

## RUTACEAE OF CENTRAL ASIA

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This article is a result of the critical treatment of Rutaceae family for the edition “Plants of Central Asia”. The work is based on the study of herbarium collections kept in the Herbarium of the Komarov Botanical Institute (LE), as well as on the review of floristic and taxonomic literature for the Central Asian floristic region of Mongolia and China and adjacent regions. Keys are provided for the identification of genera and species. References to nomenclature, information on habitat and geographic distribution are given for each species. The taxonomy and nomenclature of a number of taxa are discussed. The lectotypes of *Zanthoxylum simulans* Hance, *Z. fraxinoides* Hemsl., *Haplophyllum perforatum* Kar. et Kir., *H. sieversii* Fisch. et C.A. Mey., *H. tragacanthoides* Diels, *Ruta perforata* M. Bieb. (= *Haplophyllum perforatum* (M. Bieb.) Vved.), *Dictamnus albus* L. subsp. *turkestanicus* N.A. Winter and *D. dasycarpus* Turcz. are designated.

**Keywords:** taxonomy, nomenclature, typification, lectotype, China, Mongolia, Rutaceae, Plants of Central Asia

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The Rutaceae family includes about 255 genera and 1600 species, mostly distributed in the tropics and subtropics. In the natural flora of the Central Asian floristic region, the representatives of this family are not numerous, only 3 genera and 5 species are found, mainly coming from Siberia, Middle (Central) Asia, Eastern and Central China. This is due to the fact that the climate of Central Asia is predominantly arid.

This review is a critical treatment of the Rutaceae for the multivolume edition “Plants of Central Asia”, based on the study of herbarium collections kept in the Herbarium of the Komarov Botanical Institute (LE), as well as on the review of floristic and taxonomic literature for the Central Asian floristic region of Mongolia and China and adjacent regions.

The edition “Plants of Central Asia” (Grubov, 1999) includes only a part of the Central Asian floristic region situated in China and Mongolia. Since the definition of its boundaries is often difficult, I give here their outline with reference to modern names of geographical objects and settlements (Fig. 1).

The northern border runs through Mongolia, mainly following the watershed line of the Arctic and Pacific Oceans. The eastern border follows the watershed of the Great Khingan Ridge (Inner Mongolia Province of China) and further west through Zhangjiakou City (also known as Kalgan, Hebei Province) along the Great Wall of China. The border then goes to the Yellow River near Zhongwei City (Ningxia Au-

tonomous Region) and follows the Yellow River to Lanzhou City (Gansu Province). Further, it continues southwest and almost coincides with the eastern border of Qinghai Province. Thereafter, from the eastern end of the Bayan Har Mountains (formerly known as the Bayen-karas or Bayan-Kara-Ula, Qinghai Province), separating the drainage basins of the Yellow River and the Yangtze River, the border goes approximately a little east of the cities of Yushu and Xiangda (= Shamda) in Qinghai Province. After, it continues in Tibet Autonomous Region through: Kangda City (Riwoqê County), the eastern part of Dêngqên County, the centers of Banbar County and Gyaca County (= Jiasha), Zhegu Lake (= Chigu Co Lake) and then to the border with Bhutan. In this part, the border should separate the rich mesophilic forest and alpine flora of the Hengduan Mountains from the arid mountain-steppe flora of Tibet proper. In the south and west, the natural border of Central Asia is the highest ranges of the Himalayas and Karakorum, which form a watershed between the area of the internal flow of Tibet and Kashgaria and the Indian Ocean basin, except for the southwestern corner of Tibet, where the headwaters of the Indus and Sutlej are located. The botanical-geographical border practically coincides with the border of China up to its junction with the border of Afghanistan. The western state border of China is taken as the western border of the floristic region of Central Asia for the edition “Plants of Central Asia”.

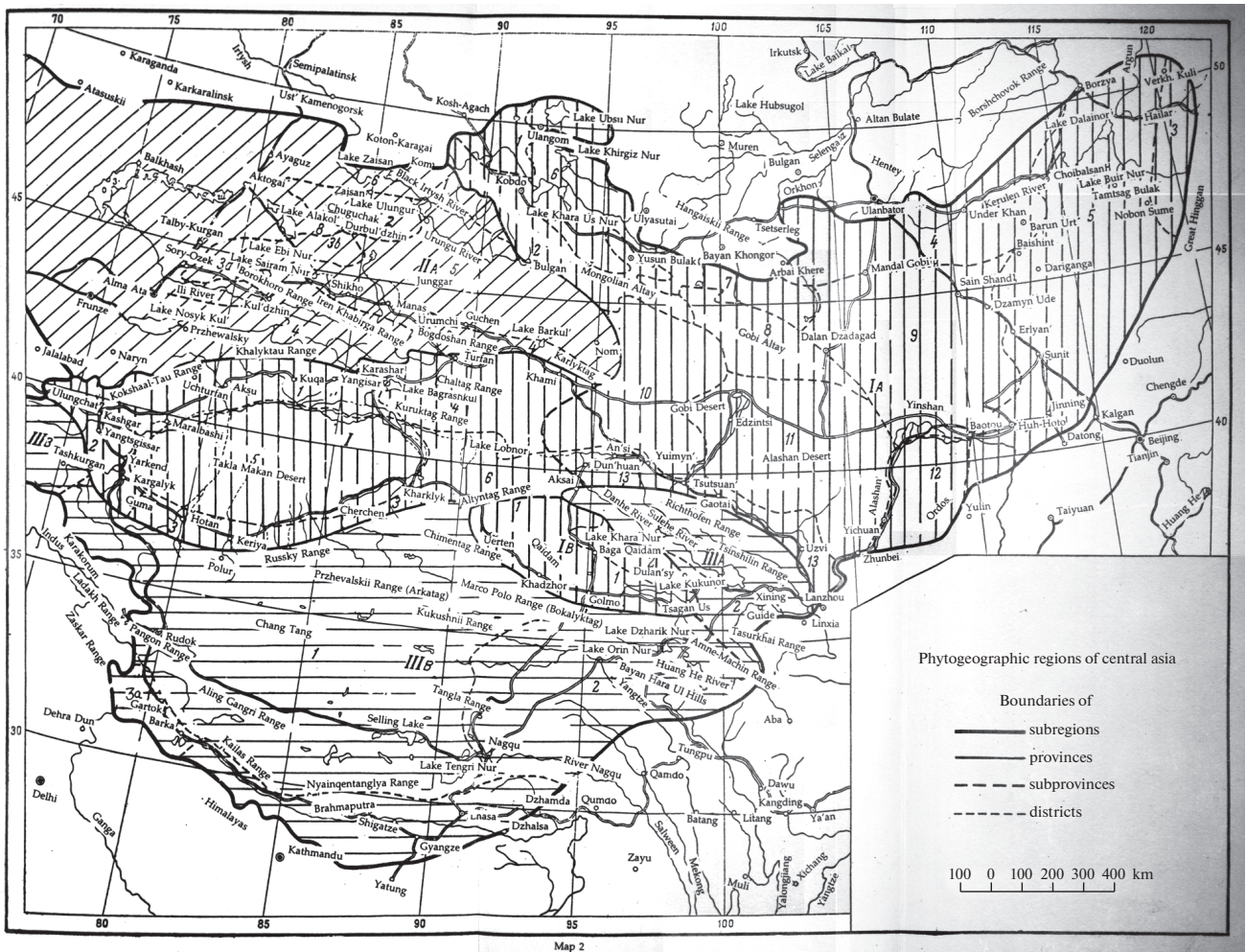


Fig. 1. Phytogeographic regions of Central Asia (Grubov, 1999)

A synopsis of the Rutaceae species of Central Asia is given below. Keys are provided for the identification of genera and species. References to nomenclature, information on habitat and geographic distribution according to the zoning accepted for the edition “Plants of Central Asia” (Grubov, 1999) are given for each species. The species are arranged according to the system provided by a number of authors (Vvedensky, 1949; Zhang et al., 2008).

Key for identifying genera of Rutaceae in Central Asia

- 1. Tree or shrub ..... **1. *Zanthoxylum***
- + Perennial grasses or small shrubs ..... 2.
- 2. All leaves simple; flowers actinomorphic, yellow..... **2. *Haplophyllum***
- + Leaves odd-pinnate (the lowest stem leaves may be simple); flowers zygomorphic, pinkish.....
- ..... **3. *Dictamnus***

1. *Zanthoxylum* L.

1753, Sp. Pl., 1: 270; id., 1754, Gen. Pl., ed. 5: 130.

1. *Z. simulans* Hance, 1866, in Ann. Sci. Nat., Bot., 5 sér., 5: 208; Rehder, 1926, in J. Arnold Arbor., 7: 181; Kitag., 1939, Lineam. Fl. Mansh.: 301; Huang, 1957, in Acta Phytotax. Sin., 6, 1: 17; Zhang et Hartley, 2008, in Fl. China, 11: 65. ≡ *Z. bungeanum* Maxim., 1871, in Bull. Acad. Imp. Sci. Saint-Petersbourg, 16: 212, nom. illeg.; Huang, 1957, in Acta Phytotax. Sin., 6, 1: 21; id., 1986, in Fl. Xizang., 3: 24; Wu, 1999, in Fl. Qinghai, 2: 296; Zhang et Hartley, 2008, in Fl. China, 11: 64; anon. 2014, in Fl. Xinjiang., Simpl. ed.: 336. – Lectotype (Illarionova, designated here): China, Fokien. 1862, De Grijs, № 10698, herb. H.F. Hance (BM – BM000798128 [digital image!], isolectotypes: K000717793 [digital image!], P05241429 [digital image!], P05298271 [digital image!], LE01015612!).

= *Z. bungei* Hance, 1866, in Ann. Sci. Nat., Bot., 5 sér., 5: 209; id., 1875, in J. Bot., 13: 131; Franch., 1884, Pl. David., 1: 66; F.B. Forbes et Hemsl., 1886, in J. Linn. Soc., Bot., 23: 105; Maxim., 1889, Fl. Tangut.: 107; id., 1889, in Trudy Imp. S.-Peterburgsk. Bot.

Sada, 11: 93; Pritzell, 1900, in Bot. Jahrb. Syst., 29: 421; Kom., 1903, in Trudy Imp. S.-Peterburgsk. Bot. Sada, 22: 667; Loesener, 1904, in Bot. Jahrb. Syst., 34, 75: 47; Rehder et Wilson, 1914, in Sargent, Pl. Wilson., 2: 121; Chung, 1924, in Mem. Sci. Soc. China, 1 [Cat. Trees Shrubs China]: 122. — Type: “China, prope Amoy, in sepibus. IX 1857, № 1460, herb. H.F. Hance” (BM?).

= *Z. bungei* var. *imperfuratum* Franch., 1884, in Mém. Soc. Sci. Nat. Math. Cherbourg, 24: 205. ≡ *Z. simulans* var. *imperfuratum* (Franch.) Reeder et Cheo, 1951, in J. Arnold Arbor., 32: 70. — Type: “China, Prov. Shan-tung. R.P. Guillon” (P?).

= *Z. setosum* Hemsl. ex F.B. Forbes et Hemsl., 1886, in J. Linn. Soc., Bot., 23: 107; Rehder et Wilson, 1914, in Sargent, Pl. Wilson., 2: 124; Chung, 1924, in Mem. Sci. Soc. China, 1 [Cat. Trees Shrubs China]: 123; Rehder, 1926, in J. Arnold Arbor., 7: 183. — Holotype: China, Kiangsi, “Kewkiang. 1873, Shearer” (K000717795 [digital image!]).

= *Z. fraxinoides* Hemsl., 1895, in Ann. Bot. (Oxford), 9: 148; Pritzell, 1900, in Bot. Jahrb. Syst., 29: 421; Chung, 1924, in Mem. Sci. Soc. China, 1 [Cat. Trees Shrubs China]: 123. — Lectotype (Illarionova, designated here): “China, Fang, province of Hupeh. № 6903, A. Henry” (K – K000717789 [digital image!]), isolectotypes: LE01015660!, P05240156 [digital image!]).

= *Z. usitatum* Diels, 1912, in Notes Roy. Bot. Gard. Edinburgh, 5: 280. — Holotype: “China, on the eastern flank of the Lichiang Range, lat. 27°12' N, alt. 9–11000 ft. V 1906, № 2103, G. Forrest” (K000717792 [digital image!]).

= *Z. acanthophyllum* Hayata, 1916, Icon. Pl. Formosan., 6: 7. — Type: “Formosa, Takao. III 1910, S. Sasaki” (TI?).

– *Z. bungei* Planch., 1853, in Ann. Sci. Nat., Bot., 3 sér., 19: 82, nom. nudum.

– *Z. nitidum* auct. non (Roxb.) DC.: Bunge, 1835, in Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans, 2: 87 (Enum. Pl. Chin. Bor. 13); Maxim., 1859, in Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans, 9: 470.

– *Z. piperitum* auct. non DC.: Daniell et Bennett, 1862, in Ann. Mag. Nat. Hist., sér. 3, 10: 195.

Mountains: rocky slopes, forest edges in mountain river valleys. Often cultivated.

III A. Qinghai: Nanshan, Amdo.

General distribution: China (Dunbei, North, North-West, Centr., East, South-West, Taiwan), Korea.

Under the priority name *Z. simulans* Hance, I aggregate several previously described forms, distinguished on the basis of small differences in the degree of pubescence of branches and leaves, in the arrange-

ment of prickles on the leaves, in the number and size of punctate glands on the surface of the leaflets, etc. A wide range of a continuous series of variability of these characters, which is often characteristic of polymorphic tree species, does not allow to distinguish taxa of the rank higher than varieties. A.R. Franchet (1884) and J.R. Reeder & S.-Y. Cheo (1951) differentiated two varieties based on the most stable character – the arrangement of punctate glands on the leaves. According to these authors, *Z. simulans* var. *simulans* is characterized by the leaflets conspicuously dotted and their margins without glands. The upper surfaces of the leaflets are sometimes scabrous-hispid. *Z. simulans* var. *imperfuratum* has the surfaces of the leaflets devoid (or nearly devoid) of dots, but the margins of the leaflets in the sinuses of the crenation bear prominent glands. My study has revealed that *Z. simulans* var. *simulans* has the leaflets with rather small marginal and numerous dark and light glands of various sizes, scattered over the entire surface; sometimes prickles are present on the upper surface of the leaves. The leaflets of *Z. simulans* var. *imperfuratum* have larger marginal glands and a few large transparent glands scattered over the entire surface; among the latter, few dark glands, almost imperceptible, are also always present. The prickles on the upper side of the leaves are always absent.

J.E. Planchon (1853) was the first to establish the independence of this species. *Z. bungei* Planch. was based on collection of A. Bunge from the vicinity of Beijing. Since Planchon did not provide a description, but only referred to the Bunge's work, where the description was also missing, the name *Z. bungei* is invalidly published. Later, two different forms of this species were described by H.F. Hance (1866) as *Z. simulans* and *Z. bungei* Hance, moreover, the description of the latter did not include a reference to the Bunge's specimens. A. Rehder (1926), who saw the collections C.F.M. de Grijns and Hance, on which the names *Z. simulans* and *Z. bungei* were based, suggested that the description of *Z. bungei* is more suitable for *Z. alatum* Roxb. than for *Z. bungei* in modern sense. When combining the species described by Hance, Rehder chose the name *Z. simulans*. According to Code (Art. 53.5) (Turland et al., 2018) this choice should be followed.

The type material of *Z. simulans* is represented by several specimens with the label of H.F. Hance's herbarium (Herb. H.F. Hance, N 10698), kept in different Herbaria of the world. None of these herbarium sheets are annotated by the author as a holotype, therefore, they all are syntypes and the choice of the lectotype is required. The specimen BM000798128, which fully corresponds to the description in the protologue, as well as to the modern understanding of the species, is designated here as the lectotype.

A single gathering was cited in the original publication of *Z. fraxinoides* Hemsl., but the existence of three duplicates of the same gathering at K, P and LE calls for lectotypification, which is done here.

The name *Z. bungeanum*, accepted in “Flora of China” and other publications (Wu, 1999; Zhang et al., 2008 and others), to which *Z. bungei* is often referred to as a synonym, is illegitimate, because of the type material of *Z. simulans* Hance cited in its protologue. According to Code (Art. 7.5) the name *Z. bungeanum* must be typified by the type of the name *Z. simulans* and, thus, becomes the nomenclatural synonym of the latter.

## 2. *Haplophyllum* Juss.

1825, Mém. Mus. Hist. Natur., 12: 464 (“*Aplophyllum*”), orth. cons.

1. Stem corymbose-branched; inflorescence broad, lax, many-flowered corymb; leaves 2.5–6.5 cm long, 0.8–2.5 cm wide. Petals 2.5–5 (6) mm long, 0.5–2 mm wide. Capsules indehiscent, 5-locular, densely tubercled .....1. *H. acutifolium*

+ Stem simple; inflorescence rather compact, of few-(to 12-)flowered cymes; leaves 0.4–2.5 cm long, 0.1–0.7 cm wide. Petals 6–8 mm long, 2.7–9 mm wide. Capsules dehiscent, (2)3–4(5)-locular, slightly tubercled .....2. *H. dauricum*

1. *H. acutifolium* (DC.) G. Don, 1831, Gen. Hist., 1: 780; Spach, 1849, in Ann. Sci. Nat., Bot., 3, 11: 187; Boiss., 1867, Fl. Orient., 1: 942; Vved., 1949, in Fl. URSS, 14: 226; Townsend, 1986, in Hooker’s Icon. Pl., 40, 1–3: 41; Zhang et Hartley, 2008, in Fl. China, 11: 74. ≡ *Ruta acutifolia* DC., 1824, Prodr., 1: 711. – Lectotype (Townsend, 1986: 41): “Iran, route de Kermancha a Amadan. 1822, Olivier” (G00219059 [digital image!]).

= *H. perforatum* Kar. et Kir., 1841, in Bull. Soc. Nat. Moscou, 14, 3: 397. – Lectotype (first-step, Gubanov et al., 1998: 37; second-step, Illarionova, designated here): Kazakhstan, “in arenosis ad radicem montium Tarbagatai ad fl. Uldschar et rivulum Burgan; in sterilibus lapidosus montium Kartschum. 1840, № 169, Karelin, Kiriloff” (LE – LE01071431!, isolecotypes: LE01071424–01071430!, LE01071432!, LE00052536!, LE00052537!, K000700960 [digital image!], K000700961 [digital image!], BR0000005783267 [digital image!], MW0593441 [digital image!]).

= *H. sieversii* Fisch. et C.A. Mey., 1841, Enum. Pl. Nov. Schrenk., 1: 89; Spach, 1849, in Ann. Sci. Nat., Bot., 3, 11: 187; Maxim., 1889, Enum. Pl. Mongol., 1: 134; O. et B. Fedtsch., 1909, Consp. Fl. Turkest., 2: 158; Orazova, 1963, in Fl. Kazakh., 6: 58. ≡ *Ruta sieversii* (Fisch. et C.A. Mey.) B. Fedtsch., 1915, Rastit. Turkestan.: 555; Krylov, 1935, Fl. Zapad. Sib., 8: 1853. – Lectotype (first-step, Botschantzev, 1961: 13–14; second-step, Illarionova, designated here): Ka-

zakhstan, “ad fl. Uldschar. [3 VII 1793] Sievers, Herb. Fischer” (LE – LE00052542!, isolecotype: LE00052543!).

= *H. flexuosum* Boiss., 1853, Diagn. Pl. Orient., ser. 2, 1: 118; id., 1867, Fl. Orient., 1: 942. ≡ *R. flexuosa* (Boiss.) Engl., 1896, in Nat. Pflanzenfam., ed. 1, 3(4): 131. – Type: “Affghanistan prope Mookloor. Griffith, 807 (Journal) [= 1202 (Cat.)]” (syntypes: G00150363 [digital image!], K000717042 [digital image!], K000717044 [digital image!]).

= *H. perforatum* (M. Bieb.) Vved., 1949, in Fl. URSS, 14: 226, sine auct. comb., non Kar. et Kir. (1841); Huang, 1957, in Acta Phytotax. Sin., 6, 1: 138; Nikitina, 1957, in Fl. Kirgiz., 7: 503; Vved., 1959, Fl. Uzbek., 4: 74; anon., 2014, in Fl. Xinjiang., Simpl. ed.: 335. ≡ *Ruta perforata* M. Bieb., 1800, Beschr. Länd. Casp.: 172. – Lectotype (Illarionova, designated here): “ex Sibiria. Com. Stephan, cui Sievers” (LE – LE01071421!, isolecotypes: “Sib. Siev[ers], Herbarium Stephanianum” (LE01071422! LE01071423!)).

– *H. suaveolens* auct. non DC.: Ledeb., 1842, Fl. Ross., 1: 491, p. p.

Steppes, dry gravelly or stony slopes, scree, dry river valleys, on sands, limestones, loess, on clayey soil; rare in crops; 100–3000 m.

II A. Junggar: Tarbag., Jung. Alat., Tien Shan, Zaisan, Dzharok.

General distribution: Fore Asia, Mid. Asia (mountains), Kazakh. (Fore Balkh., Tien Shan, Jung.-Tarb.), Centr. Tien Shan, East Pam.

The nomenclature of this species was clarified by I.A. Linczevski (1968).

The name *H. perforatum* Kar. et Kir. was based on the specimens collected by G.S. Karelin and I.P. Kirilov in Kazakhstan at the southern foot of the Tarbagatai mountains, on the Udzhar River and its tributary, the Burgan River, as well as in the Kurchum mountains. The original material of *H. perforatum* Kar. et Kir. consists of many specimens kept in different Herbaria (LE, MW, K, BR, TK and, possibly, others). All the specimens have the same printed labels with all 3 localities from the protologue mentioned, and all have the number 169. Because the authors did not indicate one of them as the type, they are syntypes. I.A. Gubanov et al. (1998) cited the same label and pointed that the lectotype was at LE, but they mistakenly attributed the choice of the lectotype to Linczevski (1968). Gubanov et al. (1998) did not specify which of 11 specimens kept in LE was indicated as the lectotype, therefore it should be considered as a first-step lectotypification (Turland et al., 2018: Art. 9.17). Specimen LE01071431 which corresponds well with the description in the protologue, is designated here as the second-step lectotype of *H. perforatum* Kar. et Kir. ([http://herbariumle.ru/?t=occ&id=45624&rid=image\\_0085672](http://herbariumle.ru/?t=occ&id=45624&rid=image_0085672)).

Botschantzev (1961), and later, Linczevski (1968), found out that names *Ruta perforata* and *Haplophyllum sieversii* were based on the plants collected by Sievers in the same place “river Urdzhar” during his journey along the Tarbagatai ridge in 1793. These authors suggested that F.M. Bieberstein and F. Fischer worked with original materials from the same gathering, but the specimens seen by Bieberstein have the labels with erroneous location “Sibiria”. Since different herbarium specimens were used for describing the taxa mentioned above, the lectotypes for each of them are designated here. Botschantzev (1961) chose the plants from Tarbagatai kept in LE as the type of *H. sieversii*, but without specifying a herbarium sheet. According to the Art. 9.17 of the *Code* (Turland et al., 2018), Botschantzev’s typification must be accepted as the first-step lectotypification. The specimen LE00052542 is designated now as the second-step lectotype of *H. sieversii* ([http://herbariumle.ru/?t=occ&id=45618&rid=image\\_0085663](http://herbariumle.ru/?t=occ&id=45618&rid=image_0085663)). The specimen LE01071421 with flowers and immature fruits is designated here as the lectotype of *Ruta perforata* ([http://herbariumle.ru/?t=occ&id=45621&rid=image\\_0085667](http://herbariumle.ru/?t=occ&id=45621&rid=image_0085667)).

2. *H. dauricum* (L.) G. Don, 1831, Gen. Hist., 1: 781 (“*dahuricum*”); Ledeb., 1842, Fl. Ross., 1: 492 (“*davuricum*”); Turcz., 1842, in Bull. Soc. Nat. Moscou, 15, 3: 636; Spach, 1849, in Ann. Sci. Nat., Bot., 3, 11: 190; Maxim., 1889, Enum. Pl. Mongol., 1: 134; Kom., 1903, in Trudy Imp. S.-Peterburgsk. Bot. Sada, 22, 1: 673; Palibin, 1905, in Trudy Troitskosavsk.-Kiakht. otdelen. Russk. Geogr. Obshchestva, 7, 3: 49; Vved., 1949, in Fl. URSS, 14: 205; Huang, 1957, in Acta Phytotax. Sin., 6, 1: 137; Grubov, 1982, Key Vasc. Pl. Mongol.: 177; Gubanov et Ganbold, 1983, in Fl. Vostochnogo Khangaya: 141; Townsend, 1986, in Hooker’s Icon. Pl., 40, 1–3: 35; Gubanov, 1996, Consp. Fl. Outer Mongol.: 75; Peshkova, 1996, in Fl. Sib., 10: 29; Zhang et Hartley, 2008, in Fl. China, 11: 73; Urgamal et al., 2014, Consp. Vasc. Pl. Mongol.: 170. ≡ *Peganum dauricum* L., 1753, Sp. Pl.: 445. ≡ *Ruta daurica* (L.) DC., 1824, Prodr., 1: 712; Franch., 1884, Pl. David., 1: 65; Forbes et Hemsl., 1886, Index Fl. Sin., 1: 102; Krylov, 1935, Fl. Zapad. Sib., 8: 1853. – Neotype (Townsend, 1986: 35): [Icon] J.G. Gmelin, 1769: “Flora Sibirica” Vol. 4, tab. 68, fig. 1.

= *H. lineare* (DC.) G. Don, 1831, Gen. Hist., 1: 780; Ledeb., 1842, Fl. Ross., 1: 492. ≡ *Ruta linearis* DC., 1824, Prodr., 1: 712. – Holotype: “Sib[iria]” (G00219064 [digital image!]).

= *H. dauricum* var. *uniflorum* Maxim., 1889, Enum. pl. Mongol., 1: 134. – Holotype: “Mongolia occidentalis, mont. Alaschan medii, decliv. occid., deserta ad pedem lapidosa. 25 VI 1873, № 152, N. Przewalski” (LE0101562!).

= *H. tragacanthoides* Diels, 1926, in Notizbl. Bot. Gart. Berlin-Dahlem, 9, 89: 1028; Ching, 1941, in Bull. Fan Mem. Inst. Biol. Bot., 10, 5: 261; Walker, 1941, in Contribs. U.S. Nat. Herb., 28, 4: 641; Huang, 1957, in Acta Phytotax. Sin., 6, 1: 138; Zhang et Hartley, 2008, in Fl. China, 11: 74. – Lectotype (Illarionova, designated here): “China, prov. Kansu, Ho Lan Shan mountains; alt. 1375 to 2400 m., dry cliff. 10–25 V 1923, № 107, R. C. Ching” (K – K000700936 [digital image!], isotypes: BM000946589 [digital image!], US00101544 [digital image!], A00044096 [digital image!], S08-7829 [digital image!], LE01015628!).

Steppe, rubble and stony slopes of mountains, sometimes dry banks of rivers and lakes; from foothills up to 2400 m.

I A. Mongolia: Khobd., Centr. Khalkha, East. Mong., Val. Lakes, Gobi Alt., East. Gobi, Alash. Gobi, Ordos.

General distribution: West Sib. (Altai), East Sib., North Mong., China (Dunbei, North.).

On the territory of Inner Mongolia, among typical specimens of *H. dauricum*, more compact plants with shorter stiffer stems and single flowers can be found. Such specimens are treated as *H. tragacanthoides*, which is currently adopted in “Flora of China” (Zhang et al., 2008). I believe that the compactness and rigidity of the plant are related to the environmental conditions of its habitat. Single flowers also cannot serve as a diagnostic character, since some stems have both the apical flower and reduced side flowers. The number of carpels in gynoecium of *H. dauricum* varies from 2 to 5, usually 3–4, which in the same way cannot serve as a basis for classifying plants with 4–5 carpels as *H. tragacanthoides*, as indicated in “Flora of China” (Zhang et al., 2008). I agree with C.C. Townsend (1986) who suggested that grazing or burning may be the reason for the occurrence of reduced, condensed forms, such as “*H. tragacanthoides*”.

In the original description of *H. tragacanthoides*, the author (Diels, 1926) does not indicate the storage location of the type material. Since F.L.E. Diels worked at the Herbarium Berlin-Dahlem, most likely the original specimen was destroyed during World War II. In this way, the lectotype should be chosen from the available type material (Turland et al., 2018: Art. 9.3). The specimen K000700936 matches perfectly with the protologue and also carries a drawing of the details of the flower structure. This specimen is designated here as the lectotype of *H. tragacanthoides*.

The original herbarium specimens, on which C. Linnaeus could have based his description of *H. dauricum*, have not been found. Townsend (1986) chose the illustration in “Flora Sibirica” (Gmelin, 1769) as the neotype (Townsend, 1986: 35–37, mistakenly as “isolectotype”). In the absence of any orig-



inal material, according to the *Code* (Turland et al., 2018: Art. 9.10), this choice should be followed.

### 3. *Dictamnus* L.

1753, Sp. Pl., 1: 383; id., 1754, Gen. Pl., ed. 5: 180.

Based on the morphological structure of the vegetative and generative parts of the plants (pubescence, size and shape of leaves, petals and capsules) throughout a vast area from southern and central Europe through the Caucasus, Central Asia and the Himalayas to the Far East, a number of *Dictamnus* species were distinguished (Vvedensky, 1949; Kovalevskaya, 1983; Linczevski, 1996; Peshkova, 1996; Zhang et al., 2008; Nikiforova, 2012; Mayorov, 2014 and others). European botanists aggregate all *Dictamnus* taxa in one polymorphic species *D. albus* L., considering the variability of characters insignificant and uncorrelated with geographical distribution (Townsend, 1968; Mabberley, 2017; Compton, Akeroyd, 2019). However, on the territory of the Central Asian floristic region, two species can be distinguished, morphologically and geographically different.

1. Leaf rachis slightly narrow-winged; ovary sparsely hairy, style glabrous; beak on the capsule 7–12 mm long ..... **1. *D. angustifolius***

+ Leaf rachis distinctly winged; ovary densely hairy, style hairy; beak on the capsule 4–7 mm long ..... **2. *D. dasycarpus***

1. *D. angustifolius* G. Don ex Sweet, 1831, Brit. Fl. Gard., 2 ser., 1: tab. 93; G. Don, 1831, Gen. Hist., 1: 782; Vved., 1949, in Fl. URSS, 14: 230; Nikitina, 1957, in Fl. Kirgiz., 7: 504; Vved., 1959, Fl. Uzbek., 4: 75; Orazova, 1963, in Fl. Kazakh., 6: 60; Peshkova, 1996, in Fl. Sib., 10: 30; anon., 2014, in Fl. Xinjiang., Simpl. ed.: 335. ≡ *D. albus* L. var. *angustifolius* (G. Don ex Sweet) Parl., 1872, Fl. Ital., 5, 2: 364. – Lectotype (Compton, Akeroyd, 2019): [Icon] Sweet, Brit. Fl. Gard., ser. 2, vol. 1: t. 93 (1837).

= *D. albus* L. subsp. *turkestanicus* N.A. Winter, 1924, in Bot. Mater. Gerb. Glavn. Bot. Sada R.S.F.S.R., 5: 158; Krylov, 1935, Fl. Zapad. Sib., 8: 1854. – Lectotype (Illarionova, designated here): Kazakhstan, “Zailiyskiy Alatau: Semirechensk region, Vernyj [Almaty], Butakovskoe gorge. 2 VI 1909, V. Lipsky, No. 1231” (LE – LE00052461!, isolectotypes: LE00052454!–LE00052460!, LE00052462!, LE00052463!).

– *D. albus* auct. non L.: Forbes et Hemsl., 1886, Index Fl. Sin., 1: 103, p. p.; Maxim., 1889, Enum. Pl. Mongol., 1: 135, p. p.; id., 1889, in Acta Horti Petrop., 11: 92, p. p.; O. et B. Fedtsch. 1909, Consp. Fl. Turkest., 2: 159.

– *D. fraxinella* auct. non Pers.: Ledeb., 1842, Fl. Ross., 1: 495, p. p.; Boiss., 1867, Fl. Orient., 1: 920, p. p.

Meadows, valleys of rivers and streams, bushes, rocky and steppe slopes of the lower and middle belts of mountains.

II A. Junggar: Cis-Alt., Jung. Alat., Tien Shan.

General distribution: Mid. Asia (Tien Shan, Pamir-Alay), Kazakh. (Fore Balkh., Tien Shan, Jung.-Tarb.), Centr. Tien Shan, West Sib. (Altay), China (Altay).

*D. angustifolius* was described based on the plants cultivated in the Botanical Garden in Chelsea from seeds of Siberian origin, sent by F.B. Fischer from Botanical Garden in Gorenki. Due to the absence of any original herbarium material, the image given in the description was chosen as the lectotype (Compton, Akeroyd, 2019).

Since the characters of the leaf structure and flower details have diagnostic value, the specimen LE00052461 on which they are well visible and correspond to the description, is designated here as the lectotype of *D. albus* subsp. *turkestanicus* ([http://herbariumle.ru/?t=occ&id=45617&rid=image\\_0085662](http://herbariumle.ru/?t=occ&id=45617&rid=image_0085662)).

The collection date on the labels of the lectotype and isolectotypes is indicated as 2 VI 1909. The other collection date in the protologue (21 VI 1909) is an error or misprint.

2. *D. dasycarpus* Turcz., 1842, in Bull. Soc. Nat. Moscou, 15: 637; Vved., 1949, in Fl. URSS, 14: 229; Huang, 1957, in Acta Phytotax. Sin., 6, 1: 141; Peshkova, 1979, Fl. Centr. Sib., 2: 646; Grubov, 1982, Key Vasc. Pl. Mongol.: 177; Gubanov, 1996, Consp. Fl. Outer Mongol.: 75; Peshkova, 1996, in Fl. Sib., 10: 30; Wu, 1999, in Fl. Qinghai, 2: 296; Zhang et Hartley, 2008, in Fl. China, 11: 75; anon., 2014, in Fl. Xinjiang., Simpl. ed.: 335. ≡ *D. fraxinella* Pers. var. *dasycarpus* (Turcz.) Trautv., 1860, in Bull. Soc. Nat. Moscou, 33: 472. ≡ *D. albus* L. subsp. *dasycarpus* (Turcz.) N.A. Winter, 1924, in Bot. Mater. Gerb. Glavn. Bot. Sada R.S.F.S.R., 5: 159; Kitag., 1939, Lin. Fl. Mansh.: 299. ≡ *D. albus* L. var. *dasycarpus* (Turcz.) Liou et Y.H. Chang, 1977, Fl. Pl. Herb. Chin. Bor.- Or., 6: 24. – Lectotype (Illarionova, designated here): Russia, “Dahuria, ad fl. Argun, 1831, Turcz[aninov]” (LE – LE01057149!, isolectotypes: LE01057153!–LE01057155!).

– *D. albus* auct. non L.: Forbes et Hemsl., 1886, Index Fl. Sin., 1: 103, p. p.; Maxim., 1889, Enum. Pl. Mongol., 1: 135, p. p.; id., 1889, in Trudy Imp. S.-Peterburgsk. Bot. Sada, 11: 92, p. p.; Kom., 1903, in Trudy Imp. S.-Peterburgsk. Bot. Sada, 22, 1: 670; Urgamal et al., 2014, Consp. Vasc. Pl. Mongol.: 170.

– *D. fraxinella* auct. non Pers.: Ledeb., 1842, Fl. Ross., 1: 495, p. p.; Maxim., 1859, in Mem. Div. Sav. Ac. Sci. St.-Petersb., 9: 72; Boiss., 1867, Fl. Orient., 1: 920, p. p.; Walker, 1941, in Contribs. Un. S. Nat. Herb., 28, 4: 641.

Open steppe slopes of mountains, steppes and meadow-steppe river valleys, bushes.

I A. Mongolia: Cis-Hing., East. Mong.

General distribution: East Sib., Far East, China (Dunbei, North., North-West, East), Korea.

*D. dasycarpus* Turcz. was described from East Siberia (“in pratis Dahuriae ad fluvia Schilka et Argun, v. gr. prope pagum Biankina etc.”). Four duplicates of the type collection are housed at LE, and the specimen LE01057149 is designated here as the lectotype (<http://en.herbariumle.ru/?t=occ&id=82598>).

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## RUTACEAE ЦЕНТРАЛЬНОЙ АЗИИ

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Статья является результатом критической обработки семейства Rutaceae для издания “Растения Центральной Азии”. Работа основана на изучении гербарных коллекций, хранящихся в Гербарии Ботанического института им. Комарова (ЛЕ), а также на обзоре флористической и таксономической литературы по Центральноазиатскому флористическому региону Монголии и Китая и прилегающим регионам. Даны ключи для определения родов и видов. По каждому виду даны ссылки на номенклатуру, информация о местообитании и географическом распространении. Обсуждаются таксономия и номенклатура ряда таксонов. Обозначены лектотипы *Zanthoxylum simulans* Hance, *Z. fraxinoides* Hemsl., *Haplophyllum perforatum* Kar. et Kir., *H. sieversii* Fisch. et C. A. Mey., *H. tragacanthoides* Diels, *Ruta perforata* M. Bieb. (= *Haplophyllum perforatum* (M. Bieb.) Vved.), *Dictamnus albus* L. subsp. *turkestanicus* N.A. Winter и *D. dasycarpus* Turcz.

*Ключевые слова:* таксономия, номенклатура, типификация, лектотип, Китай, Монголия, рутовые, Растения Центральной Азии

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