Arctium tomentosum (Asteraceae): A new report of a native genus in the flora of Mongolia

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ABSTRACT: *Arctium tomentosum* Mill. (Asteraceae), from Ulaanbaatar in the Khentei phytogeographical region of Mongolia, is recognized here as a new genus and species of the flora of Mongolia. *Arctium* differs from other genera of Asteraceae by the hooked apex of the involucre bracts. While *A. tomentosum* is most similar to *A. lappa*, it is easily distinguished by the glandular hairs of the corolla limb and the widened inner involucre bracts. Taxonomic notes, a description of the morphology, detailed photos, habitat information, the phenology and a distribution map of *A. tomentosum* are provided.

Keywords: *Arctium tomentosum*, flora of Mongolia, new record, vascular plants

To date, approximately 3,200 taxa belonging to 682 genera and 112 families of vascular plants have been recognized in Mongolia (Urgamal et al., 2014; Bazarragchaa et al., 2019; Shiga et al., 2020; Baasanmunkh et al., 2020, 2021a; Yano et al., 2021). The Asteraceae, with approximately 480 taxa belonging to 83 genera, are one of the biggest families in the country (Dariimaa 2014; Urgamal et al., 2014; Pyak et al., 2020). Furthermore, this family contains 21 endemic taxa (20% of total endemic taxa) in Mongolia (Baasanmunkh et al., 2021b). The genus *Arctium* L., however, has not been recorded in the Mongolian flora (Dariimaa, 2014; Urgamal et al., 2014).

Arctium L. is a genus of ca. 11 to 12 species. Its native range includes Macaronesia, Africa, temperate Europe, and peninsula Malaysia (Duistermaat, 1996; López-Vinyallonga et al., 2011; Plants of the World Online, 2021). The species of *Arctium* are biennials or perennials. The hooked apex of the involucre bracts is the most distinguishable characteristic that separates it from other genera of Asteraceae (Duistermaat, 1996). Among *Arctium*, *A. tomentosum* Mill. is native to temperate Eurasia

(Kaplan et al., 2019; Plants of the World Online, 2021). It has also been introduced to the British Isles, Spain, Norway, and North America (Duistermaat, 1996; Kaplan et al., 2010; Plants of the World Online, 2021). The native status, however, is questionable in the countries of central and northern Europe (Kaplan et al., 2010). While, *Arctium lappa* L., the most similar species to *A. tomentosum*, is also distributed in temperate Eurasia (Duistermaat, 1996; Plants of the World Online, 2021) and introduced in Japan and South Korea (Plants of the World Online, 2021). During our field surveys, we found *A. tomentosum* from two locations in Mongolia.

Materials and Methods

The field surveys were conducted in the Khentei region of Mongolia in 2021. Detailed photographs were taken during the field surveys by C. Javzandolgor. Herbarium specimens were deposited in Botanic Garden and Research Institute, Mongolian Academy of Sciences (UBA) and Department of Biology,

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Fig. 1. Photographs of *Arctium tomentosum* in Mongolia. **A.** Habit. **B.** Synflorescence. **C.** Involucral bract. **D.** Basal leaves. **E.** Herbarium specimens. **F.** flowers (front). **G.** Flower. **H.** Leaf (adaxial surface). **I.** Leaf (abaxial surface). **J.** Middle involucral bract (dorsal view). **K.** Middle involucral bract (lateral view). **L.** Inner involucral bract (dorsal view). **M.** Corolla. **N.** Anther. **O.** Apical part of style. **P.** Achene.

National University of Mongolia (UBU) (Thiers, 2020). The grid distribution map was created in ArcGis, using the same approach as Baasanmunkh et al. (2021a).

Results and Discussion

During our field surveys, we found *Arctium tomentosum* Mill., a new genus to the flora of Mongolia at two locations in Mongolia. *Arctium tomentosum* is most similar to *A. lappa* but according to the taxonomic key of Duistermaat (1996), it is easily distinguished by the glandular hairs of the corolla limb and widened inner involucre bracts. However, recent studies have suggested that the mitochondrial and chloroplast genome sequences in both species are almost similar (Xing et al., 2019; Zhang et al., 2020). In Mongolia, *A. tomentosum* occurs in forest fringes, field margins, fallow fields, dump sites and in towns and villages. Both species are used as medicinal plants in China (Xing et al., 2019), but the current source of medicinal or food is lacking due to not being recorded in Mongolia. We provide a taxonomic description below based on our fresh collections, detailed photographs (Fig. 1), and a distribution map (Fig. 2).

Taxonomic Treatment

Arctium tomentosum Mill., Gard. Dict. ed 8, no. 3, 1768 (Figs. 1, 2).—Neotype: According to Duistermaat (1996) and

López-Vinyallonga et al. (2011). Herb. *Linnaeus* 964.1 (LINN; Isoneotypes: BM, photo!); *Lappa tomentosa* (Mill.) Lam., Fl. Franç. 2: 37, 1779.

Herbs, biennial, stem erect, branched, 130–160 cm tall, glabrous. Leaves abaxially grayish-white and densely felted, adaxially green and glabrous; petioles 8–12 cm long. Basal leaves: blade heart-shaped, 30–35 × 25–30 cm, margin sparsely denticulate, apex obtuse. Cauline leaves similar to basal leaves. Synflorescence corymbose, with many capitula. Capitula solitary, with more than 40 flowers, arachnoid hairy. Involucral bracts in 10–14 rows, herbaceous, distally often tinged red. Outer phyllaries subulate, triangular-subulate or lanceolate, middle phyllaries linear-triangular all with a hooked apex; inner phyllaries obovate to linear-obovate, apex truncate, acuminate, straight or slightly curved. Corolla 8–12 mm long, white, (wine) red, or (pale) reddish-purple, tube 4–6 mm long. Stamens: filaments 2.4–4 mm long, verrucate, anthers 3.8–5.4 × 0.3–0.5 mm, (dark) blue (or purple). Styler apex 2.5–3.9 mm long, pink. Achenes 5–8 mm long, oblongoid, pale brown variegated with dark brown, multistriate. Pappus bristles pale brown, ca 4–6 mm.

Flowering and fruiting: June to September.

Distribution: Temperate Eurasia (Duistermaat, 1996; Plants of the World Online, 2021), Mongolia (Khentei region), as well as introduced in British Isles, Spain, Norway, and North America (Duistermaat, 1996).

Fig. 2. Distribution map of *Arctium tomentosum* in the Khentei region of Mongolia.

Specimens examined: MONGOLIA. Khentei region: Ulaanbaatar, National Amusement Park, 31 Jul 2021, 47°91'03.7"N, 106°92'01.8"E; 1,289 m a.s.l., *C. Javzandolgor* 2021073101 (UBA). Ulaanbaatar, Sukhbaatar district, 47°97'49.3"N, 106°92'80.21"E; 1,289 m a.s.l., 5 Aug 2021, *C. Javzandolgor* 2021080502 (UBA).

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Conflicts of Interest

The authors declare that there are no conflicts of interest.

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