Cardaria, *Coronopus*, and *Stroganowia* are United with *Lepidium* (Brassicaceae)

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ABSTRACT. The genera *Cardaria* (including *Hymenophysa*), *Coronopus*, and *Stroganowia* are hardly distinct morphologically from the larger *Lepidium*, and the distinctions of all four genera are based solely on a few fruit characters of doubtful value. Recent molecular data strongly suggest that the genera *Coronopus* and *Stroganowia* are polyphyletic and, together with *Cardaria*, are nested within *Lepidium*. Therefore, they are herein formally united with *Lepidium*, the earliest published generic name in this group. The new names *L. appelianum*, *L. botschantsevianum*, *L. buschianum*, *L. karelinianum*, and *L. mummenhoffianum* are proposed because the transfer of their replaced names to *Lepidium* would create later homonyms. The following 20 new combinations are proposed: *L. brachyotum*, *L. cardiophyllum*, *L. englerianum*, *L. lepidioides*, *L. litwinowii*, *L. longifolium*, *L. minor*, *L. navasii*, *L. paniculatum*, *L. rhytidocarpum*, *L. robustum*, *L. sagittatum*, *L. saravschanicum*, *L. serratum*, *L. tianschanicum*, *L. tiehmii*, *L. tolmaczovii*, *L. trautvetteri*, *L. violaceum*, and *L. zambiensis*.

Key words: Brassicaceae, *Cardaria*, *Coronopus*, *Hymenophysa*, *Lepidium*, *Stroganowia*.

During work by two of us (Al-Shehbaz and Appel) on the forthcoming account of the Brassicaceae (Cruciferae) for K. Kubitzki's *Families and Genera of Vascular Plants*, and on the basis of molecular studies on the genus *Lepidium* L. and relatives, such as *Cardaria* Desvaux, *Coronopus* Zinn, and *Stroganowia* Karelin & Kirilov (Bowman et al., 1999; Brüggemann, 2000; Mummenhoff, 1995; Mummenhoff et al., in press; Mummenhoff, unpublished), it has become amply evident that only one genus is involved, and that nomenclatural adjustments are needed to make the names available for several floristic works in progress.

Lepidium is a cosmopolitan genus of about 175 species distributed on all continents except Antarctica (Al-Shehbaz, 1986). It is one of the most natural and readily distinguished of all genera in the family. As presently delimited, all species have angustiseptate fruits with two subapical ovules (one in each locule), and the trichomes (when present) are always simple. The flowers in more than half of the species have just two stamens, and the petals in most of those are rudimentary or lacking. In the remaining species of *Lepidium*, the flowers are always petaliferous and have either six or four stamens (Thellung, 1906; Al-Shehbaz, 1986). For the reduction of stamen number in *Lepidium*, the interested reader should consult Bowman and Smyth (1998) and Bowman et al. (1999).

The genera *Cardaria*, *Coronopus*, and *Stroganowia* resemble *Lepidium* in having similar fruit structure, two ovules per ovary, and simple trichomes. Most of them have six stamens, but a few species of *Coronopus* have two stamens, just like the majority of *Lepidium*. As shown below, the principal characters used to distinguish these genera from *Lepidium* are based solely on minor differences in fruit morphology. However, recent molecular studies (Mummenhoff et al., in press) have clearly shown that the genera *Cardaria*, *Coronopus*, and *Stroganowia* are nested within *Lepidium*, that *Coronopus* and *Stroganowia* are definitely polyphyletic, and that *Lepidium* is paraphyletic.

CARDARIA

Cardaria is said to differ from *Lepidium* by having indehiscent instead of dehiscent fruits, and both genera were recognized in most of the major floris-

tic or monographic works, including those by Schulz (1936), Hedge (1968), Hewson (1982), Al-Shehbaz (1986), Schultze-Motel (1986), Rollins (1993), and Tutin et al. (1993). However, as indicated by Thellung (1906), there are some species of *Lepidium* with tardily dehiscent or even indehiscent fruits. In fact, some authors (e.g., Thellung, 1906; Busch, 1939a; Rich, 1991) reduced *Cardaria* to synonymy of *Lepidium*, though Busch (1939a, 1939b) also recognized *Hymenophysa* C. A. Meyer as a related genus with two species. By contrast, Schulz (1936) recognized *Cardaria* as a monotypic genus that he placed with *Lepidium* in the tribe Lepidieae and treated *Hymenophysa* as a monotypic genus that he placed in the tribe Euclidieae. The single character that Schulz (1936) used to separate *Cardaria* from *Hymenophysa* (and the two tribes in which he placed them) is the presence of angustiseptate (flattened at a right angle to the septum) vs. inflated fruits. The example of *Cardaria-Hymenophysa* shows that heavy reliance on the type of compression of fruit led to the artificial delimitation of genera and tribes. For another example, the vast majority of the approximately 170–190 species of *Alyssum* L. have latiseptate fruits (flattened parallel to the septum), and only a few species (e.g., *A. turgidum* T. R. Dudley and *A. globosum* Grossheim) have distinctly inflated fruits (Dudley, 1964; Avetisian, 1980). *Alyssum globosum* was placed in the monotypic genus *Takhtajaniella* V. E. Avetisian (Avetisian, 1980), but we believe that it is perfectly at home in *Alyssum*.

Molecular data (Mummenhoff, 1995; Brüggemann, 2000; Mummenhoff et al., in press) clearly demonstrated that *Cardaria* is nested within *Lepidium*, and that it is most closely related to *L. campestre* L. and its relatives, which Thellung (1906) assigned to *Lepidium* sect. *Lepia* (Desvaux) DC. The cpDNA data (Mummenhoff et al., in press) indicate monophyly of *C. draba* (L.) Desvaux and *C. pubescens* (C. A. Meyer) Jarmolenko, whereas the ITS data (Brüggemann, 2000) suggest polyphyly of *Cardaria* because *C. pubescens* appears to be more closely related to members of *Lepidium* sect. *Lepia* than does *C. draba*. However, both the cpDNA and ITS data show that *Cardaria* is nested well within *Lepidium* next to section *Lepia*. It is interesting to note that the type species of *Cardaria* was initially described by Linnaeus (1753) as *Lepidium draba* L.

There is disagreement as to the number of species recognized in *Cardaria*. Mulligan and Frankton (1962) and Czerepanov (1995) recognized as many as five and six species, respectively. By contrast, other authors (e.g., Hedge, 1968; Al-Shehbaz, 1986) recognized two, while Rollins (1993) recognized three. We believe that only two species merit recognition, and both should be placed in *Lepidium*. These are *L. draba*, which consists of subspecies *draba* and *chalapense* (L.) Thellung, and *L. appelianum* Al-Shehbaz, a new name proposed herein because the transfer of *Hymenophysa pubescens* C. A. Meyer to *Lepidium* would create a later homonym of the South American *L. pubescens* Desvaux.

Coronopus

Coronopus consists of 10 species native to South America, Africa, Southwest Asia, and adjacent Europe (Al-Shehbaz, 1986). It differs from *Lepidium* primarily by having didymous fruits with thickened, reticulate, rugose, to tuberculate (rarely smooth), indehiscent fruit valves. In three species (*C. navasii* Pau, *C. squamatus* (Forsskål) Ascherson, and *C. violaceus* (Munby) Kuntze) the fruits are not didymous while in the remaining seven (*C. didymus* (L.) Smith, *C. integrifolius* (DC.) Sprengel, *C. niloticus* (Delile) Sprengel, *C. lepidioides* (Cosson & Durieu) Kuntze, *C. serratus* (Poiret) Desvaux, *C. rhytidocarpus* (Hooker) Macloskie, and *C. zambiensis* Jonsell) they are distinctly didymous. *Coronopus wrightii* H. Hara (Japan, Taiwan) was reduced by Cheo et al. (2001) to synonymy of *C. integrifolius* (herein as *L. englerianum*). The valve orifice that faces the replum is usually smaller than the seed and, therefore, the seeds are not readily released, and these valves act as the dispersal unit. In *Lepidium* the fruit is not didymous, and the valves are generally thin and with orifices often wider than the seeds. Therefore, the seeds are easily released from the valves. However, in the southern Argentinian and Chilean *L. pseudodidymum* Thellung, the fruits somewhat approach *C. didymus* in their reticulation and thickness. In fact, *L. pseudodidymum* was treated by Muschler (1908) as *C. didymus* subsp. *australis* (J. D. Hooker) Muschler and was later redescribed by Boelcke (1975) as *Coronopus leptocarpus* Boelcke. This shows that *Lepidium* and *Coronopus* can hardly be delimited on morphological grounds. In our opinion, features of the fruit valves in *Coronopus* are adaptations for dispersal and are insignificant in the delimitation of the genus. The development of thick, reticulate, rugose, or tuberculate fruit walls apparently evolved independently within *Lepidium* (including *Coronopus*). Molecular data by one of us (Mummenhoff, unpublished) clearly show that *Coronopus* is polyphyletic and nested within *Lepidium*.

Although molecular studies have not yet been done on the monotypic *Delpinophytum* Spegazzini,

it is very likely that *D. patagonicum* (Spegazzini) Spegazzini is only a dwarf, pulvinate species of *Lepidium*. The species was subsequently treated by Muschler (1908) as *Coronopus patagonicus* (Spegazzini) Muschler. Both *C. didymus* and *C. squamatus* were originally described as *L. didymum* L. and *L. squamatum* Forsskål, respectively. *Coronopus niloticus* is known in *Lepidium* as *L. niloticum* (Delile) Sieber ex Steudel. For the remaining seven species of *Coronopus*, new combinations are proposed herein to accommodate their transfer to *Lepidium*.

STROGANOWIA

Both Pavlov (1933, 1939) and Botschantsev (1984) provided brief synopses on *Stroganowia*, and the latter author recognized 21 species in the genus. The characters used to distinguish *Stroganowia* from *Lepidium* are the perennial habit and slightly angustiseptate or nearly quadrangular fruits. However, these features are tenuous at best, and many species of *Lepidium* (e.g., *L. latifolium* L. and relatives) resemble *Stroganowia* in habit. The degree of the fruit flattening is not a reliable feature either, and there are no other differences between the two genera. In fact, some species recognized by Botschantsev (1984) as *Stroganowia* (e.g., *S. affghana*, *S. subalpina*) were treated by Thellung in *Lepidium*, who (1906: 157) suggested that *Stroganowia* is best treated as a section of *Lepidium*. Molecular data available so far for seven species (Mummenhoff, unpublished) show that the Old World *Stroganowia* forms separate groups nested within *Lepidium*. What was explicitly mentioned by Botschantsev (1984) about the dubious merit of *Stroganowia* has now been substantiated by Mummenhoff's molecular studies. As for *S. tiehmii* Rollins, Price (pers. comm.) indicated that the species falls within the American species of *Lepidium* based on molecular studies. Therefore, *Stroganowia* is polyphyletic, and the alleged relationship of *S. tiehmii* with its nearest disjunct relatives in Central Asia (Rollins, 1982) has not been supported by molecular data.

All of Botschantsev's (1984) 21 species of *Stroganowia* merit recognition as species of *Lepidium*. Three species, *S. affghana* (Boissier) Pavlov, *S. bupleuroides* (K. H. Rechinger) Botschantsev, and *S. subalpina* (Komarov) Thellung ex Pavlov, were originally described in *Lepidium*, and their retention in that genus poses no nomenclatural problems. The transfer to *Lepidium* of *S. angustifolia* Botschantsev & Vvedensky, *S. intermedia* Karelin & Kirilov, *S. persica* N. Busch, and *S. rubtzovii* Botschantsev would create later homonyms, and the following new names are proposed herein to accommodate them in *Lepidium: L. botschantsevianum* Al-Shehbaz, *L. karelinianum* Al-Shehbaz, *L. buschianum* Al-Shehbaz, and *L. mummenhoffianum* Al-Shehbaz, respectively. Upon its transfer to *Lepidium*, *S. puberula* Kitamura would become an illegitimate later homonym of *L. puberulum* Bunge. Therefore, *S. puberula* should be recognized in *Lepidium* as *L. altissimum* K. H. Rechinger, which is the earliest legitimate name for the species in *Lepidium*. New combinations in *Lepidium* are proposed herein to accommodate the remaining 13 species of *Stroganowia: S. brachyota* Karelin & Kirilov, *S. cardiophylla* Pavlov, *S. litwinowii* Lipsky, *S. longifolia* (Boissier) Botschantsev & Vvedensky (originally described as *Heldreichia longifolia* Boissier), *S. minor* Botschantsev & Vvedensky, *S. paniculata* Regel & Schmalhausen, *S. robusta* Pavlov, *S. sagittata* Karelin & Kirilov, *S. saravschanica* Bulgakova, *S. tianschanica* Botschantsev & Vvedensky, *S. tiehmii* Rollins, *S. tolmaczovii* Junussov, and *S. trautvetteri* Botschantsev.

Lepidium L., Sp. Pl. 2: 643. 1753. TYPE: *Lepidium latifolium* L. (lectotype, designated by Britton & Brown, 1913).

Coronopus Zinn, Cat. Pl. Hort. Gott. 325. 1757, nom. cons. TYPE: *Coronopus squamatus* (Forsskål) Ascherson.

Cardaria Desvaux, J. Bot. Agric. 3: 163. 1815. TYPE: *Cardaria draba* (L.) Desvaux.

Stroganowia Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 14: 386. 1841. TYPE: *Stroganowia sagittata* Karelin & Kirilov (lectotype, designated by Botschantsev, 1984).

Although Greuter et al. (1993, 2000) listed the type species of *Coronopus* as *C. ruellii* Allioni, which is based on *Cochlearia coronopus* L., both of these specific epithets are synonyms of *Lepidium squamatum* Forrskål. *Cochlearia coronopus* and *Coronopus ruellii* are correctly listed as synonyms of *L. squamatum* by Hedge (1968) and Greuter et al. (1986), respectively.

Lepidium appelianum Al-Shehbaz, nom. nov. Replaced name: *Hymenophysa pubescens* C. A. Meyer, in Ledebour, Icon. Pl. 2: 20. 1830, non *Lepidium pubescens* Desvaux, J. Bot. Agric. 3: 180. 1815, nec *L. pubescens* Tineo, Cat. Pl. Hort. Panorm. 150. 1827. TYPE: [Kazakhstan.] "Locis humidis subsalsis deserti Soongoro-Kirghisici orientalis versus montes Arkaul," 14 May 1826, *C. A. Meyer s.n.* (lectotype, designated here, LE).

The choice of *C. A. Meyer s.n.* as the lectotype

was based on the fact that *L. appelianum* is a new name replacing the later homonym *L. pubescens*, and this collection was among those cited in the original publication.

The species is named in honor of Oliver Appel, one of the authors of the present paper and an expert on the Brassicaceae.

Lepidium botschantsevianum Al-Shehbaz, nom. nov. Replaced name: *Stroganowia angustifolia* Botschantsev & Vvedensky, Bot. Mater. Gerb. Inst. Bot. Zool. Akad. Nauk Uzbekst. S.S.R. 12: 11. 1948, non *Lepidium angustifolium* Rusby, Descr. S. Amer. Pl. 23. 1920. TYPE: [Uzbekistan.] Samarkand: Zarafshon, Katta Gorgansky, Mt. Actao, near village Shamani, 24 May 1925, *M. G. Popov 349* (holotype, TASH).

The new name commemorates Victor Petrovich Botschantsev (1910–1990), an outstanding expert on the Brassicaceae of the former Soviet Union.

Lepidium brachyotum (Karelin & Kirilov) Al-Shehbaz, comb. nov. Basionym: *Stroganowia brachyota* Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 14: 387. 1841. TYPE: "In montosis deserti Soongoro-Kirghisici prope Ajagus," June 1840, *G. S. Karelin & I. P. Kirilov s.n.* (holotype, LE).

Lepidium buschianum Al-Shehbaz, nom. nov. Replaced name: *Stroganowia persica* N. Busch, Zhurn. Russk. Bot. Obshch. Akad. Nauk S.S.S.R. 11: 225. 1926, non *Lepidium persicum* Boissier, Ann. Sci. Nat. ser. 2, 17: 196. 1842. TYPE: N Iran. Tabris (Atropatania): Mt. Scher-Dara, between Sofian and Sejvan, 1430–1500 m, 18 June 1924, *A. Grossheim s.n.* (holotype, LE).

The new name commemorates Nicolai Adolfowitsch Busch (1869–1941), an outstanding expert of the Brassicaceae of Asia and the author of most of the accounts of Brassicaceae for the Flora of the former Soviet Union (see Busch, 1939a, 1939b).

Lepidium cardiophyllum (Pavlov) Al-Shehbaz, comb. nov. Basionym: *Stroganowia cardiophylla* Pavlov, Bot. Zhurn. S.S.S.R. 18: 364. 1933. TYPE: [Turkmenistan.] "Turkestania Ross., prov. Syr-Darja, montes Maschat-tau (praemontorium Alatau Talassici), in decliviis glareosis pratensibus ad trajectum Dau-baba, 1200 m," 31 Aug. 1931, *N. V. Pavlov 1226* (holotype, MW; isotype, LE).

Lepidium englerianum (Muschler) Al-Shehbaz, comb. nov. Basionym: *Coronopus englerianus* Muschler, Bot. Jahrb. Syst. 41: 139. 1908. TYPE: Mozambique. Mouth of Zambezi River, *Peters s.n.* (holotype, B).

The earliest name for the species is *Senebiera integrifolia* DC. (Mém. Soc. Hist. Nat. Paris 1: 144. 1799), but the transfer of its specific epithet to *Lepidium* would create a later homonym of *L. integrifolium* Nuttall ex Torrey & A. Gray. The second earliest name for the species is *Senebiera linoides* DC., but the transfer of its specific epithet to *Lepidium* would create a later homonym of *L. linoides* Thunberg. According to Marais (1970), the last species is a synonym of *Lepidium divaricatum* Aiton. Jonsell (1974) was the first to reduce *Coronopus englerianus* to synonymy of *S. integrifolia*, and the epithet "*englerianus*" is the earliest available name that can be used for the species in *Lepidium*.

Lepidium karelinianum Al-Shehbaz, nom. nov. Replaced name: *Stroganowia intermedia* Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 15: 162. 1842, non *Lepidium intermedium* A. Richard, Tent. Fl. Abyss. 1: 21. 1847. TYPE: "In montosis apricis Alatau inter fluvios Baskan et Sarchan," July 1841, *G. S. Karelin & I. P. Kirilov s.n.* (lectotype, designated by Pavlov (1933), LE; isolectotype, MW).

The new name honors Grigorij Siliovitsch Karelin (1801–1872), one of the famous botanical explorers of central Asia.

Lepidium lepidioides (Cosson & Durieu) Al-Shehbaz, comb. nov. Basionym: *Senebiera lepidioides* Cosson & Durieu, Bull. Soc. Bot. France 2: 245. 1855. TYPE: Algeria. "In ditione Mzab prope Guerrara," 3 Nov. 1854, *V. C. Reboud s.n.* (holotype, P).

Lepidium litwinowii (Lipsky) Al-Shehbaz, comb. nov. Basionym: *Stroganowia litwinowii* Lipsky, Trudy Imp. S.-Peterburgsk. Bot. Sada 26: 121. 1910. TYPE: Turkmenistan. Mountains near Gaudan, 30 May 1898, *D. Litwinow 625* (holotype, LE).

Lepidium longifolium (Boissier) Al-Shehbaz, comb. nov. Basionym: *Heldreichia longifolia* Boissier, Ann. Sci. Nat. ser. 2, 17: 187. 1842. TYPE: Iran. Mount Zerdakou [Zard Kuh], *Aucher 320* (holotype, G).

Hedge (1968) had correctly questioned the in-

clusion of the species in *Heldreichia* Boissier because of its habit, non-fleshy leaves, and toothless filaments. He indicated that the species should either be placed in a monotypic genus or in *Stroganowia*. As indicated by Botschantsev and Vvedensky (1948), the species is morphologically very close to *S. angustifolia* (herein as *Lepidium botschantsevianum*).

Lepidium minor (Botschantsev & Vvedensky) Al-Shehbaz, comb. nov. Basionym: *Stroganowia minor* Botschantsev & Vvedensky, Bot. Mater. Gerb. Inst. Bot. Zool. Akad. Nauk Uzbekst. S.S.R. 3: 19. 1941. TYPE: [Tajikistan.] Pamir: [up River Yakabag Darya, around village Tashkorgan], 18 June 1936, *Botschantsev & Butkov 8* (holotype, TASH # 161584).

It is quite possible that the collection was actually made from near Taxkorgan, a town in the southwestern Xinjiang Autonomous region at the Tajikistan-China border, as such town no longer exists in Tajikistan.

Lepidium mummenhoffianum Al-Shehbaz, nom. nov. Replaced name: *Stroganowia rubtzovii* Botschantsev, Novosti Sist. Vyssh. Rast. 21: 79. 1984, non *Lepidium rubtzovii* Vassilczenko, Bot. Mater. Gerb. Inst. Bot. Akad. Nauk Kazakhsk. S.S.R. 4: 40. 1966. TYPE: "Jugum Alatau Dzhungaricus, distr. inter pagos Sarkand et Kopal, locus Bel-Bulak," 20 July 1934, *N. I. Rubtzov s.n.* (holotype, LE).

The species is named in honor of Klaus Mummenhoff, one of the authors of this paper, in recognition for his extensive molecular work on *Lepidium* and related genera.

Lepidium navasii (Pau) Al-Shehbaz, comb. nov. Basionym: *Coronopus navasii* Pau, Butl. Inst. Catalana Hist. Nat. 22: 31. 1922. TYPE: Spain. Sierra de Gádor, 2000 m, *P. Navas s.n.* (holotype, MA not seen).

Lepidium paniculatum (Regel & Schmalhausen) Al-Shehbaz, comb. nov. Basionym: *Stroganowia paniculata* Regel & Schmalhausen, Trudy Imp. S.-Peterburgsk. Bot. Sada 5: 242. 1877. TYPE: Raskrask, "in valle fluvii" Tschirtschik, 8000–9000 ft., Aug. 1876, *A. Regel s.n.* (lectotype, designated by Pavlov (1933), LE).

Lepidium rhytidocarpum (Hooker) Al-Shehbaz, comb. nov. Basionym: *Senebiera rhytidocarpa* Hooker, London J. Bot. 2: 506. 1843. TYPE: Patagonia, *Tweede s.n.* (holotype, K).

Lepidium robustum (Pavlov) Al-Shehbaz, comb. nov. Basionym: *Stroganowia robusta* Pavlov, Bot. Zhurn. S.S.S.R. 18: 367. 1933. TYPE: Turkmenistan. Mt. Boroldaj-tau, summit of Bukuj-tau, 1600 m, 27 June 1931, *N. Pavlov 397* (holotype, MW; isotype, LE).

Lepidium sagittatum (Karelin & Kirilov) Al-Shehbaz, comb. nov. Basionym: *Stroganowia sagittata* Karelin & Kirilov, Bull. Soc. Imp. Naturalistes Moscou 14: 387. 1841. TYPE: "In arenosis ad radicem montium Tarbagati praesertim ad torrentes Dschany-bek et Terekty," May 1840, *G. S. Karelin & I. P. Kirilov s.n.* (holotype, LE).

Lepidium saravschanicum (Bulgakova) Al-Shehbaz, comb. nov. Basionym: *Stroganowia saravschanica* Bulgakova, Bot. Mater. Gerb. Inst. Bot. Akad. Nauk Uzbeks. S.S.R. 20: 8. 1982. TYPE: Uzbekistan. Jugum Seravschanicum, above Sarykol, vicinity of Tillja-Tikan, ca. 1000 m, 13 June 1980, *L. L. Bulgakova s.n.* (holotype, TASH; isotype, MO).

Lepidium serratum (Poiret) Al-Shehbaz, comb. nov. Basionym: *Senebiera serrata* Poiret, in Lamarck, Encycl. 7: 76. 1806. TYPE: [Uruguay]. Montevideo, *Commerson s.n.* (holotype, P-JU).

Lepidium serratum is unrelated to and should not be confused with the Hawaiian *L. serra* H. Mann.

Lepidium tianschanicum (Botschantsev & Vvedensky) Al-Shehbaz, comb. nov. Basionym: *Stroganowia tianschanica* Botschantsev & Vvedensky, Bot. Mater. Gerb. Inst. Bot. Zool. Akad. Nauk Uzbekst. S.S.R. 12: 12. 1948. TYPE: [Kyrgyzstan.] W Tian Shan, Maidantalsky, Chotan-gutsai, 24 July 1940, *V. Makarchuk s.n.* (holotype, TASH).

Lepidium tiehmii (Rollins) Al-Shehbaz, comb. nov. Basionym: *Stroganowia tiehmii* Rollins, Syst. Bot. 7: 215. 1982. TYPE: U.S.A. Nevada: Lyon County, Virginia Range, SE of Talapoosa Peak, T19N, R24E, sect. 34, 5900 ft., 1 June 1980, *A. Tiehm 5783, F. Almeda & M. Williams* (holotype, GH; isotype, MO).

Lepidium tolmaczovii (Junussov) Al-Shehbaz, comb. nov. Basionym: *Stroganowia tolmaczovii* Junussov, Dokl. Akad. Nauk Tadzh. SSR 18(2): 62. 1975. TYPE: W Tajikistan. Karatau ridge, 4 km N of Mt. Chodzha-Maston, 17 May 1960, *A. Meczislavskij & V. N. Zavedeev 675* (holotype, LE).

Lepidium trautvetteri (Botschantsev) Al-Shehbaz, comb. nov. Basionym: *Stroganowia trautvetteri* Botschantsev, in Komarov, Fl. URSS 8: 652. 1939. TYPE: [Kazakhstan.] Ad lacum Balchasch, Betpak-dala, 13 June 1843, *A. Schrenk 399* (holotype, LE).

Lepidium violaceum (Munby) Al-Shehbaz, comb. nov. Basionym: *Senebiera violacea* Munby, Bull. Soc. Bot. France 2: 282. 1855. TYPE: Algeria. Dhaya-Baalis, Ain-Turck, near Oran, *G. Munby s.n.* (holotype, K?).

Lepidium zambiensis (Jonsell) Al-Shehbaz, comb. nov. Basionym: *Coronopus zambiensis* Jonsell, Bot. Not. 127: 116. 1974. TYPE: Zambia. Kalabo District: Liuwa Plain, Paramount Chief's Game Reserve, ca. 45 km N of Kalabo, 14 Sep. 1959, *Drummond & Cookson 6458* (holotype, BM; isotypes, BR, COI, LISC, SRGH; see Jonsell, 1974).

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