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*In memory of Alexandra N. Berkutenko (19 IX 1950 – 29 IX 2014)*

## Some new and revised typifications in North Eurasian Cruciferae

### Типификация некоторых крестоцветных (Cruciferae) Северной Евразии

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**Key words:** лектотип, неотип, новая комбинация, номенклатура, систематика, *Alysseae*, Brassicaceae, *Odontarrhena*.

**Summary.** Nomenclature of some taxa of North Eurasian Cruciferae is updated. Lectotypes are designated for *Aethionema levandowskyi*, *Alyssum americanum*, *A. gymnopodum*, *A. inflatum*, *Arabis fruticulosa* f. *major*, *Arabis fruticulosa* f. *minor*, *Cheiranthus leucanthemus*, *Ch. nitrarius*, *Erysimum macilentum*, *Eutrema edwardsii*, *Lunaria suffruticosa*, *Sisymbrium album*, *Thlaspi praecox* var. *macranthum*, and *Vella tenuissima*, in some cases refining or revising previous typifications. Place of validation and authorship of *Lepidium coronopifolium* is corrected and a neotype for this name is designated. Combinations *Odontarrhena americana*, *O. borzaeana*, *O. gehamensis*, *O. gymnopoda*, *O. inflata*, *O. savranica*, *O. schirwanica*, and *O. subalpina* are validated.

**Аннотация.** В работе уточнена номенклатура некоторых крестоцветных Северной Евразии. Осуществлена лектотипификация названий *Aethionema levandowskyi*, *Alyssum americanum*, *A. gymnopodum*, *A. inflatum*, *Arabis fruticulosa* f. *major*, *Arabis fruticulosa* f. *minor*, *Cheiranthus leucanthemus*, *Ch. nitrarius*, *Erysimum macilentum*, *Eutrema edwardsii*, *Lunaria suffruticosa*, *Sisymbrium album*, *Thlaspi praecox* var. *macranthum* и *Vella tenuissima*, в ряде случаев корректирующая данные о статусе типовых образцов или отменяющая прежний выбор. Уточнено место обнародования и авторство биноминала *Lepidium coronopifolium*, для ко-

торого также обозначен неотип. Обнародованы новые комбинации: *Odontarrhena americana*, *O. borzaeana*, *O. gehamensis*, *O. gymnopoda*, *O. inflata*, *O. savranica*, *O. schirwanica* и *O. subalpina*.

The present communication continues a series of publications (German, 2005, 2011a, c, 2012c, 2014a, b; German, Cherneva, 2008; German et al., 2006) focusing on updating the information on the types of North Eurasian (mainly within the former USSR) representatives of Cruciferae B. Juss. (Brassicaceae Burnett). The need of this work is dictated by several reasons. First, some of the names dealt with herein have to be typified for the Cruciferae accounts of some floras, e. g. Flora of Altai and Flora of Tuva. These data are also needed for the Brassi-Base database project (Kiefer et al., 2014). Finally, revised typifications help to decrease spreading of the incorrect information on the types of taxa over the taxonomic and floristic literature. Here, lectotypes of 14 names are designated and in three cases (*Alyssum gymnopodum* P.A. Smirn., *Cheiranthus leucanthemus* Steph. ex Willd., *Eutrema edwardsii* R. Br.) previous designations are shown to be in conflict with the International Code of Nomencla-

ture for algae, fungi, and plants (ICN; McNeill et al., 2012) and therefore superceded. For *Aethionema levandowskyi* N. Busch, *Lunaria suffruticosa* Vent., and *Thlaspi praecox* var. *macranthum* Lipsky, it is demonstrated that no holotypes, as recently reported, can be recognized. Besides, eight combinations in *Odontarrhena* C.A. Mey. ex Ledeb., a genus well separated from *Alyssum* L. both morphologically and molecularly (e. g., German et al., 2009; Rešetnik et al., 2013; Warwick et al., 2008) are proposed for the species distributed within the region in question. Accepted names are given in the main text in italicized bold.

Main part of the material has been studied in the herbaria B, BRNM, HAL, KFTA, KW, LE, MW, NS, P, PRC, and W; citations of such specimens are supplied with an exclamation mark. Other collections were studied online: BM (Natural History Museum botany collection database), E (Royal Botanic Garden Edinburgh herbarium catalogue), G (CHG, [2014]), GH (Harvard University Herbarium...), JE (Virtual Herbaria), K (The [Kew] Herbarium Catalogue, 2006), NGD (Global Plants) P, in part (Muséum national d'Histoire naturelle...), and US (Smithsonian National Museum...). Information on the other herbaria mentioned in the text is taken from respective literature; that material was not checked.

The paper is dedicated to the memory of Alexandra Naumovna Berkutenko (1950–2014), a bright Soviet/Russian botanist who contributed considerably to the knowledge of diversity, taxonomy, and distribution of North Eurasian, especially NE Asian Cruciferae.

*Aethionema levandowskyi* N. Busch, 1907, Acta Horti Bot. Univ. Imp. Jurjev. 7 (4): 222.

Described from S Azerbaijan: «... in h. P. J. S. Пир-Шах-Верды. VII. 96. fl. fr. semimat. Левандовский! (sub *Ae. armeno*) / Pir-Shakh-Verdy. VII. 96. fl. fr. semimat. Levandovsky! (sub *Ae. armeno*)» (Busch, l. c.).

Lectotype (designated here): «Flora caucasica. Пер-Шах-Верды [Per-Shakh-Verdy]. VII 1896. [fl., fr. semimat.], leg. B. Levandowsky» (LE!; iso – KFTA!).

The specimen from LE was recently cited as holotype (Dorofeyev, 2012b: 461) but duplicates at three herbaria were mentioned in the protologue. It was not revealed whether isolectotypes are still available in TAA and H; the one in KFTA is apparently a duplicate taken from LE in the beginning of XX century.

*Alyssum americanum* Greene, 1892, Pittonia, 2 (11): 224. ≡ *Odontarrhena americana* (Greene) D.A. German, **comb. nova**.

Described from NW America: «Collected on the Porcupine River, in the interior of northern Alaska, 1891, by Mr. J. Henry Turner. The specimens are in flowers only, though with remains of the fruit of a former season» (Greene, l. c.: 224–225).

Lectotype (designated here): [USA, E Alaska], «Collected on Porcupine River, Alaska, 1891 by J. Henry Turner, [fl.]» (NGD 04670; iso – GH 00018397, NGD 04671).

Although it is still to be disentangled how many species should be recognized within *O. obovata* C.A. Mey. s. l. (German, 2011b), it seems preferable to treat East Siberian/Far Eastern/N American plants as a separate species primarily based on their predominantly simple vs. branched inflorescences combined with more eastern distribution. After the proposal to conserve *A. obovatum* (C.A. Mey.) Turcz. against *A. fischerianum* DC. (German, 2012a) was transformed to and voted for the rejection of the latter name as long used in a confusing way (Applequist, 2013), *A. americanum* turned to be the earliest available basionym for the eastmost *Odontarrhena* C.A. Mey. ex Ledeb. The genus is much in need of the revision on the territory of North Eurasia. Before it is done, in addition to the taxa recently restored (Avetisian, 2009; Iljinska in Iljinska et al., 2007), typified (Dorofeyev, 2012b; German, 2011a; Iljinska, 2000; Iljinska in Iljinska et al., 2007; Ilyinska 2002) and transferred to *Odontarrhena* (German, 2010 and herein), the following combinations are provided for the rest of taxa to make the names available for use.

*Odontarrhena borzaeana* (Nyár) D.A. German, **comb. nova**. ≡ *Alyssum borzaeanum* Nyár., 1926, Bul. Grăd. Bot. Muzeul. bot. Univ. Cluj, 6 (3–4): 90.

*Odontarrhena gehamensis* (Fed.) D.A. German, **comb. nova**. ≡ *Alyssum gehamense* Fed., 1941, Zаметки Sist. Geogr. Rast. (Tbilisi), 10: 65.

*Odontarrhena savranica* (Andrz.) D.A. German, **comb. nova**. ≡ *Alyssum savranicum* Andrz., 1822, in Bess., Enum. Pl. Volhyn.: 82.

*Odontarrhena schirwanica* (Rupr.) D.A. German, **comb. nova**. ≡ *Alyssum schirwanicum* Rupr., 1869, Mém. Acad. Imp. Sci. St. Pétersb., ser. 7, 15 [Fl. Cauc. 1] 2: 100.

*Odontarrhena subalpina* (M. Bieb.) D.A. German, **comb. nova**. ≡ *Alyssum subalpinum* M. Bieb., 1800, Besch. Länd. Terek u. Kur.: 181.

*Alyssum gymnopodum* P.A. Smirn., 1939, Bull. Soc. Nat. Mosc., sect. biol. Nov. sér. 48, 5–6: 116. ≡ *Odontarrhena gymnopoda* (P.A. Smirn.) D.A. German, **comb. nova**.

Described from SE Europe: «Copiose crescens in prov. Stalingradensi distr. Ssirotinskij ad fontes Coeruleae fluminis (olim Terra Cosaccorum Tanaiticorum) in planitiebus cretaceis glareosis vel subpulverulosis atque in declivitatibus virgineis cretaceis lapidosis omnium expositionum i. e. australibus (rarior) nec non septentrionalibus (saepissime) ubi in phytocoenosis cretaceis unacum *Artemisia salsoioidi* Willd. aliisque suffruticibus membrum principale est» (Smirnov, l. c.: 117).

Lectotype (designated here): [Russia, Volgograd prov.], «Верховья р. Голубой. Северный щебнистый задернованный склон мелового холма, обильно / Upper reaches of Golubaya River. Northern gravelly matted slope of limestone hill, abundant, [fl.]. 5 VI 1938. P. Smirnov» (MW!; iso – MW!).

Other original material: the same place and collector, 30 V [fl.], 31 V [fl.], 8 VI [fl.], and 3 VIII [fr. mat.] 1938 (MW!).

There are 11 specimens in the type folder of the species in MW (ten labeled ones are listed by Gubanov & Bagdasarova, 1978: 72), all collected by Smirnov, six of which in 1938 and four in 1939 (plus one unlabeled). Gubanov (1981: 94) designated the specimen collected on 6<sup>th</sup> June 1939 as the lectotype. That choice cannot be considered effective typification under current ICN (McNeill et al., 2012) because relevant gathering is not a part of original material as evidenced by two facts. First, although no specimens were cited in the protologue, it was mentioned that discovery of the new species is based «on the observations made during the spring, summer and partly autumn of 1938» (Smirnov, 1939: 112, originally in Russian). Second, the phrase «Moscow, December 1938» in the end of the article apparently refers to the submission date. Hence, only collections of 1938 represent original material of *A. gymnopodum*. The new choice is done in accordance with this fact.

*Alyssum inflatum* Nyár., 1929, Bul. Grăd. Bot. Muzeul. bot. Univ. Cluj, 9: 43. ≡ *Odontarrhena inflata* (Nyár.) D.A. German, **comb. nova**.

Described from S Turkmenistan: «Hab. Turkomania: in rupestribus pr. Gaudan cca. 1896 m. 29. V. 1898. Cat. Jul. (11. VI. 1898. nach dem neuen Kalendar.) I. D. [D. I.] Litwinow sub *A. alp.* var. *sufirut.* (H. Buc., H. D., H. U. W., H. Fr.); Julukii [Suluklū]

(Saratowka) ad fines Persiae in schistosis montium. 2. VII. 1900. P. Sintenis It. transcasp.-persicum 1900–1901. Nr. 481 [841]. det. J. Freyn pro *A. alp.* var. *suffr.* (H. U. W., H. Fr.)» (Nyárady, l. c.).

Lectotype (designated here): [Turkmenistan, Ashkhabad], «841. *Alyssum* [added by J. Freyn:] ‘*alpestre* L. β *suffrutescens* Boiss. fl. or. I. 268! 15/3 [19]02. Freyn’. Suluklū: in schistosis montium, [fr.]. 2/7 [19]00 [P. Sintenis] / Herb. J. Freyn» (BRNM 18244/33!; iso (with printed labels) – BM 000595354, E 00373098, K 000697005, LE!, PRC 454141!, US 324485, W 1902-0005338!, WU).

Syntypes: [Turkmenistan, Ashkhabad], «567. *Alyssum alpestre* L. v. *suffrutescens* Boiss. Turkomania. In rupestribus pr. Gaudan. Ex 6000’ [fl., fr. immat.], 1898. V. 29. Cat. Jul. D. Litwinow» (BP, BRNM 18245/33!, BUC, WU; isosyn – B 100244987!, JE 00003060, LE!, PRC 454140!).

As correctly noted by Rechinger (1968: 166), the number of collection of Sintenis (481) given in the original publication is erroneous and to be corrected to the actual 841. Information on the availability of relevant material in BP, BUC, and WU is based on the protologue data. Lectotype, as well as the studied syntype, is supplied with the author’s determination: «*Alyssum inflatum* Nyár. E. J. Nyárady, Cluj 1926».

*Arabis fruticulosa* C.A. Mey. f. *major* Stschegl. 1854, Bull. Soc. Nat. Mosc. 27, 1: 151. [= *Dendroarabis fruticulosa* (C.A. Mey.) D.A. German et Al-Shehbaz].

Described from E Kazakhstan (Altai): «In saxosis ad fl. Ulba nec non in montibus Kolba. Jinio 1843» (Stschegleew, l. c.: 152).

Lectotype (designated here): «*Arabis fruticulosa* C.A. Mey. var. β. *major*. In saxosis ad fl. Ulba. 1843, [fr.], [G.S. Karelin] (Ex herb. Turcz.)» (LE!).

Isolectotypes: «In saxosis ad fl. Ulba. 16 Juni 1843, [fr.], [G.S. Karelin]»; «№. 2238. *Arabis fruticulosa*? In sax. ad fl. Ulba. 16 Juni 1843, [fr.], [G.S. Karelin] (Ex herb. Turcz.)»; «*Arabis Meyeri* Stschegl. ... In saxosis ad fl. Ulba. 16 Juni 1843, [fr.], [G.S. Karelin] (Ex herb. Turcz.) (LE!).

The labels of lectotype and at least second isolectotype are written by Shchegleyev, and in both cases supplied with diagnosis of a new taxon which he initially intended to describe as a separate species but finally found a rank of form to be the most appropriate (cf. Stschegleew, l. c.). The specimen with the taxon author’s label reporting his final taxonomic decision and diagnosis coinciding with the published one is chosen as lectotype.



One more specimen, «1840. Altai. *Arabis fruticulosa* Mey. *major*. Ulba, [fr.], Herb. Karelin» (LE!) might represent an uncited element of original material.

Material on the second cited gathering, from Kalba («Kolba»), was not located.

*Arabis fruticulosa* C.A. Mey. f. *minor* Stschegl. 1854, Bull. Soc. Nat. Mosc. 27, 1: 151 [= *Dendroarabis fruticulosa* (C.A. Mey.) D.A. German et Al-Shehbaz].

Described from E Kazakhstan: «In montibus Soongoriae prope Ajagus. 1842» (Stschegleew, l. c.: 151).

Lectotype (designated here): «Songaria. Ajagus. 1842, [fl.], Karelin / 1842. ... *Arabis fruticulosa* C.A.M. f. *minor* / ex herb. bot. inst. URSS» (KW!).

Possible isolectotypes: «Songaria. *Arabis fruticulosa* Mey. *minor*, [fl.], Ajagus» (LE!); «Songaria. Ajagus, [veg.], Karelin» (NS!).

*Cheiranthus leucanthemus* Steph. ex Willd. 1800, Sp. Pl. 3: 521. ≡ *Erysimum leucanthemum* (Steph. ex Willd.) B. Fedtsch. ≡ *E. versicolor* (M. Bieb.) Andr. ex Bess., nom. illeg. superfl.

Described from N Caucasus: «Habitat in Persia boreali» (Willdenow, l. c.).

Lectotype (designated here): «[Russia, N Caucasus (most likely N Daghestan), F. Marschall von Bieberstein], [fl., fr. immat.]]» (B-W 12102-4!; other original material including possible isolectotypes – B-W 12102.1–3! and probably LE!).

Lectotype of *Ch. leucanthemus* was first designated by Polatschek (2010: 211) who has chosen B-W 12102.5 as such. There are, however, serious doubts that this choice is acceptable. First, petal color of both plants constituting relevant specimen is in contradiction with the protologue where white petals are explicitly mentioned. Although original color of petals in *E. leucanthemum* is often changed under drying, in most cases it is possible to reveal whether the plant was yellow- or white-flowered. As found by Schanzer (2004), originally yellow color usually can be discerned on at least some dried petals while white petals if not left whitish are turning brown and «this brownish hint is different from that of initially yellow-flowered plants». Left-hand plant from the sheet 12102-5 is clearly yellow-flowered (with bright-yellow petals) and the right-hand one has predominantly dark-yellow to brownish and brownish-orange petals. Thus, definitely the left-hand plant and most likely the right-hand one as well were yellow-flowered *in vivo*, a character still discernable

on the dried plants. In contrast, the rest of specimens stored in the Willdenow's folder 12102 have whitish (discernable in all cases) to (yellowish)-brown petals. Hence, relevant plants were white-flowered *in vivo* and this character is detectable even on dried specimens. Apparently, any of these four specimens could be the source of the character «*flores albi*» and the species epithets «*leucanthemus*» (Willdenow, l. c.) rather than the specimen 12102.5.

Second, the plants from the sheet 12102.5 distinctly differ from each other not only in the hint but also in the size (ca. 10 mm long in the left-hand plant vs. 6.5–8.5 in the right-hand one) of petals. Besides, leaves in the right-hand plant are darker compared to another one. Differences in the color of leaves and petals assume that the plants were very probably dried not simultaneously and thus represent different gatherings; different petal size can be interpreted as an argument supporting this conclusion. Even in [the very unlikely] case the petals of the right-hand plant were white, another plant being taxonomically identical cannot be treated as an admixture to be ignored (ICN Art. 8.2) like the central and right-hand fragments on the sheet 12102.1 belonging to *Sisymbrium polymorphum* (Murr.) Roth. This means that the choice of Polatschek is in contradiction with ICN Arts. 8.2 and 9.19b (McNeill et al., 2012); therefore, a new lectotype fitting relevant requirements is designated here.

*Cheiranthus nitrarius* Pall., 1799, Reise Südl. Russ. Reichs 1: 105. ≡ *Erysimum nitrarium* (Pall.) Wettst. [= *Sterigmostemum caspicum* (Lam.) Rupr.].

Described from SW Europe and NE Kazakhstan: «Crescit in campis limosis versus Mare Caspium et circa Irtin in australioribus, a primo vere florens, seminaque Junio perficiens» (Pallas, 1773: 741).

Lectotype (designated here): [Russia, Astrachan province or adjacent NW Kazakhstan]: «*Cheiranthus novus*. Pall. itin. II. Ex salsugineis ad Volga et Irtin, [fl., fr. immat.], [Spring 1770, N.P. Sokolov] / Herb. Jacquin fil.» (W: W-Jacq. 0056009, lower plant!).

Other original material: [Russia, Astrachan province or adjacent NW Kazakhstan]: «*Cheiranthus novus*. Pall. itin. II. Ex salsugineis ad Volga et Irtin, [fl., fr. immat.], [Spring 1770, N.P. Sokolov] / Herb. Jacquin fil.» (W: W-Jacq. 0056009, upper plant!); image (Pallas, 1773, tab. K, fig. 2).

Possible original material [in addition to that cited by Jacquemoud (1988, 50–52) for *Ch. caspicum* Lam. and *Ch. tomentosus* Willd. including lecto-

types of both names]: «Sibiria prope mare Caspium, [fl.], Pallas» (BM 000946226); «*Cheiranthus* Pallas legit ad mare Caspium, [fl., fr. immat.]» (HAL!); «*Cheiranthus nitrarius*. [fl.]. Cum *C. littoreo* et *laccero* comp[orandum?] / Herb. Fischer» (LE!); «In nitrosis limoso-arenosis deserti caspici, ... copiosa, [fr.] / Herb. Fischer» (LE!).

Nearly all names in *Sterigmostemum* M. Bieb. were typified by F. Jacquemoud (1988). This was not done for *Cheiranthus nitrarius* since the name was treated as not validly published but appearing only on the labels. However, it was validated by Pallas (1799) solely by reference to his previously published description of «*Cheiranthus an littoreus* Lin.» (Pallas, 1773: 741). The same reference was included into the protologues of the prior *Cheiranthus caspicus* Lam. (in Pallas, 1794) and later *Ch. tomentosus* Willd. (Willdenow, 1800) and original material of all three taxa is much shared though neither *Ch. nitrarius* nor *Ch. tomentosus* are illegitimate because in both cases none of the criteria of ICN Art. 52.2 are met.

In typifying *Ch. nitrarius* it should be taken into consideration that during the travels of Pallas the species was collected multiple times either by himself or by his companions as listed below, and not all of those gatherings are original material for this name. First time is done by his student, N.P. Sokolov, in spring 1770 along the northern shore of the Caspian Sea. In the original publication (Pallas, 1773: 329), the species is mentioned among the plants brought by Sokolov from his trip to pre-Caspian deserts only as «*Cheiranthus sinuatus?*» with erroneous reference to the description № 114 actually corresponding to *Sisymbrium salsugineum* Pall. (Pallas, 1773: 740). This mistake is improved in the Russian translation (Pallas, 1786a: 429) where «*Cheiranthus an littoreus*» is added and the reference is corrected to № 115 corresponding the description of «*Cheiranthus an littoreus* Lin.» (Pallas, 1773: 741). Then, *S. caspicum* was gathered by Pallas in NE Kazakhstan on 11<sup>th</sup> June 1771, with mature fruits, in the valley of Irtysh, on the hills near Krivozerskaya [now Krivinka of East Kazakhstani province] (Pallas, 1773: 489 and 1786b: 174, as «*Cheiranthus sinuatus?*»). Third time the species is mentioned in the «Reise ...» under the name «*Cheiranthus*» (with reference to the description № 115) as collected in late (25<sup>th</sup> and 27<sup>th</sup>) April 1774 in the upper valley of Akhtuba and Bogdo steppe (Pallas, 1776: 662, 665; 1788: 305, 310). Finally, Pallas collected it in Low Volga (near Krasnyi Yar, Arsagar, and Sharenyi Bugor) on 7<sup>th</sup>, 11–14<sup>th</sup>, and 19–20<sup>th</sup> May 1793, respectively (Pallas, 1799: 105, 124, 141).

Due to the way of validation of *Ch. nitrarius*, its original material is restricted to the specimens on which the description of «*Cheiranthus an littoreus* Lin.» was based and illustration associated with it, as determined by ICN Art. 7.7 (McNeill et al., 2012). This means that, apart from fig. 2 at tab. K (Pallas, 1773), collections of 1770–1771 only can be the source of lectotype for this binomial. Unfortunately, not in a single Pallas's specimen of *S. caspicum* the year is given on the label and most of them are either lacking precise (or even any) distribution data, or mentioned areas (like «near the Caspian Sea») were visited several times, and almost the whole material can hardly be attributed to the certain collection. However, there is an exception of the two plants mounted on one herbarium sheet (W-Jacq. 0056009) which fortunately represent the original material of *Ch. nitrarius*. This is evidenced by the reference «Pall. itin. II» indicating that material was gathered during the second part (1770–1771) of the expedition and the self-explaining phrase «*Cheiranthus novus*». Based on the phenophase (flowers and first immature fruits) and strong dissection of leaves typical for the plants of *S. caspicum* from western rather than eastern part of its distribution area, this material can be undoubtedly identified as Sokolov's collection and not Pallas's who (Pallas, 1773: 489; 1786b: 174–175) emphasized that the plant was found by him in a stage of tumble-weed, with completely ripen fruits (I failed to find any part of this gathering). Although two plants share one label only, they are treated as two separate specimens because it is unknown whether the species was collected by Sokolov once or several times and his original label is missing. This conclusion is in agreement with slightly different habit and phenophase of the two plants. Among three available elements (two uncited specimens and cited illustration) of original material of equal priority in lectotype designation (ICN Art. 9.12), a specimen represented by the better evolved and preserved plant is given a preference.

Noteworthy, similar restriction of original material to the gatherings of 1770 and 1771 and relevant illustration also concerns *Cheiranthus caspicus* admitting that Lamarck's description and diagnosis are apparently based on the above description of Pallas (№ 115 in the original publication and № 352 of French translation) and on the image «Tab. K, fig. 2» in Pallas (1773) given in the French translation (Pallas, 1794) as «Tab. 103, fig. 2», but not on any studied specimens. This raises the problem that the lectotype of *Ch. caspicus* (one of the four plants mounted on the sheet [presently BM 000522215]

with two labels «*Cheiranthus nitrarius*» handwritten by Pallas) chosen by Jacquemoud (1988: 50) is of unknown origin and probably represents one of the later (of 1774 or 1793) collections. But as long as there is no way to either confirm or dispose this, the first choice is to be followed.

*Erysimum macilentum* Bunge, [1833], Enum. Pl. Chin. Bor.: 6; id., 1835, Mém. Sav. Étr. Pétersb. 2: 80.

Described from N China: «Hab. in siccis apricis lapidosis prope Pekinum frequens» (Bunge, [1833], 1835).

Lectotype (designated here): [N China, near Beijing]: «*Erysimum cheiranthoides* var. *macilentum* m. Chin. bor., [fl., fr. immat.], Bunge [publ.] 1835 [coll. 1831]» (P!).

Other original material: «China. D[r]. Bunge. 1831, [fl., fr. immat.] / *Erysimum macilentum* Bge. Bunge Enum. pl. chin. № 36. China boreal. Acc. a. D[r]. Bunge. Hb. Meyer»; «*Erysimum macilentum* m. Ch.[ina] b[orealis], [Bunge], [fl., fr. immat.]. Mis. Bunge» (LE)!

Possible original material: «*Erysimum macilentum* Bge. China» (B 100263607!, G, K 000693849, PRC 452161!).

*Erysimum macilentum* is one of the few names in Asian *Erysimum* L. not typified by Polatschek (2010). It was also not included into a special work focusing on the typification of Bunge's taxa described by him based on the own material collected in China (Borodina-Grabovskaya, 2007).

The labels of the lectotype and of the second specimen from LE are written by Bunge (except for «Mis. Bunge»). The specimen in P is chosen as lectotype following ICN Recommendation 9A.3 (McNeill et al., 2012) as, unlike other specimens, it is supplied with the author's note regarding the plant morphology and affinity. The date «1835» on the label of the lectotype should not be misinterpreted as the collection date because Bunge visited China only once, in 1830/31 (Borodina-Grabovskaya, 2007). Indication «1835» appearing on some labels of Bunge's Chinese specimens from his private collection, currently in P, most likely refers to what Bunge treated as the date of «official» publication of his «Enumeratio ...» (Borodina-Grabovskaya, 2007), and labels of some specimens (e. g., lectotype of *Andreoskia dentata* Bunge) have both dates. Therefore, the specimen designated here as lectotype is definitely a part of the original material. The two specimens in LE reported as syntypes by Buzonova (2010) might well represent the same collection and thus are potential isolectotypes.

There are also several specimens above supplied with the printed label «*Erysimum macilentum* Bge. China» recognized here as possible original material.

*Eutrema edwardsii* R. Br., 1823, Chlor. Melvill.: 9, pl. A.

Described from Melville Island (Brown, 1823).

Lectotype (designated here): [Canada, Northwest Territories / Nunavut]: «Melville Island, [the Winter Harbour area], [fr.]. Mr. Edwards [1820]» (BM 000999229).

Other original material: «*Eutrema Edwardsii* Ch. Melv. Melville Island, [fr. mat.], Mr. Edwards» (BM 000999230); «Melville Island, [fl., fr. immat.], Mr. James Ross» (BM 000999231); «*Eutrema Edwardsii*, [fl., fr. immat.], Mr. Edwards» (BM 000999232); «Plants of Melville Island collected on Capt. W. R. Parry's first Voyage and described by Robert Brown (Received 1919 from the estate of Edward C. Pickering), [fl. prim]. *Eutrema Edwardsii* R. Br. Duplicate type. Coll. Sabine, Edwards, Ross, and others 1819–1820» (GH 00019140).

Although the type of *E. edwardsii* is sometimes being cited as holotype (e. g., Al-Shehbaz, Warwick, 2005: 132), the name is based on several uncited gatherings and thus needs lectotypification as was emphasized and done by Grant (1994). Unfortunately, that designation was not effective because the intended lectotype included three specimens (now BM 000999229, 31, and 32, all mounted on one sheet along with J. Ross's gathering treated as syntype) apparently representing different collections. Following the idea of choosing the lectotype from J. Edwards's collections as the most complete (Grant, l. c.: 250), «in which only perfect specimens with ripe siliquae of *Eutrema Edwardsii* were found» (Brown, l. c.: 10), one of the two Edwards's specimens with ripen fruits is designated here as lectotype.

*Lepidium coronopifolium* Spreng., 1815, Pl. min. cogn. pug. 2: 72.

Described from SE Europe: «Habitat ad Sareptam» (Sprengel, l. c.).

Neotype (designated here): [Russia, Volgograd prov., Volgograd]: «*Lepidium coronopifolium* Fisch. Sarepta, [fl., fr.], ded. Fischer 1821» (B 100241322!).

There is no agreement among authors regarding the place of valid publication and the author(s) of the name *L. coronopifolium*. It is being cited with the authorship «Fisch.» (e. g., Akeroyd, Rich, 1993; Busch, 1939; Jalas, 1996; Marhold, 2011; The Plant List; Vinogradova, 1974), «Fisch. ex DC.» (e. g., Roskov, 2014; The Catalogue of Life; Warwick et



al., 2006), or «Fisch. ex Ledeb.» (Dorofeyev, 2002, 2012a; Kotov, 1979; Tropicos.org.; etc.) meaning, respectively, Fischer (1808: 79), Candolle (1821: 532), and Ledebour (1841b: 203) as the place of its validation. Among three publications in focus, descriptions are available in the two, earlier in Candolle (1821), while in the «Catalogus ...» (Fischer, 1808), as well as in its second edition (Fischer, 1812), *L. coronopifolium* is *nomen nudum*. However, one of four sources cited by Candolle, namely Sprengel (1815), provides the description which is the earliest one related to the binominal in question and thus relevant publication is a place of its, even though unintended, validation. The name is cited by Sprengel as «*Lepidium coronopifolium* Willd. suppl. 43» referring to Willdenow (1813) where it appears as *nomen nudum* without an author indication. Being just a reference, it should not be treated as an ascription of the authorship of the species name to Willdenow as determined by ICN Art. 46.3 (McNeill et al., 2012). This assumption is further confirmed by the fact that in a later publication Sprengel (1825: 867) cited this species as «*Lepidium coronopifolium* Fisch.». As long as there is also no ascription of the validating description and diagnosis, the author of the discussed name is that of relevant publication, i. e. Sprengel (ICN Art. 46.3. Note 3).

No material of *L. coronopifolium* was cited in either Willdenow (1813) or Sprengel (1815). It is very likely that the specimen studied by Ch. Steven in Willdenow herbarium and cited by Candolle (l. c.) as «*L. laciniatum*. Wild. herb. ex Stev. obs. ined. in h. Wild.» is a part of original material or even the holotype of the discussed species. However, it is absent in both B-W or general herbarium B and it is unclear where and when it could be transferred. Based on the way it was cited by Ledebour (l. c.), it was not in B-W already in late 1830<sup>ths</sup>. In a similar way, with reference to Candolle, this specimen is cited by Thellung (1906: 169). The only specimen of *L. coronopifolium* in B-W known to me is B-W 11809.4 deposited in the folder B-W 11809 (*Lepidium calycinum* Steph. ex Willd.) and correctly re-determined yet by Ledebour; apparently it is not the original material of the species. Unless the type is found, a neotype is proposed herein which is a historical specimen collected in the *locus classicus* and obtained in B from the informal author of the binominal.

*Lunaria suffruticosa* Vent., 1800, Descr. Pl. Nouv.: 19. ≡ *Fibigia suffruticosa* (Vent.) Sweet ≡ *Brachypus suffruticosus* (Vent.) V.I. Dorof.

Described based on materials collected in Iran by G.A. Olivier (together with J.G. Bruguère) and A. Michaux and grown in the garden of J.M. Cels: «...trouvé par Michaux sur la route d'Hamadan à Casbin, cultivé depuis plusieurs années chez Cels. ... Les fruits de *Lunaria suffruticosa* m'ont été communiqués par Olivier, qui a trouvé cette plante dans les mêmes lieux que Michaux» (Ventenat, l. c.).

Lectotype (designated here): [W Iran, Hamedan, mt. Alvand]: «Amadan. Mont Elwind, [fl., fr. prim.], Olivier et Bruguère» (P 00747689: <http://colddb.mnhn.fr/catalognumber/mnhn/p/p00747689>).

Possible isolectotype: «*Lunaria suffruticosa* mont Elwind, [fl.], herb. Olivier [mis.] 1822» (G-DC: G 00204574).

Other original material: «Perse. [Inter Hamedan and Quazvin], [fr. mat., fragm.], Michaux» (P 00747690: <http://colddb.mnhn.fr/catalognumber/mnhn/p/p00747690>); «*Alyssum superbum* fructus ex sp. persico h. Michaux, [fr. sep.]» (G-DC: G 00204704); «*Lunaria suffruticosa* Vent.! [fl., sem. sep.], m. B. Delessert 1819» (G-DC: G 00204706).

Information on the type of this species considerably differs among authors. The specimen designated here as lectotype was recently cited as holotype by Ranjbar et al. (2014: 35) despite more than one gathering was mentioned in the protologue. Dorofeyev (2012b) considered holotype to be the drawing accompanying the original description which apparently does not belong to the original material (ICN Art. 9.3; McNeill et al., 2012; Ross, 2002). Rechinger (1965: 143) referred to unspecified cultivated material as type. More precise was Cullen (1965: 358) who reported both elements at P as syntypes.

However, it is hardly possible to say that any of these elements, though mentioned by Ventenat, were in fact cited by him which prevents recognition of syntypes. Indeed, although location of the gathering of Michaux was given («sur la route d'Hamadan à Casbin»), this information is missing on the actual label and it can be just suggested that it belongs there. Similarly, the same region but not the same locality was meant when saying that Olivier's collection originates from the same area as Michaux's one: in fact it was collected not between Hamedan (Hamadan) and Quazvin (i. e., north of the prior) but somewhat to the south of Hamedan.

It was also mentioned that fruits of *L. suffruticosa* were obtained from Olivier and thus the plants were grown in Cels's garden from those seeds. To be noted in this respect, mature silicles in the description, in agreement with the image, are characterized as obovate while those of the single available fruiting

specimen (and two separate silicles taken most probably from this specimen) are round rather than obovate. The source of this character could be any unknown cultivated plant or, more probable, Olivier's fruits mentioned by Ventenat.

Taking into account the above considerations, all elements of available original material are equally appropriate as lectotypes; the one composed of two well-developed plants with precise information on the place of origin is given a preference.

Given the apparent polyphyly of the traditionally circumscribed *Fibigia* Medik. (e. g., German et al., 2009; Kiefer et al., 2014; Rešetnik et al., 2013; Warwick et al., 2008), the species is accepted here as a member of monotypic *Brachypus* Ledeb. recently restored by Dorofeyev (2012b). I refrain from transferring here three species closely related to *B. suffruticosus* and described this year from Iran (Ranjbar et al., 2014) in view of their unclear status which is based on prevalence of quantitative discriminating characters and some obvious errors in interpreting the morphological pattern. For example, the main qualitative character separating *F. tabriziana* Ranjbar et Karami from *F. suffruticosa* is an «arachnoid hairs on seeds» which in fact, as can be seen on the relevant photo, are fungi. Taking this into consideration, the viewpoint of Rechinger (1968) accepted one polymorphic species might be more appropriate for *Brachypus*.

*Sisymbrium album* Pall. 1776, Reise, 3: 293, 739, ahn. 102, tab. U, fig. 2. ≡ *Smelowskia alba* (Pall.) Regel.

Described from SE Siberia: «In frigidis circa Baikal Junio floret» (Pallas, 1776 : 739).

Lectotype (German & Sennikov, designated here): [Russia, SE Siberia, Irkutsk prov.]: «*Sisymbrium album* Pall. it. III. [1772] affine *Sisymbrio orientali* Linn., [fl.], ad Baical et Selenga [P.S. Pallas]» (LE!).

Other original material: «*Sisymb. album* Sib. / *Sisymbrium album*, [fl.], herb. Pall. m. Lambert 1819» (G-DC: G 00203318); «*Sisymbrium album*. ad lac. Baikal, [fl.], Hb. Pallas mr. Fischer 1819» (G-DC: G 00203317); «Ad montes Angae II. Lect. Junio 1772. *Turritis* Gm. Fl. 3. p. 264. no. 24. *Sisymbrium album* Pall. itin. III [fl., fr. prim.] / Herb. Fischer Baical, [fr.], Herb. Fischer. Herb. Pallas» (LE!); «*Sisymbrium album*. Ad Baical, [fr.], Herb. Fischer. Herb. Pallas» (LE!); «*Sisymb. album*. Angara, [fl.], Herb. Pallas» (LE!); «*Sisymbrium album* Pall. It. III. append. no. 102. tab. U. fig. 1, [fl.]. Hab. in Sibiria ad lacum Baikal. Dr. Prof. Pallas misit 1778. [Herb. Pott]» (LE!); «Herbarium

Stephanianum № 5290. *Sisymbrium album*. [fl.], Pall. d.» (LE!); «*Cardamine*... In sylvis et vall[is] humidis ubique, [fl., fr. prim.]. Jun. 1772. *Sisymb. album* Pall. / Herb. Trinius № 419» (MW!).

The main part of the cited specimens of the species collected by Pallas during June – July 1772 are supplied with the author's labels (except for those from herbaria of Fischer (fr.) and Pott in LE and both specimens in G-DC). The single plant with attached label is chosen as lectotype not to be mixed with the other three («Ad montes Angae...») mounted on the same sheet also bearing the anonymous printed label «Typus». The specimens from Angara and from herb. Pott are also mounted together and with the plant labeled «*Sisymbrium album* ex Sibiria, [fl.], com. Steven 1816. remitte! M. Bieb.» which might also be a part of original material. The specimen from MW was previously cited as «isotypus» (Gubanov, Bagdasarova, 1978: 76) and subsequently reported as «isolectotypus» (Gubanov, 1993: 60, 2002: 79) but no typification was proposed in any of these accounts. J.G. Gmelin's «*Turritis* No. 24» mentioned by Pallas on the label of the specimen from Anga is not to be merged with *Smelowskia alba*: it was later described as *Arabis crassifolia* Ledeb. (Ledebour, 1841a) and recently recognized conspecific with *Sisymbrium polymorphum* (Murr.) Roth (German, 2012b).

*Thlaspi praecox* Wulfen [var.] β *macranthum* Lipsky, 1894, Zap. Kievsk. Obshch. Estestvoisp. 13, 1: 271. ≡ *Noccaea macrantha* (Lipsky) F.K. Mey.

Described from NW Ciscaucasia: «...Растет на холмах между кустарниками возле Новороссийска и соседних местах Кубанской области. ... Кубанская область: Тоннельная / Grows on the hills between bushes near Novorossiysk and other localities of Kuban province. ... Kuban province: Тоннельная» (Lipsky, l. c.: 271–272).

Lectotype (designated here): [Russia, Krasnodar Krai], «*Thlaspi praecox* Wulf. β *macranthum* m. 20 IV 1889, [fl., fr. immat.]. Черномор.[ский] окр[уг]. Новороссийск. В. Липский / Chernomorsk. окр. Novorossiysk. V. Lipsky» (LE!, iso [fide Meyer (2006: 162)] – PRC; other original material – KW).

The specimen was recently cited as type (Dorofeyev, 2003: 121; 2012a: 457) or lectotype (Al-Shehbaz, 2014: 41; Meyer, 2006: 161) but none of those citations led to the effective type designation. The need of choosing the lectotype is based on the fact that two localities were mentioned in the protologue and, furthermore, the author emphasized that the specimens were collected by him around Novorossiysk



«most completely, in different phenophases – with flowers, fruits, etc.» (Lipsky, l. c.: 271, originally in Russian). Four Lipsky's gatherings of 1889–1892 representing the original material and studied by Busch in KW and LE are cited by the latter author (Busch, 1906: 143; 1910: 170). As long as none of those gatherings/specimens were cited by Lipsky, all are equally appropriate for lectotype designation (ICN Art. 9.12; McNeill et al., 2012). Among them, the complete specimen long believed to be either the type or lectotype and reported as such in a number of publications was definitely the best candidate to be designated which is finally done here. Both Meyer (2006) and Al-Shehbaz (2014) referred to the choice of Dorofeyev (2003) but his designation of the «type» being published after 1<sup>st</sup> January 2001 cannot be interpreted as lectotypification (ICN Art. 7.10; McNeill et al., l. c.). Label of the lectotype is written by Lipsky.

*Vella tenuissima* Pall. 1776, Reise, 3: 740, ahn. 103, tab. U, fig. 2. ≡ *Litwinowia tenuissima* (Pall.) Woron. ex N. Pavl. ≡ *Bunias tatarica* Willd., nom. illeg. superfl.

Described from NW Kazakhstan: «Praeter collis sic dictos Inderienses ad Jaikum australem nusquam observata» (Pallas, l. c.).

Lectotype (designated here): [Kazakhstan, around the border of Atyrau or West Kazakhstani provinces, Inder mts., V.F. Zuev, 16–23 May 1773]: «[fl., fr.]» (B-W 11748.2!).

Other original material (very likely isolectotypes): «[fl., fr.]» (B-W 11748.1!); «*Bunias tatarica*. Ex reg. Uralensi. Comm. Pallas, [fl., fr.], M. Bieb.» (LE!).

Original material of *Litwinowia tenuissima* was believed to be deposited in LE (Busch, 1939: 327) or in LE and BM (Jafri, 1973: 104); however, the search resulted in finding its main part in B-W. There are three specimens in Willdenow herbarium (B-W 11748.1–3) and four labels glued on their common folder. The label «Swartz. W.» does not refer to the origin of the specimen it accompanied and apparently indicates only that relevant specimen came to Willdenow via Olof Peter Swartz. The other three are original ones written by Pallas, each corresponding to a specimen: 1) «Inderskie Gory (Pallas)»; 2) «*Vella tenuissima* (Pallas). In collibus circa lacum Inderskoe lecta primo vera»; 3) «29. In tumulo Golodnoi astrachaniae vicino ad foveas argillaceas locis sterilissimis siccissimis occurit Majo (Herb. Pall.)». It is clear that among these labels by Pallas, two (first and second) are related to the original ma-

terial as they refer to the *locus classicus* (Inder mts. in vicinities of Inder Lake along Lower Ural) of the species. As emphasized in the protologue, the species was collected only once during the whole expedition of 1768–1774 and it was done by his student V.F. Zuev (Suief) in between 16 and 23 May 1773 (Pallas, 1776: 518, 521; 1788: 97; Sytin, 1997: 285). For this reason, the cited specimen in LE collection locality of which apparently refers to Lower Ural is also recognized as part of original material. The species was afterwards collected by Pallas in 1793 somewhat westwards, in the Low Volga region. Although it is mentioned only once in the text as found in the locality Arsagar (Arsagir) (Pallas, 1799: 125; Sytin, 1997: 164; relevant collection is available in LE), there are no doubts that the third label from B-W also belongs to the material collected during that trip in May 1793 in lower reaches of Volga because there are no other options of being collected by Pallas in Astrachan region. Hence, one of the three specimens in B-W is not a part of original material of *L. tenuissima*. I am sure that it is B-W 11748.3: both plants constituting this specimen considerably differ from the others in having relatively thick stems branched from the very base and rather densely hispid in the basal part. In this, they are not in agreement with characteristics «caulis filiformis» and «pilis raris ... sparsus» given in the protologue (Pallas, 1776: 740) while other specimens cited above perfectly agree with the description. This conclusion is confirmed by the information of Willdenow (1800: 413) who, while validating the illegitimate homotypic name *Bunias tatarica* Willd. (ICN Art. 52.1), provided characteristics «caulis erectus» (fitting first two B-W specimens but not B-W 11748.3 with inclined rather than erect stems) and reported only the distribution repeating that of the protologue of *Vella tenuissima* («in collibus Sibiriae ad Jaikum australem»); no material from either Volga or Astrachan was mentioned. Thus, the specimen with deviating morphology should not be any gathering from Lower Ural but the last one from Lower Volga which was probably obtained by Willdenow after the publication of relevant volume of «Species plantarum».

Preference in the choice of lectotype is given to one of the B-W specimens because any (although it is not clear which) of the two original labels belong to it and it consists of two well developed plants in a good condition similar (though not identical) to that pictured in the original publication. In contrast, the specimen in LE is a single small plant with broken

off upper part of the stem supplied with a non-original label (by Marschall von Bieberstein).

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