. crassifolium* Waldst. et Kit., 1799, Descr. Icon. Pl. Rar. Hung. 1: 4. – 5, 7+ (Revushkin et al., 2001, as *L. crassifolium*), 8, 10, 12, 14+ (Revushkin et al., 2001, as *L. crassifolium*).

***Lepidium cordatum*** Willd. ex Steven, 1821, in DC. Reg. Veg. Syst. Nat. 2: 554. – 6, 7, 8, 9, 10, 11, 13, 14, 15, 16.

*Lepidium crassifolium* Waldst. et Kit. = *L. cartilagineum*

*Lepidium densiflorum* auct. non Schrad. = *L. apetalum* (Ebel, 2001)

***Lepidium lacerum*** C. A. Mey., 1830, in Ledeb., Icon. Pl. Fl. Ross. 2: 19. – *L. songaricum* auct. non Schrenk – 7+ (Revushkin et al., 2001), 14.

*Lepidium latifolium* auct. non L. = *L. affine* and *L. obtusum*

*Lepidium obtusum* Basin., 1844, Bull. Acad. Sci. Pétersb. 2: 203. – *L. latifolium* auct. non L., p. p. – 6, 7, 10, 14, 15.

*Lepidium ruderales* auct. non L. = *L. apetalum*

*Lepidium songaricum* auct. non Schrenk = *L. lacerum* (German, 2009).

+ *Litwinowia tenuissima* (Pall.) Woron. ex Pavl., 15 XII 1934, Fl. Centr. Kaz. 2: 302. – *Vella tenuissima* Pall., 1776, Reise 3: 780. – 14+ (Smirnov et al., 2003).

*Macropodium nivale* (Pall.) W. T. Aiton, 1812, Hort. Kew., ed. 2, 4: 108. – *Cardamine nivalis* Pall., 1773, Reise 2: 740. – 1, 7.

*Malcolmia africana* (L.) W. T. Aiton ≡ *Strigosella africana* (Botschantzev, 1972; Al-Shehbaz et al., 2014)

+ *Matthiola superba* Conti, 1900, Mém. Herb. Boiss. 18: 23. – 14+ (this study).

*Megacarpaea megalocarpa* (Fisch. ex DC.) Schischk. ex B. Fedtsch., 1939, Fl. URSS 8: 543. – *Biscutella megalocarpa* Fisch. ex DC., 1811, Ann. Mus. Hist. Nat. 18: 296. – 14.

*Meniocus linifolius* (Steph. ex Willd.) DC., 1821, Reg. Veg. Syst. Nat. 2: 325. – *Alyssum linifolium* Steph. ex Willd., 1800, Sp. Pl. 3 (1): 467. – 3, 7.

# *Microstigma brachycarpum* Botsch., 1959, Bot. Zhurn. 44 (10): 1485. – *M. junatovii* Grub., 1978, Bot. Zhurn. 63 (3): 363. – 15, 16+ (Smirnov et al., 2003, as *M. junatovii*). – Subendemic; described from China (Gansu, Beidashan Mts. north of Jinchang); holotype – LE.

*Microstigma deflexum* (Bunge) Juz., 1939, Fl. URSS 8: 298. – *Matthiola deflexa* Bunge, 1839, Del. Sem. Horti Dorpat.: 8. – *Sterigmostemum botschantzevii* Grub., 1978, Bot. Zhurn. 63 (3): 363. – 3+ (Ebel, 2000a), 6, 7, 12, 13, 16+ (German, 2009). – Subendemic; described from SW Siberia (Central Altai); lectotype (German, 2005a) – LE, isolectotypes – B, G, HAL, LE, P.

*Microstigma junatovii* Grub. = *M. brachycarpum* (Zhou et al., 2001)

+ *Neotorularia brevipes* (Kar. et Kir.) Hedge et J. Léonard, 1986, Bull. Jard. Bot. Nat. Belg. 56 (3–4): 393. – *Sisymbrium brevipes* Kar. et Kir. 1842, Bull. Soc. Nat. Mosc. 15 (1): 154, excl. var. – *Malcolmia brevipes* (Kar. et Kir.) Boiss., 1867, Fl. Or. 1: 267. – 7+ (Smirnov et al., 2003), 14+ (Maximowicz, 1889, as *Malcolmia brevipes*; Smirnov et al., 2003).

*Neotorularia grubovii* (Botsch.) Botsch. = *Braya humilis* (Al-Shehbaz, German, 2014)

*Neotorularia humilis* (C. A. Mey.) Hedge et J. Léonard ≡ *Braya humilis*

*Neotorularia maximowiczii* auct. non (Botsch.) Botsch. = *Braya humilis* (German, 2001, as *N. humilis*)

*Neotorularia mongolica* Botsch. et Gubanov = *Braya humilis* (Al-Shehbaz, German, 2014)

*Neotorularia korolkowii* (Regel et Schmalh.) Hedge et J. Léonard – not in the flora (German, 2009)

*Neslia paniculata* (L.) Desv., 1815, Journ. Bot. Appl. (Paris) 3, 4: 162. – *Myagrum paniculatum* L., 1753, Sp. Pl. 2: 641. – 2, 3, 4.

+ *Noccaea ferganensis* (N. Busch) Czer. 1981, Vasc. Pl. USSR: 140. – *Thlaspi ferganense* N. Busch, 1936, Bot. Journ. USSR 31 (5): 551. – *T. cochleariforme* auct. non DC., p. min. p. – 7+ (German, 2009).

# *Noccaea thlaspidioides* (Pall.) F. K. Mey., 2010, Haussknechtia 12: 5 – *Lepidium thlaspidioides* Pall., 1776, Reise 3: 161. – *Thlaspi cochleariforme* DC., 1821, Reg. Veg. Syst. Nat. 2: 381. – *N. cochleariformis* (DC.) Á. Löve et D. Löve, 1975, Bot. Notiser 128: 513. – 1, 2, 3, 4, 5, 6, 7, 8, 9, 13.

# *Odontarrhena obovata* C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 61. – *Alyssum obovatum* (C. A. Mey.) Turcz., 1837, Bull. Soc. Nat. Mosc. 10, 1: 57. – *Alyssum microphylliforme* Nyár., 1949, Anal. Acad. Rep. Popul. Române, Ser. A, 1(3): 11. – 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

+ *Olimarabidopsis pumila* (Čelak.) Al-Shehbaz, O’Kane et Price, 1999, Novon, 9 (3): 303. – *Sisymbrium pumilum* Steph. 1800, in Willd., Sp. Pl. 3: 507, nom. illeg., non Lam., 1779. – *Stenophragma pumilum* Čelak., 1872, Flora 55: 442. – *Arabidopsis pumila* (Čelak.) N. Busch, 1909, Fl. Cauc. crit. 3, 4: 465. – *Thellungiella pumila* (Čelak.) V. I. Dorof., 2002, Turczaninowia 5, 3: 110. – *Calymmatium pumilum* (Čelak.) D. A. German, 2010, Komarovia 6 (2): 86. – 14+ (Ebel, Rudaya, 2002, as *Arabidopsis pumila*).

*Oreoloma violaceum* Botsch. ≡ *Sterigmostemum violaceum* (Yang, 1987; Kamelin, German, 2001)

*Pachyneurum grandiflorum* (C. A. Mey.) Bunge, 1839, Del. Sem. Horti Dorpat.: 8. – *Draba grandiflora* C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 74. – 1, 3, 6, 7, 10+ (Günther & Schnittler in Flora GREIF: University of Greifswald ..., 2010+), 13. – Subendemic; described from SW Siberia (SE Altai); lectotype (German, 2005a) – LE, isolectotypes – B, GOET, LE, M, W.

*Pachypterygium multicaule* (Kar. et Kir.) Bunge ≡ *Isatis multicaulis* (Jafri, 1973; Al-Shehbaz, 2012)

*Prionotrichon kamelinii* Botsch. = *Rhammatophyllum erysimoides*

*Ptilotrichum canescens* (DC.) C. A. Mey. ≡ *Stevenia canescens* (Krasnoborov, German, 2007)

*Ptilotrichum dahuricum* Peschkova ≡ *Stevenia dahurica* (German, Al-Shehbaz, 2010)

*Ptilotrichum tenuifolium* (Steph. ex Willd.) C. A. Mey. ≡ *Stevenia tenuifolia* (German, 2010)

***Pugionium dolabratum*** Maxim., 1880, Bull. Acad. Sci. Pétersb. 26: 426. – *P. calcaratum* Kom., 1932, Bull. Jard. Bot. Acad. Sci. URSS 30, 5–6: 718. – *P. cristatum* Kom., 1932, Bull. Jard. Bot. Acad. Sci. URSS 30, 5–6: 719. – *11, 12, 13, 16*. – Subendemic; described from China (Inner Mongolia, Ordos); lectotype (Illarionova, 1999) – LE.

***Pugionium pterocarpum*** Kom., 1932, Bull. Jard. Bot. Acad. Sci. URSS 30, 5–6: 720. – *10*. – Subendemic; described from Depression of Great Lakes phytogeographical region (to the south of the lake Bayan-Nuur); lectotype (Illarionova, 1999) and isolectotypes – LE.

Yu et al. (2010) provided convincing evidences confirming previous finding of Illarionova (1999) regarding conspecificity of specimens from China (Inner Mongolia, Dengkou) described as *P. dolabratum* var. *platypterum* H. L. Yang and subsequently assigned to *P. pterocarpum*, with *P. dolabratum*. This fact, however, does not mean that plants of true *P. pterocarpum* from NW Mongolia and adjacent Russia (Tuva) should also be classified as *P. dolabratum* as suggested by Yu et al. (2010) who did not include Mongolian/Tuvian specimens into their analyses (Yu et al., 2010, 2013). Unless it is done, suggested merge of *P. pterocarpum* with *P. dolabratum* cannot be accepted and based on the distinct morphological pattern (conf. Grubov, 1982; Illarionova, 1999) it is rather unlikely that conspecificity of *P. pterocarpum* and *P. dolabratum* might be proven.

***Raphanus raphanistrum*** L., 1753, Sp. Pl. 2: 669. – *3, 4, 7, 8*.

# ***Rhammatophyllum erysimoides*** (Kar. et Kir.) Al-Shehbaz et O. Appel, III 2002, Novon, 12 (1): 3. – *Arabis erysimoides* Kar. et Kir., 1842, Bull. Soc. Nat. Mosc. 15 (1): 145. – *Rh. erysimoides* (Kar. et Kir.) Kamelin, XII 2002, Bot. Zhurn. 87, 12: 108, comb. superfl. – *Prionotrichon erysimoides* (Kar. et Kir.) Botsch. et Vved., 1948, Not. Syst. Herb. Inst. Bot. Zool. Acad. Sci. Uzbek. 12: 8. – *P. kamelinii* Botsch., 1987, Novit. Syst. Pl. Vasc. 24: 98. – *Rh. kamelinii* (Botsch.) Al-Shehbaz et O. Appel, III 2002, Novon, 12 (1): 3. – *Rh. kamelinii* (Botsch.) Kamelin, XII 2002, Bot. Zhurn. 87, 12: 109, comb. superfl. – *7, 14+* (Smirnov et al., 2003, as *Rh. kamelinii*).

*Rhammatophyllum kamelinii* (Botsch.) Al-Shehbaz et O. Appel = *Rh. erysimoides*

***Rorippa barbareaifolia*** (DC.) Kitag., 1937, J. Jap. Bot. 13 (2): 137. – *Camelina barbareaifolia* DC., 1821, Reg. Veg. Syst. Nat. 2: 517. – *R. hispida* suct. non (Desv.) Britt. – *2*.

+ ***Rorippa dogadovae*** Tzvel., 1957, Not. Syst. Herb. Inst. Bot. Acad. Sci. URSS 18: 98. – *R. islandica* subsp. *dogadovae* (Tzvel.) Jonsell, 1968, Symb. Bot. Upsal. 19: 156. – *3+*, *11+* (Ebel, 2000b).

***Rorippa palustris*** (L.) Bess., 1822, Enum. Pl. Volhyn.: 27. – *Sisymbrium amphibium* L. [var.] *α palustre* L., 1753, Sp. Pl. 2: 657. – *R. islandica* subsp. *fernaldiana* (Butters & Abbe) Hultén, 1967, Ark. Bot., n. s. 7 (1): 61. – *R. islandica* auct. non (Oeder) Borbás – *1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 13*.

***Sinapis arvensis*** L., 1753, Sp. Pl. 2: 663. – *4, 5+* (German, 2009), *8, 10+* (German, 2009).

+ ***Sisymbrium altissimum*** L., 1753, Sp. Pl. 2: 659. – *2* (German, 2011c).

***Sisymbrium brassiciforme*** C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 129. – *7, 14, 15+* (Smirnov et al., 2003).

***Sisymbrium heteromallum*** C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 132. – *2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 14*.

***Sisymbrium loeselii*** L., 1755, Cent. Pl. 1: 18. – *3, 4, 7+* (this study), *14*.

***Sisymbrium polymorphum*** (Murr.) Roth, 1830, Mant. Bot. 2: 946. – *Brassica polymorpha* Murr., 1776, Novi Comment. Gotting. 7: 35. – *S. junceum* (Willd.) M. Bieb., 1808, Fl. Taur.-Cauc. 2: 114. – *3, 4, 6, 7, 8, 9, 10, 14*.

***Sisymbrium subspinescens*** Bunge, 1847, Arb. Naturf. Veg. Riga 1, 2: 151. – *14*.

+ ***Sisymbrium volgense*** M. Bieb. ex Fourn., 1865, Rech. Fam. Crucif.: 97. – *4+* (Smirnov et al., 2003).

***Smelowskia alba*** (Pall.) Regel, 1861, Bull. Soc. Nat. Mosc. 34 (3): 208. – *Sisymbrium album* Pall., 1776, Reise 3: 293, 739. – *1, 3, 4, 6, 7, 10, 13*.

***Smelowskia altaica*** (Pobed.) Botsch., 1968, Novit. Syst. Pl. Vasc. 5: 142. – *Hedinia altaica* Pobed., 1966, Novit. Syst. Pl. Vasc. 3: 117. – *6, 7*. – Subendemic; described from Russian Altai (Ukok Plateau) with paratypes from Mongolian Altai; holotype – LE.

***Smelowskia bifurcata*** (Ledeb.) Botsch., 1968, Novit. Syst. Pl. Vasc. 5: 140. – *Hutchinsia bifurcata* Ledeb. 1841, Fl. Ross. 1 (1): 201. – *1*.

***Smelowskia calycina*** (Steph. ex Willd.) C. A. Mey., 1831, in Ledeb. Fl. Alt. 3: 170, s. str. – *Lepidium calycinum* Steph. ex Willd., 1800, Sp. Pl. 3 (1): 433. – *3, 6, 7, 14?*

+ *Smelowskia calycina* subsp. *pectinata* (Bunge ex Ledeb.) D. A. German, 2005, Novit. Syst. Pl. Vasc. 37: 297. – *Hutschinsia pectinata* Bunge ex Ledeb., 1841, Fl. Ross. 1 (1): 201. – *S. pectinata* (Bunge ex Ledeb.) E. Veliczka, 1976, Novit. Syst. Pl. Vasc. 13: 130. – *S. koeltzii* auct. non (Rech. f.) Rech. f. – 3+, 7+ (Ebel, 1999, as *S. pectinata*), 13+ (Revushkin et al., 2001, as *S. pectinata*), 14+ (Ebel, 1999, as *S. pectinata*). – Subendemic; described from SW Siberia (SE Altai); lectotype (German, 2005a) – LE, isolectotypes – B, GOET, HAL, KW, LE, M.

*Smelowskia mongolica* Kom., 1911, Feddes Repert. 9: 393. – *Sophiopsis mongolica* (Kom.) N. Busch, 1939, Fl. URSS 8: 87. – *Hedinia mongolica* (Kom.) E. Veliczka, 1974, Biol. Nauki 17, 6 (126): 64. – 3. – Endemic; described from Khangai phytogeographical region (valley of Sagistai); holotype – LE.

*Sterigmostemum botschantzevii* Grub. = *Microstigma deflexum* (Botschantzev, 1979, in sched. typ. (LE); Jacquemoud, 1988).

*Sterigmostemum regeliiorum* Kamelin et D. A. German = *S. violaceum* (Zhou et al., 2001)

# *Sterigmostemum violaceum* (Botsch.) H. L. Yang, 1987, Fl. Desert. R. P. Sin. 2: 64. – *Oreoloma violaceum* Botsch., 1980, Bot. Zhurn. 65 (3): 426. – *O. sulphureum* Botsch., 1980, Bot. Zhurn. 65 (3): 427. – *S. regeliiorum* Kamelin et D. A. German, 2001, Turczaninowia 4, 3: 8, non (Banks et Soland.) Bornm., 1911. – 7, 14. – Subendemic; described from Dzungarian Gobi phytogeographical region within Mongolia (loc. Tsagan-Tunge to the south-east of the lake Gashun-Nor); holotype – LE.

*Stevenia alyssoides* Adams et Fisch., 1817, Mém. Soc. Nat. Mosc. 5: 84, s. str. – 1, 3.

*Stevenia alyssoides* subsp. *zinaiidae* (Malysch.) Kamelin, 1995, Bot. Zhurn. 80, 3: 71. – *S. zinaiidae* Malysch., 1963, Not. Syst. Herb. Inst. Bot. Acad. Sci. URSS 22: 16. – 1, 3. – Subendemic; described from SE Siberia (Buryatia, E Sayan); holotype and isotype – LE.

# *Stevenia canescens* (DC.) D. A. German, 2007, Key Pl. Tuva Rep.: 194. – *Alyssum canescens* DC., 1821, Reg. Veg. Syst. Nat. 2: 322, nom. prop. cons. (German, 2013b). – *Ptilotrichum canescens* (DC.) C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 66. – 1, 2, 3, 4, 6, 7, 8, 9, 11, 12, 13, 15, 16.

Occurrence of *S. canescens* in eastern regions of the country requires clarification.

*Stevenia cheiranthoides* DC., 1821, Reg. Veg. Syst. Nat. 2: 210, s. str. – *Arabis incarnata* Pall. ex C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 210, nom. illeg. superfl. – *Draba multiceps* Kitag., 1935, Rep. First Sci. Exped. Manchoukou, sect. 4, 2: 18. – 4, 5, 9+ (Neuffer et al., 2012). – Subendemic; described from SE Siberia (Transbaikal Prov., to the west of Gazimursky Zavod); lectotype (Kamelin, 1995) – G.

*Stevenia cheiranthoides* subsp. *incarnata* (Kamelin) D. A. German, 2015, Turczaninowia 18, 2: 62. – *S. incarnata* Kamelin, 1995, Bot. Zhurn. 80, 3: 73. – *Hesperis rupestris* Pall., 1776, Reise 3: 260, nom. rej. prop. (German, 2013a). – *Cheiranthus fruticosus* J. Mayer, 1786, Abh. Böhm. Ges. Wiss. (Math.-Nat.), 2: 237, non L., 1753. – 1, 2, 3, 4, 6, 7, 8, 10.

# *Stevenia dahurica* (Peschkova) D. A. German et Al-Shehbaz, 2010, Nordic J. Bot. 28 (6): 649. – *Ptilotrichum dahuricum* Peschkova, 1979, Novit. Syst. Pl. Vasc. 15: 230. – *Alyssum dahuricum* (Peschkova) Al-Shehbaz, 2004, Novon 14 (2): 153. – 4, 5, 8+ (Neuffer et al., 2012), 9. – Subendemic; described from SE Siberia (Transbaikal Prov., valley of Bukukun); holotype and isotype – LE.

*Stevenia incarnata* Kamelin ≡ *S. cheiranthoides* subsp. *incarnata*

*Stevenia sergievskajae* (Krasnob.) Kamelin et Gubanov, 1986, Bull. Soc. Nat. Mosc., Ser. Biol. 91, 6: 91. – *Alyssum sergievskajae* Krasnob., 1975, Bot. Zhurn. 60 (5): 664. – 3. – Subendemic; described from SE Siberia (Tuva, Sangilen Mts.); holotype – NS, isotypes – LE, NS, TK.

# *Stevenia tenuifolia* (Steph. ex Willd.) D. A. German, 2010, Komarovia 6 (2): 84. – *Alyssum tenuifolium* Steph. ex Willd., 1800, Sp. Pl. 3: 460. – *Ptilotrichum tenuifolium* (Steph. ex Willd.) C. A. Mey., 1831, in Ledeb., Fl. Alt. 3: 67. – *P. canescens* subsp. *tenuifolium* (Steph. ex Willd.) Hanelt et Davažamc, 1965, Feddes Repert. 70, 1–3: 31. – 2, 3, 4, 5, 6, 7+ (Revushkin et al., 2001), 8, 9, 10+ (Revushkin et al., 2001), 12, 13, 14, 15. – Subendemic; described from SE Siberia (lake Baikal); lectotype – B-W.

Western limit of distribution of the species in Mongolia needs elucidation; at least partly relevant material represents well-developed plants of *S. canescens* described as *Ptilotrichum canescens* var. *elongatiformis* A. L. Ebel.

*Strigosella africana* (L.) Botsch., 1972, Bot. Zhurn. 57 (9): 1038. – *Hesperis africana* L., 1753, Sp. Pl. 2: 663. – *Malcolmia africana* (L.) W. T. Aiton, 1812, Hort. Kew., ed. 2, 4: 121. – 10, 11.

+ *Strigosella brevipes* (Bunge) Botsch., 1972, Bot. Zhurn. 57 (9): 1041. – *Dontostemon brevipes* Bunge, 1847, Arb. Naturf. Veg. Riga 1 (2): 149. – *Malcolmia karelinii* Lipsky, 1903, Vid. Medd. Dansk. Nat. Foren Kjøbenhavn 25: 139. – 14+ (Smirnov et al., 2003).

*Subularia aquatica* L., 1753, Sp. Pl. 2: 642. – 3, 6.

- Syrenia macrocarpa* auct. non Vass. = *Erysimum kotuchovii* et *E. mongolicum* (German, 2005b)  
*Taphrospermum altaicum* C. A. Mey. ≡ *Eutrema altaicum* (Al-Shehbaz, Warwick, 2005)  
*Tauscheria lasiocarpa* Fisch. ex DC. = *Isatis gymnocarpa* (Al-Shehbaz, 2012)  
***Tetracme quadricornis*** (Steph. ex Willd.) Bunge, 1836, Del. Sem. Horti Dorpat.: 8. – *Erysimum quadricorne* Steph. ex Willd., 1800, Sp. Pl. 3 (1): 514. – 7, 14.  
*Thellungiella salsuginea* (Pall.) O. E. Schulz ≡ *Eutrema salsugineum* (Al-Shehbaz, Warwick, 2005)  
***Thlaspi arvense*** L., 1753, Sp. Pl. 2: 646. – 1, 2, 3, 4, 6, 7 13, 14+ (German, 2009).  
# ***Thlaspi ceratocarpum*** (Pall.) Murr. 1774, Novi Comment. Gotting. 5: 26. – *Thlaspi ceratocarpum* Pall., 1773, Reise 2: 740. – *Carpoceras ceratocarpum* (Pall.) N. Busch, 1913, Fl. Sibir. Orient. Extr. 1: 119. – 6, 10, 14.  
*Thlaspi cochleariforme* DC. = *Noccaea thlaspidioides* (Meyer, 2010)  
***Turritis glabra*** L., 1753, Sp. Pl. 2: 666. – 7.

## II. Unconfirmed state and regional records of Mongolian Cruciferae (Brassicaceae)

Table 1

Species erroneously recorded from Mongolia<sup>1</sup>.

Species	Reported for Mongolia by	Excluded from the flora of Mongolia by	Notes
<b><i>Arabis amplexicaulis</i></b> Edgew.	Urgamal et al. (2013); Oyuntsetseg (2014)	Present study	First reported by Neuffer et al. (2012) as “ <i>Erysimum amplexicaule</i> Willd.” (apparently a misprint of the actual determination <i>E. cheiranthoides</i> [OSBU 20693]) and later misinterpreted as <i>Arabis amplexicaulis</i> Edgew. [= <i>E. amplexicaule</i> (Edgew.) Kuntze]. Occurrence of Himalayan <i>A. amplexicaulis</i> in Mongolia is impossible.
<b><i>Barbarea stricta</i></b> Andrz.	Kamelin et al. (1992)	German (2009)	The record was based on short-fruited specimens of <i>B. orthoceras</i> .
<b><i>Erysimum perofskianum</i></b> Fisch. et C. A. Mey.	Polatschek (2010)	German (2012a)	Cited localities are situated in China and refer to <i>E. amurense</i> Kitag.
<b><i>Erysimum ledebourii</i></b> D. A. German	Urgamal et al. (2013); Oyuntsetseg (2014)	Present study	The species was reported for Mongolia with a reference to Olonova et al. (2013). In fact, <i>E. ledebourii</i> is endemic to W Altai within Kazakhstan and adjacent Russia (German, Ebel, 2009), exactly as indicated by Olonova et al. (2013, as “ <i>E. ledebourianum</i> Serg.”). A finding of the species in Mongolia is improbable.
<b><i>Erysimum leucanthemum</i></b> (Steph. ex Willd.) B. Fedtsch.	Polatschek (2010)	German (2012a)	Cited specimen was collected in Kazakhstan.
<b><i>Erysimum quadrangulum</i></b> Desf.	Urgamal et al. (2013)	Present study	The report was based on the misinterpretation of Altaian endemic <i>E. kotuchovii</i> as a synonym of mainly E European/N Kazakhstanian <i>E. quadrangulum</i> (Polatschek, 2010).
<b><i>Erysimum siliculosum</i></b> (M. Bieb.) DC.	Polatschek (2010)	German (2012a)	Mongolia was mentioned in the general distribution, no specimens were cited; any confirming vouchers are absent.

<sup>1</sup> Unless require special comments, the records based on differences in interpretation of limits and ranks of closely related taxa are not included. These are: *Arabis sagittata* auct. non (Bertol.) Scop. (actually *A. borealis*), *Brassica rapa* auct. non L. (*B. campestris*), *Braya glabella* auct. non Richardson (*B. siliquosa*), *Draba cana* auct. non Rydb. (*D. lanceolata*), *Eruca vesicaria* auct. non (L.) Cav. (*E. sativa*), *Erysimum canescens* auct. non Ehrh. (*E. andrzejowskianum*), *E. hieracifolium* auct. non L. (*E. marschallianum*), *Hesperis matronalis* auct. non L. (*H. sibirica*).

Table 1 (continuation)

Species	Reported for Mongolia by	Excluded from the flora of Mongolia by	Notes
<i>Erysimum vassilczenkoi</i> Polatschek	Grubov (1976), Gubanov et al. (1990) [both as <i>Syrenia macrocarpa</i> ]	German (2005a)	<i>Erysimum vassilczenkoi</i> was shown to be a local endemic of NW China; Mongolian specimens with such identification were recognized as <i>E. kotuchovii</i> and <i>E. mongolicum</i> .
<i>Erysimum virgatum</i> Roth	Polatschek (2010); Oyuntsetseg (2014)	Present study	The record of Oyuntsetseg (2014) is based on misinterpretation of <i>E. cheiranthoides</i> subsp. <i>transiliense</i> as a synonym of <i>E. virgatum</i> as proposed by Polatschek (2010). Records by Polatschek (2010) are tentatively assigned herein to <i>E. marschallianum</i> .
<i>Eutrema altaicum</i> (C. A. Mey.) Al-Shehbaz et S. I. Warwick	Maximowicz (1889, as <i>Taphrospermum altaicum</i> )	Ebel (2000a, as <i>T. altaicum</i> )	The species has long been reported for Mongolia based on the single record of Maximowicz (1889) from vicin. of the lake Khubsugul. Ebel (2000a) emphasized that the record fits neither ecology (forest belt instead of alpine habitats), nor distribution (species is unknown to the east of W Tuva) of <i>E. altaicum</i> , is not confirmed by any material and should be considered erroneous; this is also true for subsequent two reports. Theoretically, occurrence of <i>E. altaicum</i> cannot be excluded in Khobdo region but no confirming material is known yet.
	Al-Shehbaz (2000, as <i>T. altaicum</i> )	Present study	The single gathering reported as if from Mongolia: “Mongolia: Altai, Politoff s. n. (K, LE)” cannot be from this country because Politow collected only within present-day Russia and Kazakhstan. The cited samples apparently originate from SE Altai of Russia.
	Neuffer et al. (2003, as <i>T. altaicum</i> )	(German et al., 2003, as <i>Hymenolobus procumbens</i> ).	Cited specimen (OSBU 10597) reported as novelty for both Khobdo and Mongolian Altai regions (collected in the latter) is <i>Hornungia procumbens</i> .
<i>Goldbachia laevigata</i> (M. Bieb.) DC.	Hilbig, Schamsran (1976)	German (2001, 2009)	The single cited specimen ([Depression of Great Lakes], “Ulaan uul bei Chovd, Halbwüste”, HAL 56584) is <i>G. ikonnikovii</i> .
	Gubanov (1996), as new for Dzungarian Gobi and Valley of Lakes	German (2001, 2009)	The record from Dzungarian Gobi is based on specimens of <i>G. pendula</i> (LE). Regarding the Valley of Lakes, although no material of “ <i>G. laevigata</i> ” has been found on which the record from that region was based, relevant information should be considered erroneous as no reliable findings of the species are known from Mongolia and neighboring regions of China and Russia.
	Neuffer et al. (2003), as new for Khobdo and Mongolian Altai	(German et al., 2003)	Cited specimen ([Khobdo region], near Bayan-Ulgiy, OSBU 10601) reported as novelty for both Khobdo and Mongolian Altai regions is <i>G. ikonnikovii</i> .
<i>Isatis tinctoria</i> L.	Grubov (1977)	Smirnov et al. (2003)	Cited specimen and further gatherings determined as <i>I. tinctoria</i> were re-identified as <i>I. costata</i> .

Table 1 (continuation)

Species	Reported for Mongolia by	Excluded from the flora of Mongolia by	Notes
<i>Lepidium densiflorum</i> Schrad.	Grubov (1982)	Ebel (2001)	Ebel (2001) demonstrated that by the end of XX century, the name <i>L. densiflorum</i> was widely misapplied to the plants of <i>L. apetalum</i> from N and Central Asia. Indeed, all revised collections of “ <i>L. densiflorum</i> ” from Mongolia represent <i>L. apetalum</i> , in agreement with earlier data of Thellung (1906). At the same time, American <i>L. densiflorum</i> is becoming common in neighboring China and Russia and will very likely be introduced in Mongolian but presently it is not confirmed yet.
<i>Lepidium latifolium</i> L.	Grubov (1955, 1982)	Present study	In a present-day floristic literature on Mongolia, two concepts of <i>L. latifolium</i> (s. l. vs. s. str.) are being confused. This confusion was enhanced by Kamelin et al. (1992) who reported <i>L. affine</i> (as <i>L. sibiricum</i> Schweigg.) as a novelty for Mongolian flora but did not comment on previous records of <i>L. latifolium</i> , e. g., by Grubov (l. c.), who’s concept of the last species, as evidenced by his herbarium annotations, comprised <i>L. affine</i> . As for <i>L. latifolium</i> s. str., I failed to study a single specimen of it from Mongolia which agrees with the data of Thellung (1906) who did not report “ <i>L. latifolium</i> subsp. <i>eu-latifolium</i> ” for the country, but recorded, among other subspecies, subsp. <i>sibiricum</i> [= <i>L. affine</i> ]. The fact that specimens of <i>L. latifolium</i> from Mongolia correspond to <i>L. latifolium</i> subsp. <i>sibiricum</i> was emphasized by Hanelt and Davažamc (1965), although these authors, like Grubov, also preferred not to recognize the latter at either subspecies or species rank. Thus, true <i>L. latifolium</i> seems to be never recorded from Mongolia and studied herbarium material demonstrates the same: all revised gatherings kept under this name belong predominantly to <i>L. affine</i> and <i>L. obtusum</i> , more rarely to <i>L. amplexicaule</i> or <i>L. cordatum</i> . To be mentioned, this is true for material from 10 out of 12 regions for which <i>L. latifolium</i> was reported by Gubanov (1996) and Oyuntsetseg (2014); no collections from East Mongolia and East Gobi have been studied and it would be unclear to which of the above species these records might belong because none of them is known from there. However, Grubov (1955, 1982) listed both regions with a question mark and Gubanov (l. c.) did not supply them with the sign “+”, which means that no relevant gatherings were made after 1982, i. e., the records from East Mongolia and East Gobi are still provisional and no taxa of <i>L. latifolium</i>

Table 1 (continuation)

Species	Reported for Mongolia by	Excluded from the flora of Mongolia by	Notes
			affinity are yet collected from these regions. In sum, the possibility of finding <i>L. latifolium</i> s. str. in Mongolia cannot be excluded in view of its ability of being weedy and introduced (conf. Thellung, 1. c.), but currently its occurrence in the country is not confirmed.
<i>Lepidium ruderale</i> L.	Urgamal et al. (2013); Oyuntsetseg (2014)	Present study	In both works the species is reported for Mongolia with reference to Grubov (1982) and Manibazar (2010). The latter work is the Dictionary of Latin and Mongolian plants names and cannot be considered a source of floristic data. In Grubov (1982), <i>L. ruderale</i> is given as a species which “could be found along the roads and in settlements as a weed” but not a single locality is reported. By this, Grubov corrected his earlier data: in the “Conspect ...” (Grubov, 1955) the species was reported for up to 9 regions of the country. Renewed information is in agreement with the herbarium material: all gatherings of “ <i>L. ruderale</i> ” from Mongolia revised by Grubov represent <i>L. apetalum</i> and this is true for subsequent collections with such determination I could check. An old report of Thellung (1906: 137–138): “West-Mongolei (Vallée de Kéroulen, 1895–6, Chaffanjon – Paris)” is noteworthy as it is based on the correctly determined specimen: “Vallée de Kéroulen, Mandchourie. M. Chaffanjon, 1895–1896” (P 05444728; <a href="http://coldb.mnhn.fr/catalognumber/mnhn/p/p05444728">http://coldb.mnhn.fr/catalognumber/mnhn/p/p05444728</a> ). As follows from the label, it was apparently collected in the Chinese (Mandshurian) part of the valley of Kerulen. Hence, occurrence of <i>L. ruderale</i> in Mongolia can be considered possible but not yet confirmed.
<i>Lepidium songaricum</i> Schrenk	Revushkin et al. (2001); Ebel, Rudaya (2002)	German (2009)	Both reports are based on the poorly developed plants of <i>L. lacerum</i> .
<i>Neotorularia korolkowii</i> (Regel et Schmalh.) Hedge et J. Léonard	Maximowicz (1880, as <i>Malcolmia mongolica</i> Maxim.); Grubov (1979); Jäger et al. (1985) [both as <i>Torularia korolkowii</i> ]	German (2009)	Among three records from Mongolia, the latter is <i>Strigosella brevipes</i> (HAL 57361). The second is not located but ecologically and geographically does not correspond to <i>N. korolkowii</i> . The first is indeed <i>N. korolkowii</i> (lectotype of <i>Malcolmia mongolica</i> , LE), but, along with a set of gatherings of other species by Dr. Kalning from “Kobdo” in 1870, it apparently originates from outside Mongolia, most likely E Tian Shan (details in German, 2009). Grubov (1955) questioned that Kalning collected the species in Khobdo area but later (Grubov, 1982) listed it without question mark.



Table 1 (end)

Species	Reported for Mongolia by	Excluded from the flora of Mongolia by	Notes
<i>Neotorularia maximowiczii</i> (Botsch.) Botsch.	Grubov (1972, as <i>Torularia maximowiczii</i> Botsch.)	German (2001)	Records from Mongolia are based on specimens of <i>Braya humilis</i> ; <i>N. maximowiczii</i> is recently synonymized with <i>B. stigmatica</i> (Franch.) Al-Shehbaz et D.A. German endemic to China (Al-Shehbaz, German, 2014).
<i>Sterigmostemum regeliorum</i> Kamelin et D. A. German	Urgamal et al. (2013)	Present study	<i>Sterigmostemum regeliorum</i> has been proposed as a replacing name for <i>Oreoloma sulphureum</i> Botsch. while transferring the latter to <i>Sterigmostemum</i> in order to avoid creation of a later homonym of <i>S. sulphureum</i> (Banks. et Soland.) Bornm., 1911 (Kamelin, German, 2001). Nothing new was said about its distribution, i. e., it was treated endemic to NW China following the original publication (Botschantzev, 1980). Zhou et al. (2001) found it conspecific with <i>S. violaceum</i> (as <i>O. violaceum</i> ), and this viewpoint is accepted here. However, would <i>S. regeliorum</i> be treated specifically distinct from <i>S. violaceum</i> as done by Urgamal et al. (2013) and Oyuntsetseg (2014), it should not be reported for Mongolia as long as this yellow-flowered variety of <i>S. violaceum</i> is only known from Chinese part of Dzungaria.

Table 2

Species erroneously recorded from certain phytogeographical regions of Mongolia.

Species	Region	Reported by	Excluded by	Notes
<i>Aphragmus involucratus</i>	6	Grubov (1982)	German (2009)	The single reported locality (Kity-Tai) is situated in neighboring Russia (border area of Tuva and Altai Republic).
<i>Arabis borealis</i>	7	Hilbig, Schamsran (1976); Grubov (1982) [both as <i>A. hirsuta</i> ]	German (2009, as <i>A. sagittata</i> )	The single gathering cited by Hilbig & Schamsran (1976) was not located at HAL. Other specimens from Mongolian Altai in HAL, LE, and UBA ever determined as <i>A. sagittata</i> ( <i>A. hirsuta</i> ) belong to other species.
<i>Camelina microcarpa</i>	6	Grubov (1982)	German (2009)	Neither specimens nor localities were cited; material from the region is absent; occurrence is possible but currently not confirmed.
<i>Cardamine bellidifolia</i>	13	Neuffer et al. (2012)	Present study	Cited specimen (OSBU 12084) is <i>Aphragmus involucratus</i> .
<i>Catolobus pendulus</i>	8	Neuffer et al. (2012)	Present study	Cited locality (Hustai National park) is situated in Mongol-Daurian region; occurrence in Middle Khalkha is possible but currently not confirmed.
<i>Chorispora bungeana</i>	6, 13, 14	Oyuntsetseg (2014)	Present study	The species was long reported for Mongolia from the single locality (Kyzyl-Gaya [= Kairty-Daba] pass) (e. g., Grubov, 1955, 1982) in Mongolian Altai at the border with China. The record is based on the gathering of V.V. Sapozhnikov of 15 Jul. 1908 (TK); other material on <i>Ch. bungeana</i>

Table 2 (continuation)

Species	Region	Reported by	Excluded by	Notes
				from Mongolia is unknown to me. Probably the species was confused with <i>Ch. sibirica</i> which is surprisingly not reported for Khobdo and Dzungarian Gobi (Oyuntsetseg, 2014) although it is common in these regions and recorded by previous authors.
<i>Conringia planisiliqua</i>	6	Grubov (1982)	German (2009)	No specimens or localities were cited; material from Khobdo region is absent, ecological and geographical evidences are not in favour of occurrence of the species in the region.
<i>Dendroarabis fruticulosa</i>	6	Grubov (1982, as <i>Arabis fruticulosa</i> )	German (2009, as <i>A. fruticulosa</i> )	Situation is the same as with <i>Conringia planisiliqua</i> .
<i>Dontostemon crassifolius</i>	11	Gubanov (1996)	German (2003)	Revised material from Valley of Lakes (MW) belongs to <i>D. senilis</i> ; occurrence of <i>D. crassifolius</i> in the region is rather possible but currently not confirmed.
	14	Jäger et al. (1985)	German (2009)	The single record was based on misidentified specimen of <i>D. elegans</i> (E. Jäger E 313, HAL).
	15	Gubanov (1996)	German (2003)	The single record was based on misidentified specimen of <i>D. senilis</i> (NW of Atas-Bogdo, G. N. Ogureyeva s. n., MW). A finding of <i>D. crassifolius</i> in both Dzungarian and Transaltai Gobi is unlikely.
<i>Dontostemon elegans</i>	6	Grubov (1982)	German (2003); German et al. (2003)	All collections from Khobdo region and Depression of Great Lakes (as well as from adjacent part of Mongolian Altai) ever determined as <i>D. elegans</i> and <i>D. crassifolius</i> (except for few specimens of true <i>D. crassifolius</i> from Depression of Great Lakes) were re-identified as “untypical <i>D. senilis</i> ” and subsequently recognized as <i>D. senilis</i> subsp. <i>gubanovii</i> (German, 2007) currently accepted as <i>D. gubanovii</i> .
	10	Gubanov (1996)		
<i>Dontostemon perennis</i>	5	Gubanov (1996); Gubanov et al. (1996)	German (2009)	The record was based on the collection of E. Ganbold et al., 1146 (MW) re-identified by A. L. Ebel as <i>D. dentatus</i> (Gubanov, 1999). No other specimens determined as <i>D. perennis</i> from Great Khingan are available; its occurrence in the region and eastern part of Mongolia as a whole (see next comment) is not expected.
	8, 12	Grubov (1955)	Present study	All revised collections from Middle Khalkha and East Gobi ever determined as <i>D. perennis</i> (mainly LE) were re-identified, predominantly as <i>D. integrifolius</i> or <i>D. senilis</i> , by V. F. Golubkova (in 1950), Ch. Sanchir (in 1977), V. I. Grubov (in 1970–1980ths) and finally by the present author (since 2000). Thus, occurrence of <i>D. perennis</i> the eastern part of Mongolia does not get support. The species is apparently restricted to the western part of the country and even there it is not as widely distributed as previously thought (see the next comment).

Table 2 (continuation)

Species	Region	Reported by	Excluded by	Notes
	15	Grubov (1982)	Present study	There are only two specimens (Dayan Uul, 5 VII 1973, N.S Golubkova & U. Tsogt 186 and Khurgu Uul, 15 VII 1973, E.A. Isachenko & E. I. Rachkovskaya 2668, both LE) from Transaltai Gobi determined as <i>D. perennis</i> (a very similar specimen, 10 km to the south of Noen, V. I. Grubov et al. 1983, 8 IX 1979 [LE], was determined by Grubov as " <i>D. senilis?</i> "). Habitually they fit <i>D. senilis</i> but in the indumentum partly composed of rather short, patent to subappressed trichomes, they remind <i>D. perennis</i> . Based on to the habit, fruits, and presence of long twisted trichomes they are preliminarily treated as untypical specimens of <i>D. senilis</i> and their status needs further elucidation while presence of <i>D. perennis</i> in Transaltai Gobi of Mongolia at the moment cannot be confirmed.
<i>Dontostemon pinnatifidus</i>	3	Neuffer et al. (2012, as <i>D. pectinatus</i> and <i>D. pinnatifidus</i> )	Present study	The record was based on three specimens (OSBU 12263, 12268, 12279) collected in two localities with the same coordinates corresponding to NW part of Middle Khalkha. Occurrence of the species in Khangai is possible but cannot be considered confirmed yet.
<i>Dontostemon senilis</i>	8	Neuffer et al. (2012)	Present study	The record was based on two specimens (OSBU 11810 and 11812) both collected near the ruins of Saikhan-Ovoo (bank of Ongi-gol). This locality is situated at the very east of the Valley of Lakes (border with East Gobi). Occurrence of <i>D. senilis</i> in southern part of Middle Khalkha is possible but currently not confirmed.
<i>Draba altaica</i>	10	Oyuntsetseg (2014)	Present study	The record was given with a reference to German (2009); however, in the latter work <i>D. altaica</i> is added to the flora of Gobi-Altai which is not mentioned in Oyuntsetseg (2014). Apparently, "13+" was misprinted as "10+" in that work.
<i>Draba baicalensis</i>	10	Oyuntsetseg (2014, as <i>D. czuensis</i> )	Present study	The single mentioned gathering (Naranbulag, Uvs aimag) was collected in the north-westmost part of Khangai (Khan Khukhii range, mt. Khurmiin-Ovoo) and not in Depression of Great Lakes as explicitly reported by Ebel in a referred work (Ebel, 2002, as <i>D. czuensis</i> ) and previously by Gubanov and Kamelin (1991) while reporting the species as a novelty for Khangai.
<i>Draba mongolica</i>	6, 7	Grubov (1955)	Ebel (2002)	Available material on " <i>D. mongolica</i> " from W Mongolia was assigned to other <i>Draba</i> species. This is also true for subsequent records (e. g., Neuffer et al., 2003).
<i>Draba ochroleuca</i>	13	Grubov (1982)	German (2009)	Relevant specimens were re-determined as subglabrous form of <i>D. oreades</i> .

Table 2 (continuation)

Species	Region	Reported by	Excluded by	Notes
<i>Draba pygmaea</i>	6	Gubanov (1996)	Smirnov et al. (2003)	The specimen on which the record of <i>D. pygmaea</i> from Khobdo region and W Mongolia as a whole was based is a mixture of <i>D. turczaninowii</i> and <i>D. altaica</i> .
<i>Erysimum andrzejowskianum</i>	2, 3, 4, 8, 9, 10, 13	Grubov (1955, as <i>E. diffusum</i> )	Present study	Since the checklist of Grubov (1955), <i>E. andrzejowskianum</i> is reported for eight regions of the country (those listed here plus Mongolian Altai). Based on revised material, presence of the species only in the latter region can be confirmed while other collections represent <i>E. flavum</i> s. l. (HAL, LE). Despite most of old material of “ <i>E. canescens</i> ” or “ <i>E. diffusum</i> ” in LE from relevant regions has been correctly re-identified by Grubov in 1976, the same (wide) distribution was still given in the “Key ...” (Grubov, 1982) and reported in subsequent Mongolian treatments (Gubanov, 1996; Oyuntsetseg, 2014, both as <i>E. canescens</i> ). To be noted, the single locality in Mongolian Altai (“north-west: upper reaches of Tsagan-gol”) given in Grubov (1955), is based on the specimen “Slope near the river Dzurhe, one of the peaks of Tsagan-gol. Light larch woods. 30 VII [18]98. № 76. [D.A. & E.N. Klementz]” (LE) which originates from one of the tributaries of Urungu in neighboring China and not from the tributary of Khobdo-gol. This conclusion is in congruence with Klementz’s route of 1898 (Grubov, 1955: 14). However, occurrence of the species in Mongolia is confirmed based on recent collections from Dzungarian slope of Mongolian Altai (valleys of Bulgan-gol, Bodonchijn-gol – ALTB).
<i>Erysimum flavum</i> s. str.	6, 7, 10	Grubov (1982)	Ebel (2000a); German, Oyuntsetseg (2008)	The species is represented in relevant regions by subsp. <i>altaicum</i> .
<i>Eutrema salsugineum</i>	6	Neuffer et al. (2003, as <i>Thellungiella salsuginea</i> )	(German et al., 2003, as <i>Noccaea cochleariformis</i> )	Cited specimen (OSBU 10379) was re-identified as <i>Noccaea thlaspidioides</i> .
<i>Goldbachia ikonnikovii</i>	9	Gubanov (1996)	German et al. (2003)	Occasional record from East Mongolia actually refers to Khovd region; it is based on a misprint (9 instead of 6).
<i>Isatis oblongata</i>	6	Hilbig, Schamsran (1980, 1985)	German (2009)	The specimen (HAL 56302) first reported as “ <i>I. costata</i> vel <i>I. oblongata</i> ” and later referred to the latter species was re-identified as <i>I. costata</i> .
	7	Gubanov (1996)	German (2009)	The single specimen identified as <i>I. oblongata</i> from Mongolian Altai (Gubanov Nr. 8972, MW) is <i>I. costata</i> .
<i>Lepidium cartilagineum</i>	6	Neuffer et al. (2003, as <i>L. crassifolium</i> )	German et al. (2003)	Cited specimen (OSBU 10467) was re-identified as <i>L. cordatum</i> .

Table 2 (continuation)

Species	Region	Reported by	Excluded by	Notes
<i>Microstigma brachycarpum</i>	6, 7	Neuffer et al. (2003, as <i>M. junatovii</i> )	Present study	The species was reported for both Khobdo region and Mongolian Altai based on the single gathering. Unfortunately, relevant specimen (OSBU 10809) seems to be misplaced and could not be revised. However, a possibility of occurrence of the species in the area is definitely excluded based on severe discrepancy between the ecology and geography of <i>M. brachycarpum</i> (desert plant known from the very south of the country) and collection data (alpine habitat at 2800 m a. s. l. at the ultimate north-west of Mongolia [Tavan Bogd mountain knot]).
<i>Microstigma deflexum</i>	15	Gubanov et al. (1987)	German (2009, as <i>M. junatovii</i> )	The single cited specimen (MW) represents <i>M. brachycarpum</i> .
<i>Noccaea thlaspidioides</i>	11	Neuffer et al. (2012, as <i>Thlaspi cochleariforme</i> )	Present study	This record was based on the single specimen (OSBU 12247) actually collected in southern Khangai.
<i>Rorippa palustris</i>	8	Neuffer et al. (2012, as <i>R. islandica</i> subsp. <i>fernaldiana</i> )	Present study	The record was based on the specimen (OSBU 11794) collected, along with <i>Dontostemon senilis</i> , near the ruins of Saikhan-Ovoo (bank of Ongi-gol), i. e., in the Valley of Lakes. Occurrence of <i>R. palustris</i> in Middle Khalkha is possible but currently not confirmed.
<i>Smelowskia calycina</i>	1	Grubov (1955)	Ebel (1999)	According to Ebel (1999), <i>S. calycina</i> [s. str.] occurs within Mongolia only in Khangai and Mongolian Altai; apparently, the latter is meant as a mountain range rather than phytogeographical region and thus includes Khobdo region. Hence, records from Khubsugul region should be assigned to <i>S. bifurcata</i> and those from Gobi-Altai and Dzungarian Gobi to <i>S. calycina</i> subsp. <i>pectinata</i> . However, some specimens from Baitag Bogd approach <i>S. calycina</i> s. str. and presence of the taxon in Dzungarian Gobi needs further elucidation.
	13	Grubov (1982)		
	14	Gubanov (1996)		
<i>Smelowskia mongolica</i>	6	Neuffer et al. (2003)	German et al. (2003)	Both cited specimens (OSBU 10301, 10413) were re-identified ad <i>S. altaica</i> .
	7	Grubov (1955, as <i>Sophiopsis mongolica</i> (Kom.) N. Busch)	Ebel (1999, 2000a, as <i>Hedinia mongolica</i> )	The specimens of <i>S. mongolica</i> from Mongolian Altai were assigned to <i>S. altaica</i> (including paratypes of the latter species from Tsagan-gol and Tal-Nuur). Some subsequent records (e. g., Neuffer et al., 2003) from this region are also based on plants of <i>S. altaica</i> (German et al., 2003).
<i>Sterigmostemum violaceum</i>	6	Grubov (1982, as <i>Oreoloma violaceum</i> )	Present study	Like in case of <i>Conringia planisiliqua</i> and <i>Dendroarabis fruticulosa</i> , no specimens or localities were cited and no confirming material from Khobdo region is available; occurrence of the species in that area is very unlikely.

Table 2 (end)

Species	Region	Reported by	Excluded by	Notes
<i>Stevenia cheiranthoides</i>	6	Neuffer et al. (2003, as <i>Draba multiceps</i> )	Present study	The record is based on the misidentified specimen of <i>Draba lanceolata</i> (OSBU 10262).
	7	Neuffer et al. (2003)	Present study	The record is based on the misidentified specimen of <i>Crucihimalaya mollissima</i> (OSBU 10589: <a href="http://greif.uni-greifswald.de/floragreif/wp-content/uploads/scan_OSBU/template.php?i=arab-moll-OSBU-10589">http://greif.uni-greifswald.de/floragreif/wp-content/uploads/scan_OSBU/template.php?i=arab-moll-OSBU-10589</a> ).
<i>Stevenia dahurica</i>	2	Neuffer et al. (2012), as <i>Ptilotrichum dahuricum</i>	Present study	The record is based on two specimens (OSBU 20346, 20372) attributed to Khentei but collected in Mongol-Daurian region.
	12	Grubov et al. (1990), as <i>P. dahuricum</i>	German (2009, as <i>P. dahuricum</i> )	Identification of relevant specimens is problematic but they definitely do not belong to <i>S. dahurica</i> . Further studies are needed to either recognize them as a new species (“ <i>Ptilotrichum gobicum</i> Kamelin et D. A. German”, ined.) or assign to <i>S. canescens</i> .

### III. Geographical notes: new country record, regional records, and remarks on distribution of certain species

#### 1. Novelty for the flora of Mongolia

***Matthiola superba* Conti – Dzungarian Gobi:** “Aimak-Chovd, Somon Bulgan, Biljut-berge nördl. d. Grenzpunktes Jarantaj a. Bulgan, Berghänge. Meereshöhe 1200 m. 4. 7. 1964. Nr. 3481. Leg. S. Danert, C. Davažamc, P. Hanelt et Č. Sančir” (GAT 9233, sub nom. *Sisymbrium subspinescens*).

This is the first record of *Matthiola* W. T. Aiton from Mongolia. *Matthiola superba* is the most eastern representative of the genus reaching the western part of SE Siberia, E Kazakhstan and NW Xinjiang.

According to the current knowledge, distribution of the species is rather fragmented in this area and the nearest localities known from northern foothills of Saur within Kazakhstan (Krylov, 1931, as *M. odoratissima* (M. Bieb.) R. Br.), vicinities of Bortala and Urumqi (German, Chen, 2009) in China are quite distant (300 km and more) from each other and from the Mongolian site.

A long-known peculiarity of the specimens from the eastern part of its distribution area is rather considerable reduction of indumentum (Chernyakovskaya, 1939), especially in fruit. The plant from Bilyut-Ula, similarly to the geographically closest specimen from Urumqi (Anonymous 3175, XJU: German, Chen, 2009) reveals the ultimate case ha-

ving trichomes almost exclusively restricted to the stem base; therefore, its initial identification is not too surprising.

The species definitely requires protection at the state level in Mongolia. Inclusion into the next edition of the national Red Data book and monitoring of the single known Mongolian population, if still persisting, could be the first steps in this direction.

#### 2. Regional records

***Barbarea orthoceras* Ledeb. – Khentei:** “Mongolei, Ulan-Bator, Bogd-uul, feuchter Waldweg. W. Hilbig. 2. 7. 1986” (HAL 129453, sub nom. *B. arcuata*; [http://greif.uni-greifswald.de/floragreif/wp-content/uploads/scan\\_GFW-14/template.php?i=Barb-arcu-HAL-129453](http://greif.uni-greifswald.de/floragreif/wp-content/uploads/scan_GFW-14/template.php?i=Barb-arcu-HAL-129453))

***Capsella orientalis* Klok. – Khangai:** “Khangai. Stony slopes near the spring Khatsinlin-bulak. 4 VIII 1926. No. 406. N. Pavlov” (MW); “Khangai. Zavkhan aimag. Valley of Sherigiin-gol in 5 km downstream from Thagan-Khairkhan. 3 VIII 1982. No. 5982. I. A. Gubanov” (MW); “Uvs aimag. Khyargas sum. Khan-Khukhii range, western slope of mt. Tsagan-Khairkhan-Uul, ca. 2150 m a. s. l. Upper reaches of Khiiviin-gol, 25 km SW of Khyargas. 5 IX 1984. No. 9252. I. A. Gubanov” (MW). **Depression of Great Lakes:** “Uvs Nuur depression. 14 km SE of Ulangom. Valley of Khototyn-Khev. 6 VII 1988. No. 922. I. A. Gubanov, R. V. Kamelin, A.L.

Budantsev” (MW); “Kobdo (Khovd): Weiderasen ca. 23 km nordwestl. Tschandmani (Urgdol), am Fuß der Steilstufe des Jargalant-Gebirges (Dshargalant), an der Mündung eines großen klammartigen Tales, ca. 2600 m s. m. Leg. K.-H. Günther et M. Schnittler am 04. 09. 2007” (Herb. K.-H. Günther; [http://greif.uni-greifswald.de/floragreif/wp-content/uploads/scan\\_GFW-13/template.php?i=caps-burs-KF-27950](http://greif.uni-greifswald.de/floragreif/wp-content/uploads/scan_GFW-13/template.php?i=caps-burs-KF-27950)). All specimens – sub nom. *C. bursa-pastoris*.

***Catolobus pendulus* (L.) Al-Shehbaz – Depression of Great Lakes:** “Kobdo [Khovd] city. Weed in the garden. 11 VII 1898. № 430. E. Klementz” (LE).

***Lepidium affine* Ledeb. – Middle Khalkha:** “Aimak Chentij, Somon Bajan chutag, Steppen-ebene ca. 12 km südöstlich von Öndörchaan am Wege nach Burencogt. 31. 7. 1987. Nr. 26. Leg. K. Pistrick, Č. Sančir et G. Cerenbalžid” (GAT 7992, sub nom. *L. latifolium*).

***Lepidium apetalum* Willd. – Khovd:** “Ad fontes fl. Harkira ... 25 Juli 1879. G. N. Potanin” (LE, det. A. Thellung); “Bayan-Ulgiy aimag, 18 km to the east of Bayan-Ulgiy. 13 VII 1979. № 73. U. Beket, Kh. Buyan-Orshikh, I. Yu. Sumerina” (LE, sub nom. *L. densiflorum*); “Bayan-Ulgiy, 25 VII 2001, R.V. Kamelin et al.” (ALTB), etc.

***Sisymbrium loeselii* L. – Mongolian Altai:** “Lower reaches of Sagsai-gol, 25 VII 2001. R.V. Kamelin et al.” (ALTB).

### 3. Other floristic notes

***Clausia aprica* (Steph. ex Willd.) Korn.-Tr.** – the species is not reported for Gobi-Altai by Gubanov (1996) and Oyuntsetseg (2014). Probably it was occasionally omitted by the former author because it is included in both Grubov’s (1955, 1982) treatments and those records are supported by abundant correctly determined material from different parts of the region. In particular, gatherings from Baga Bogd, Ikh Bogd, Dund-Saikhan, Dzun-Saikhan, and Bayan-Bogdo-Nuruu are available at LE.

***Pachyneurum grandiflorum* (C. A. Mey.) Bunge** – The species is recorded here from Depression of Great Lakes based on the gathering “Kobdo (Khovd): lückiger Rasen an einem nordexponierten Steilhang ca. 23 km nordwestl. Tschandmani

(Urgdol), im untersten Bereich der Steilstufe des Jargalant-Gebirges (Dshargalant), an der Mündung eines großen klammartigen Tales, ca. 2600 m s. m. Leg. K.-H. Günther et M. Schnittler am 05. 09. 2007” (Private herbarium of K.-F. Günther) correctly identified by collectors and available at [http://greif.uni-greifswald.de/floragreif/?flora\\_search=Record&record\\_id=29803](http://greif.uni-greifswald.de/floragreif/?flora_search=Record&record_id=29803) and [http://greif.uni-greifswald.de/floragreif/wp-content/uploads/scan\\_GFW-13/template.php?i=pach-gran-KF-27971](http://greif.uni-greifswald.de/floragreif/wp-content/uploads/scan_GFW-13/template.php?i=pach-gran-KF-27971).

***Rorippa dogadovae* Tzvel.** – The species was first recorded from Mongolia by Ebel (2000b) based on two gatherings, one from Khangai and another from Valley of Lakes. The latter specimen (“Middle Gobi aimak, Delger-Khangai sum, loc. Khutu-Khid at Ongijn-gol, flood plain. 22 V 1947. Grubov et Kalinina” – LE) was said to be “bad-quality and not completely reliable” one and indeed, both plants constituting this gathering might well be just small samples of *R. palustris*. Here occurrence of *R. dogadovae* in the Valley of Lakes is confirmed based on the gathering “Mongolei, 45°05’39”N, 100°48’47”E, ca. 1200 m, südlich des Orrog Nuur, *Glycirrhiza*-Standort Flussbett, versalzter Boden. 25. 08. 2001. H. Hurka” (OSBU 12156, upper right and lower left plants; other two plants are *R. palustris*). The specimen was cited under the name *R. islandica* and attributed to Gobi-Altai region (Neuffer et al., 2012). In fact, it was collected at the border of the two regions, and based on the habitat and elevation it definitely should be assigned to the Valley of Lakes.

***Sisymbrium brassiciforme* C. A. Mey.** – [Mongolian Altai]: “Becken der Großen Seen, Khovd-sum in Khovd-Aimag, Barun Sala-Tal, Bergsteppe. Höhe 2200–2500 m, trockene Bergsteppe. 11. 06. 2002. Leg. Anne Zemmrich” (GFW 45515, sub nom. *S. heteromallum*; [http://greif.uni-greifswald.de/floragreif/?flora\\_search=Record&record\\_id=45545](http://greif.uni-greifswald.de/floragreif/?flora_search=Record&record_id=45545)). According to the phytogeographic region indicated on the label, this would be the first record of *S. brassiciforme* from Depression of Great Lakes; however, the valley of Barun-gol at the mentioned elevation belongs to Mongolian Altai. Nevertheless, the finding is noteworthy as rather distant from the closest localities and being the first record of the species at the north-eastern macroslope of Mongolian Altai. Unlike other Mongolian localities representing the north-eastern limit of natural distribution area of the species, the new one ap-

parently has anthropogenic character. It is unclear, however, whether this finding is occasional or *S. brassiciforme* has the potential of expansion of its distribution under the natural conditions of W Mongolia; in the latter case, further findings at NE slope of Mongolian Altai and neighboring regions can be assumed.

#### IV. Taxonomic remarks

##### *Guenthera* Andrz.

Gómez-Campo (2003), using morphological and primary molecular evidences, argued for the restoration of the genus *Guenthera* Andrz. as distinct from *Brassica* L., and this viewpoint was supported by subsequent phylogenetic studies (Warwick, Hall, 2009; Arias, Pires, 2012). The weedy SW Asian species introduced in Mongolia and elsewhere is usually treated either as a subspecies of *B. elongata* Ehrh. [*B. elongata* subsp. *integrifolia* (Boiss.) Breistr.] or as a distinct species *B. armoracioides* Czern. ex Turcz. (*Erucastrum armoracioides* (Czern. ex Turcz.) Cruchet). The latter viewpoint is preferred by me and relevant combination based on the prior basionym *B. persica* is given below. As long as other subspecies of *G. elongata* (Ehrh.) Andrz. recognized by Gómez-Campo reveal at least the same level of differences from subsp. *elongata* as subsp. *integrifolia* (Boiss.) Gómez-Campo does, they are also accepted here as specifically distinct from *G. elongata*.

*Guenthera cretacea* (Kotov) D. A. German, **comb. nov.** – *Erucastrum cretaceum* Kotov, 1939, Zhurn. Inst. Bot. Vseukraïns’k. Akad. Nauk 21–22: 237. – *Brassica cretacea* (Kotov) Stank. ex Tzvel., 2003, Novit. Syst. Pl. Vasc. 35: 107. – *B. elongata* subsp. *pinnatifida* (Schmalh.) Greuter et Burdet, 1985, Willdenowia 15 (1): 64. – *G. elongata* subsp. *pinnatifida* (Schmalh.) Gómez-Campo, 2003, Anales Jard. Bot. Madrid 60: 304.

*Guenthera persica* (Boiss. et Hohen.) D. A. German, **comb. nov.** – *Brassica persica* Boiss. et Hohen., 1849, Diagn. Pl. Or. Nov. 8: 26.

*Guenthera subscaposa* (Maire et Weiller) D. A. German, **comb. nov.** – *Brassica subscaposa* Maire et Weiller, 1940, Bull. Soc. Hist. Nat. Afrique N. 31: 9. – *B. elongata* subsp. *subscaposa* (Maire et Weiller) Maire, 1965, Fl. Afrique N. 12: 168. – *G. elongata* subsp. *subscaposa* (Maire et Weiller)

Gómez-Campo, 2003, Anales Jard. Bot. Madrid 60: 304.

*Guenthera subscaposa* subsp. *imdrahsiana* (Quézel) D. A. German, **comb. nov.** – *Brassica elongata* subsp. *imdrahsiana* Quézel, 1955, Bull. Soc. Sci. Nat. Maroc 34: 304. – *G. elongata* subsp. *imdrahsiana* (Quézel) Gómez-Campo, 2003, Anales Jard. Bot. Madrid 60: 304.

Rather recently described *Erucastrum takhtajanii* V. I. Dorof. (Dorofeyev, 2000) characterized by well-developed indumentum of stems, leaves, pedicels, and sepals, which I previously accepted as a subspecies of *B. elongata* (German, 2005c), appears to be similar to *B. elongata* var. *scabra* O. E. Schulz and could be treated as a variety of either *G. persica* or *G. elongata* subsp. *integrifolia*.

##### *Stevenia* Fisch.

*Stevenia cheiranthoides* subsp. *incarnata* (Kamelin) D. A. German, **comb. et stat. nov.** – *S. incarnata* Kamelin, 1995, Bot. Zhurn. 80, 3: 73.

The first attempt to validate this combination (German, 2010: 84) turned to be unsuccessful on account of the invalidity of the intended basionym cited as “*Arabis incarnata* Pall. ex DC., Reg. Veg. Syst. Nat. 2: 210. 1821”. As evidenced by the way this variety was cited in Candolle (1821, 1824, both times as “ $\beta$  *Arabis incarnata* Pall. in herb. Lamb.”), the author did not intend to name it and just cited herbarium material annotated as “*Arabis incarnata* Pall.”. Hence, neither the correction of the “basionym” to “*Stevenia cheiranthoides* var. ( $\beta$ ) *incarnata* Pall. ex DC.” suggested by German (2011b: 25) is possible, nor the binominal *S. incarnata* published as if being based on “*Arabis incarnata*” (Kamelin, 1995) can be considered as such. However, direct reference to the previously and effectively published diagnosis of Candolle’s “var.  $\beta$ ” in the protologue of *S. incarnata* along with the type designation made the last binominal a validly published name of a new taxon. In German (2011), a full and direct reference to the potential basionym, *S. incarnata*, was given but the combination “*S. cheiranthoides* subsp. *incarnata*” was not definitely accepted which precluded its validation (ICN Art. 36.1(a); McNeill et al., 2012) that is finally done here.

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