

Two *Euphorbia* (*Euphorbiaceae*) species new for the flora of China (Xinjiang and Inner Mongolia)

Два вида *Euphorbia* (*Euphorbiaceae*), новые для флоры Китая (Синьцзянь и Внутренняя Монголия)

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Abstract. *Euphorbia caesia* Kar. et Kir. and *E. cyrtophylla* (Prokh.) Prokh. are reported for the first time in China; *E. caesia* occurs in several localities in the northern Xinjiang and eastern Nei Mongol, and *E. cyrtophylla* in a single locality near Sailimu (Sayram) Lake (northern Xinjiang). A revised synonymy with typification, description and detailed distribution data are provided for each species.

Keywords: *Euphorbia*, China, Xinjiang, Inner Mongolia.

Аннотация. *Euphorbia caesia* Kar. et Kir. и *E. cyrtophylla* (Prokh.) Prokh. впервые указываются для флоры Китая. *E. caesia* обнаружен в нескольких местонахождениях на севере Синьцзяна и востоке Внутренней Монголии, *E. cyrtophylla* — в единственном местонахождении вблизи озера Сайлиму (Сайрам) на севере Синьцзяна. Для каждого вида приводятся уточненная синонимика, типификация, морфологическое описание и детальные сведения о распространении.

Ключевые слова: *Euphorbia*, молочай, Китай, Синьцзян, Внутренняя Монголия.

Euphorbia L. (*Euphorbiaceae*) is one of largest genera of flowering plants and contains ca. 2000 species (Horn et al., 2012). J. S. Ma and M. G. Gilbert (2008) recorded 78 *Euphorbia* species for the Flora of China, and K. Shen (2011) mentioned 39 species of this genus for the Flora of Xinjiang. However, more extensive studies of herbarium holdings provide more data about species distribution. I have already reported *E. edgeworthii* Boiss. as new for Xinjiang, China (Geltman, 2012). The aim of this paper is to report two more species new for those areas.

Material and methods

Holdings of the following Chinese Herbaria were taken into account: Xinjiang Agricultural University (XJA), Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences (XJBI), Xinjiang University (XJU) and the Shihezi University (SHI). Also materials from the Herbarium of the Komarov Botanical Institute of the Russian Academy of Sciences (LE) and the Herbarium of the Tomsk State University (TK) were used, mainly for description of general distribution and typification. Conservation status categories are provided according the IUCN system (IUCN, 2012).

Results and taxonomic treatments

Euphorbia caesia

E. caesia Kar. et Kir. is a Eurasian steppe species occurring in Russia from the Volga River to Transbaikalia, in Northern and Eastern Kazakhstan, and a significant part of Mongolia. Recently it was unexpectedly found in Austria (Geltman, Till, 2009). This species was never recorded from China. P. N. Krylov (1935) and Ya. I. Prokhanov (1949) treated *E. caesia* as a synonym of *E. subcordata* Ledeb., but, in my opinion, it merits the specific rank (Geltman, 1996).

In the course of studies of XJA, XJU and XJBI Herbaria, it became clear that *E. caesia* also occurs in China, in the northern Xinjiang, where it is mostly restricted to Altay and Tarbagatay prefectures; one locality is found in Changji Hui Autonomous Prefecture. After careful studies of the LE holdings, it was found that this species also occurs in Inner Mongolia (Nei Mongol) Autonomous Region (Hulunbuir district).

E. caesia belongs to section *Esula* (Pers.) Dumort. In some ways it resembles the widely distributed *E. virgata* Waldst. et Kit., but clearly differs by its smaller size (usually up to 30 cm, rarely to 50 cm; *E. virgata* is

30–70 cm) and the greyish raylet-leaves during flowering, almost the same colour as stem leaves. There are also evident differences in habitat preferences: *E. caesia* is usually a member of undisturbed steppe communities, whereas *E. virgata* prefers roadsides, agricultural and abandoned lands, human settlements, etc.

Euphorbia caesia Kar. et Kir. 1841, Bull. Soc. Imp. Naturalistes Moscou, [14], 4: 743. $\equiv$ *Tithymalus caesius* (Kar. et Kir.) Klotzsch et Garcke, 1860, Abh. Königl. Akad. Wiss. Berlin, 1859: 87. $\equiv$ *Galarhoeus caesius* (Kar. et Kir.) Hurus. 1954, Journ. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6: 249. — Lectotype (Gubanov et al., 1998): Kazakhstan, “In montosis deserti Soongoro-Kirghisici prope Arkat, a. 1840, Karelin et Kiriloff, № 442” (LE: LE01043400).

= *E. cyparissias* L. var. *glabriuscula* C. A. Mey. 1833, Fl. Altaic. 4: 180. — Type unknown.

= *E. cyparissias* L. var. *pubescens* C. A. Mey. 1833, Fl. Altaic. 4: 180. — Lectotype (Geltman, designated here): Kazakhstan, “prope Ustkamenogorsk, Ledebour, № 701” (LE: LE01043401!).

= *E. esula* L. var. *humilior* C. A. Mey. 1833, Fl. Altaic. 4: 182. — Lectotype (Geltman, designated here): Russia, “In rupestribus ad fl. Tscharysch, 15 VI [1826], Ledeb[our]” (LE: LE01043403!).

= *E. esula* L. var. *cyparissoides* Boiss. 1862, in DC., Prodr. 15, 2: 161. — Lectotype (Geltman, Till, 2009): Kazakhstan, “In montosis deserti Soongoro-Kirghisici prope Arkat, a. 1840, Karelin et Kiriloff, № 442” (LE: LE01043400!).

= *E. subcordata* Ledeb. f. *obtusifolia* Krylov, 1907, Fl. Alt. Tomsk. Gub. 5: 1195. — Lectotype (Gureyeva, Geltman, designated here): Kazakhstan, “Между дд. Красноярской и Новошуйбинской, степь, 31 V 1901, П. Крылов [Between villages Krasnoyarskaya and Novoshulbinskaya, steppe, 31 V 1901, P. Krylov]” (TK 001791!).

= *E. subcordata* Ledeb. var. *glabra* (Krylov) Krylov, 1935, Fl. Zap. Sibiri, 8: 1879. $\equiv$ *E. subcordata* a. *glabra* Krylov, 1907, Fl. Alt. Tomsk. Gub. 5: 1195. — Lectotype (Gureyeva, Geltman, designated here): Kazakhstan, “Алтай, с. Шемонаиха, на Мохнатой сопке, 26 IV 1901, П. Крылов [Altay, Shemonaikha village, on Mokhnataya Hill, 26 IV 1901, P. Krylov]” (TK 001787!).

Glabrous or pilose perennials with thin, horizontal or obliquely descent roots. Stems few or numerous, erect, 10–30(50) cm, scaly at the base, sometimes with a few axillary vegetative shoots. Stem leaves green or greyish, linear or oblong, 1–6 cm $\times$ 0.3–0.7 cm, base rounded or truncate, apex more or less acute or almost rounded. Terminal rays of synflorescence 5–10(15), ax-

illary 2–10, once or rarely twice dichotomous, 1.5–4(6) cm. Ray-leaves similar to upper stem leaves, raylet-leaves 2, broadly triangular, rhombic-ovoid or reniform, the same colour as stem leaves or slightly yellowish-green when flowering. Cyathia 1–2.5 mm long and 0.7–2.2 mm diam., with small, obtuse pubescent lobes, glands 4, semilunate, with or without short appendages. Capsule truncate-ovoid, trilobate, 3.5–4 $\times$ 3–4 mm, glabrous or finely rugose. Seeds ca. 2.5 $\times$ 1.5 mm, glabrous, caruncle discoid or conic.

Specimens studied. **XINJIANG-UYGUR AUTONOMOUS REGION.** **Altay Prefecture:** Fuyun County Suburb, desert, 900 m, 11 VI 1972, Zhenggao An, № A720469 (XJA); Qinghe County Suburb, desert, 900 m, 15 VI 1972, Cangyou Yang, № A720653 (XJA); Qinghe County, Xiaoqing River, river bank, 980 m, 11 VII 1972, Zhenggao An, № A720671 (XJA00062238); Qinghe County, Xiaoqing River, Mutougou, steppe, 1400 m, 13 VI 1972, Zhenggao An, № A720671 (XJA00062239); Altay City Suburb, dry montane slope, 10 V 1976, anon. № 0013 (XJBI00025158, XJBI00025175); Buerjin County, Kanas Nature Reserve, montane slope, 1700 m, 13 V 1992 [collector unclear], № 319 (XJU00031732B). **Tarbagatay Prefecture:** Tayeergaite Lake, river bank, 900 m, 6 VII 1972, Zhenyu Wang, № 368 (XJA00062249); Hebukesai Mongolian Autonomous County (formerly Hefeng County), Biesigaoerzha Swamp, 1500 m, 18 VI 1980 [Desert Investigation Team], № 80618-5 (XJA00062252); Wusu County, Qianjin Farm, mountain slope, 1820 m, 27 VI 1981 [Grassland Survey Team], № 038 (XJA00062254); Wusu City, Ganjiahu forest farm, gravels and sands, 252 m, 27 IV 1985, Xiaozhen Zhang, № 8 (XJU00031750B); Wusu City, Kuitun River North Shore, Ganjiahu Forest Farm North, 252 m, 27 IV 1985, Xiaozhen Zhang, № 630 (XJU00031747B); Wusu City, Kuitun River North Shore, Ganjiahu Forest Farm North, 252 m, 27 IV 1985, Xiaozhen Zhang, № 81 (XJU00031730B). **Changji Hui Autonomous Prefecture:** Manasi Country, Xiaobaiyanggou, Fanxiu Town, 1400 m, 9 VI 1972, anon., № 1064 (XJBI00075066). **NEI MONGOL AUTONOMOUS REGION.** **Hulunbuir District:** окрестности ж.-д. ст. Маньчжурия, равнина между станцией и еврейским кладбищем, 13 VI 1915, Е. Нечаева [vicinity of Manzhouli railway station, plain between the station and Jewish cemetery, 13 VI 1915, E. Nechaeva] (LE); Manzhouli railway station, Beishan mountain, abandoned land, 23 VI 1951, Li Shuhsin, Fuh Peuyun, Chang Yuiliang, № 811 (LE); Manzhouli railway station, Nanshan mountain, 24 VI 1951, Wang Chang et al., № 872 (LE); vicinity of Hailar, Nunmintun village, at the foot of sand slope, 10 VI 1951, Wang Chang, № 613 (LE); prope Dolon-nor, in arenosis, Lomonossov, 1870 (LE); Terra Ordos, in valle Hoanghe, 12 (24) V 1872, N. M. Przewalski (LE).

Distribution. Russia (European part: republics of Tatarstan and Bashkortostan, Ulyanovsk, Samara, Saratov, Volgograd, Orenburg regions; Siberia: republics of Altay and Khakassia, Altay, Krasnoyarsk (south) and Transbaicalia territories, Chelyabinsk, Kurgan,



Fig. *Euphorbia cyrtophylla* from the vicinity of Sailimu (Sayram) Lake (SHI).

Tyumen (south), Omsk, Tomsk, Kemerovo regions), Kazakhstan (Aktobe, Kostanay, North Kazakhstan, Ak-mola, Pavlodar, Karaganda, East Kazakhstan, Almaty regions), Mongolia (Uvs, Khovd, Govi-Altay, Töv, Dundgovi, Khentii, Sükhbaatar, Dornod, Ömnögov aimags), China (north Xinjiang and east Inner Mongolia), Austria (Niederösterreich).

In the course of preparation of this article it became clear that *E. caesia* is much more widely distributed in Mongolia than had been suggested before (compare with map in Geltman, Till, 2009).

Habitats: steppes, dry meadows, rocks, dry and sparse forests, sometimes abandoned agricultural lands.

Conservation status: LC.

Euphorbia cyrtophylla

In the course of studies of SHI Herbarium I paid attention to an unnamed specimen from the vicinity of Sailimu (Sayram) Lake sharply differing from other *Euphorbia* (Fig.) occurring in Xinjiang. After careful additional studies it became clear that this specimen belongs to *Euphorbia cyrtophylla* (Prokh). Prokh. previously known from Uzbekistan and Tajikistan where it is restricted mainly to Gissar and Zeravshan ranges (Prokhanov, 1930, 1933, 1949; Pazij, 1959; Kinzikaeva, Shibkova, 1981; Nasimova, 1983) and also from Afghanistan and Pakistan (Rechinger, Schiman-Czeika, 1964; Radcliffe-Smith, 1986).

The locality in China is quite distant from the main range of this species — about 1100 km northeast. So, it is quite probable that this species could be found in high mountain areas of Kyrgyzstan and Kazakhstan.

Euphorbia cyrtophylla belongs to the section *Esula*. From other species of this sections occurring in Central Asia and Xinjiang, it differs mainly by numerous axillary shoots as well as the narrow elliptic stem leaves. Prokhanov (1933: 192) mentioned that this plant resembles “very small pine-tree”.

There is no detailed information about habitat preferences of the species in China. It is quite probable that near Sailimu (Sayram) Lake it occurs on mountain slopes at an elevation of about 2100 m and higher. In Tajikistan, *E. cyrtophylla* occurs in high mountains at elevations of 2500–3600 m in sparse woodlands with *Juniperus semiglobosa* Regel, montane steppes, communities dominated by *Cousinia* Cass. and *Onobrychis* Mill. species, sometimes forms almost pure groups (Kinzikaeva, Shibkova, 1981); in Pakistan it was found in mountain slopes and by edges of cultivated fields at 1770–3000 m (Radcliffe-Smith, 1986).

Euphorbia cyrtophylla (Prokh.) Prokh. 1949, Fl. URSS, 14: 441. = *Tithymalus cyrtophyllus* Prokh. 1930,

Izv. Glavn. Bot. Sada SSSR, 29: 556. — Lectotype (Geltman, designated here): Uzbekistan, “Flora Zeravshanica, Mousarif, alt. 7000–9000 pd., 28 VI 1893, V. L. Komarov” (LE: LE01043402!).

Glabrous perennials with vertical rootstock. Stems numerous, erect (10)12–40 cm, with numerous long axillary vegetative shoots. Stem leaves sessile, 0.7–3 × 0.3–0.7 cm, narrowly ovoid or elliptic, sometimes almost linear, entire, base rounded, apex acute, with prominent midrib. Leaves on axillary shoots linear, 1–2 × 0.1–0.2 cm, often arcuate. Terminal rays of syn-florescence 5–15, axillary — 0–6, unbranched or rarely branching monochasically, 2–6 cm. Ray-leaves similar to upper stem leaves; raylet-leaves 2, transversely elliptic or broadly ovoid, 0.5–0.8 × 0.9–1.2 cm, yellow at flower time. Cyathia broadly campanulate, glands 4, semilunate, usually without appendages. Capsule truncate-ovoid, 3–4 × 4–5 mm, usually finely granulate, seeds oblong-ovoid, 2.5–3 × 1.6–2 mm, caruncle truncate-conic.

Specimen studied. Xinjiang, Bole county, Sailimu Lake [44.30°N, 81.10°E], 24 V 2007, Wen-Bing Xu, Yang Liu, № 98 (SHI).

Distribution. Uzbekistan (Quashqadaryo and Surxondaryo regions), Tajikistan (Sughd Region, northern part of the Region of Republican (Central Government) Subordination), China (Xinjiang, Bole county), Afghanistan (Nuristan), Pakistan (Khyber Pakhtunkhwa province, Chitral district).

Habitats: sparse montane woodlands and steppes, alpine carpets, edges of cultivated grounds, 1770–3600 m.

Conservation status: LC.

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