MUSINEON GLAUCESCENS (APIACEAE), A NEW SPECIES FROM CENTRAL MONTANA, U.S.A.

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ABSTRACT

Musineon glaucesens is described as a new species from two populations in the Big Belt Mountains of Montana, U.S.A. It appears to be most closely allied to the small genus *Musineon* which is endemic to western North America. It occurs just outside the range of *M. vaginatum* but differs from that species by its larger fruits, more widely lobed and glaucous leaves, and talus-slope habitat.

RESUMEN

Musineon glaucesens se describe como nueva especie de dos poblaciones en las Big Belt Mountains de Montana, U.S.A. Parece estar emparentada con el pequeño género *Musineon* que es endémico del oeste de Norteamérica. Aparece justo al finalizar el rango de *M. vaginatum* pero difiere de esa especie por sus frutos más grandes, hojas glaucas con lóbulos más anchos, y hábitat de taludes.

KEY WORDS: *Musineon,* Montana, Big Belt Mountains, Apiaceae

INTRODUCTION

The genus *Musineon* Raf., as currently circumscribed, is endemic to the Intermountain Region and adjacent Northern Great Plains of western North America (Kartesz 2015; Shultz & Smith 2018). There are currently five species described for this genus. *Musineon divaricatum* (Pursh) Nutt. occurs throughout the range of the genus. The other four species, *M. lineare* (Rydb.) Mathias, *M. tenuifolium* Nutt. ex Torr. A. Gray, *M. naomiensis* M. Shultz & F.J. Smith, and *M. vaginatum* Rydb. occur in small areas of the intermontane portions of Montana, Idaho, Wyoming, Utah, and Colorado. The latter species occurs sporadically from the Bighorn and Pryor mountain ranges in south-central Montana and adjacent Wyoming northwest to the foothills of the Bitterroot Range in western Montana. It is usually found in open, montane, coniferous forest often in calcareous soils (Lesica 2012).

In June of 1992 I collected an early-fruiting specimen of what I believed was *Musineon vaginatum* in limestone talus on the upper slopes of Candle Mountain in the Gates of the Mountains Wilderness in the northern Big Belt Mountains of Lewis and Clark County, Montana. However, the leaves of these plants were glaucous with broader lobes than typical *M. vaginatum*. I returned in 2003 to collect plants in flower and again in 2006 and 2015. In 2016 I collected the same plant in a similar habitat on the upper slopes of Willow Mountain 5 km west of Candle Mountain. By this time it was apparent that this plant was not *M. vaginatum* because not only were the leaves different, but the fruits were also larger and the habitat was consistently different.

DESCRIPTION

Musineon glaucescens P. Lesica, **sp. nov.** (**Figs. 1, 2**). TYPE: U.S.A. MONTANA: Lewis and Clark Co., Big Belt Mtns., limestone scree and talus on a steep south-facing slope of Candle Mtn. 18 km east of Wolf Creek, T13N R1W S7, common with *Artemisia michauxiana* and *Lomatium cous,* 2195 m, 2 Jul 2006, *P. Lesica 9610 with P. Kittelson* (HOLOTYPE: MONTU; ISOTYPES: ILL, MONT, NY, RM, SRP, WTU).

Plants low perennial from a simple to branched caudex surmounting a thickened woody taproot; caulescent with 1–3 basal leaves and 1–2(3) stem leaves. **Herbage** glabrous and glaucous, sometimes scaberulose in the inflorescence. **Leaves** petiolate, compound, ovate in outline, 1–7 cm long by 1–5(7) cm wide; petioles 1–11 cm long, purplish, dilated, scarious and sheathing the stem at the base; leaflets short-stalked, ovate, 5–25 mm long and 5–20 mm wide, deeply to shallowly 1–2 times divided into narrowly oblanceolate, mucronate lobes;

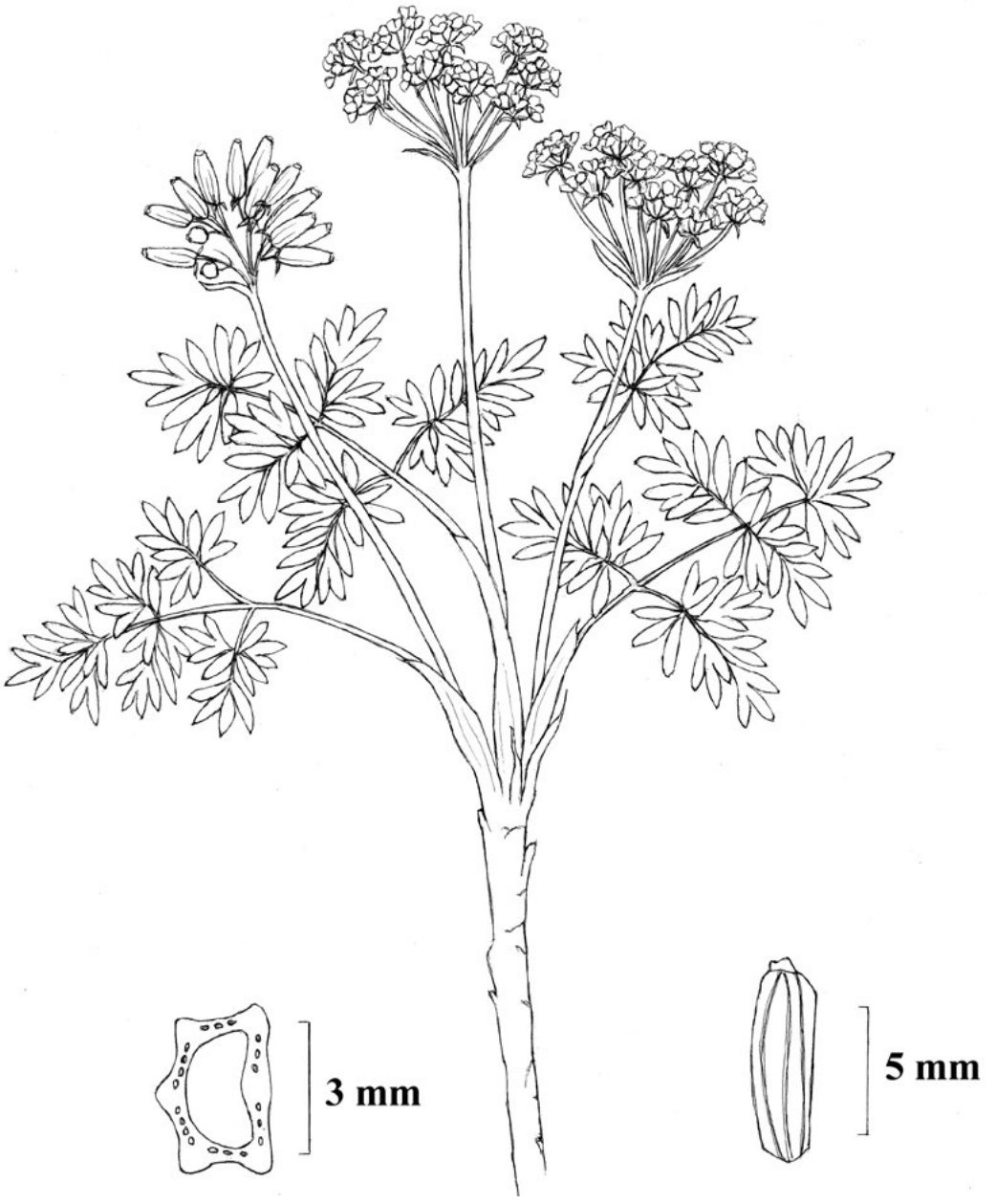

Fig. 1. Illustration of *Musineon glaucescens*.

ultimate lobes 1.5–10(12) mm long and 0.5–3 mm wide with entire margins and apparent midveins. **Inflorescence** a single compound umbel on a peduncle 4–13 cm long, exceeding the leaves; umbels 13–21 mm diameter in flower and 15–40 mm in fruit, subtended by up to 3 linear-attenuate, often purplish, early-deciduous, involucral bracts 2.5–5 mm long; umbels with 5–10 spreading rays, 5–15 mm long in fruit, each ray terminating in an umbellet subtended by 3–5(7) separate to basally united, linear-attenuate, involucel bracts 1–3.5 mm long

with thin hyaline margins; umbellets have 6–15 all perfect or all staminate flowers or a mixture of outer perfect flowers and inner staminate flowers. **Flowers** perfect or imperfect; petals dull yellow or white, fading to off-white or pinkish, ca. 1 mm long, obovate with an incurved tip, sometimes with a short claw; calyx teeth rounded, obscure; anthers spreading, 0.3–0.5 mm long; filaments 0.5–2 mm long; styles divergent, 0.7–1.5 mm long. **Fruit** narrowly ellipsoid, subterete, (3)4–7 mm long and 1.5–4 mm wide, 1–9 per umbellet; fruiting pedicels 0.5–2 mm long; mericarps purple, outer surface glabrous or sparsely scaberulose; ribs prominent to subprominent, rounded and corky; with an epigynous disk present at the summit, stylopodium absent; carpophore divided to near the base; oil tubes 3–5 in the intervals between ribs.

Distribution and habitat.—*Musineon glaucescens* occurs in sparse vegetation of warm slopes on shifting to stabilized limestone talus in the lower subalpine zone. Common associated species include *Agropyron spicatum*, *Artemisia michauxiana, Lomatium cous,* and *Penstemon attenuatus*. *Musineon glaucescens* is currently known from Candle Mountain and Willow Mountain ca. 5 km apart in the Big Belt Mountains of Lewis and Clark County in central Montana, U.S.A. Two unnamed peaks east of Candle Mountain appear to have similar habitat and may harbor additional populations. Dave Hanna and I unsuccessfully searched several limestone peaks at similar elevations south of Candle Mountain in the Big Belt Mountains.

Etymology.—The specific epithet refers to the glaucous bloom of the leaves which helps separate *Musineon glaucescens* from the similar-appearing *M. vaginatum*.

Suggested common name.—Big Belt wild parsley

Additional specimens examined. **UNITED STATES. Montana: Lewis and Clark Co.:** Big Belt Mtns., shifting limestone talus on a south-facing slope of Candle Mtn., abundant with *Lomatium cous* and *Artemisia michauxiana,* 2195 m, T13N R1W S7, 19 May 1992, *P. Lesica 5621* (MONTU, RM); same location, abundant in shifting limestone talus with *Lomatium cous* and *Phlox alyssifolia,* 2165 m, 6 Jun 2003, *P. Lesica 8607* (ILL, MONT, MONTU); same location, common with *Draba oligosperma* and *Lomatium cous,* 2135 m, 6 Jun 2003, *P. Lesica 8611* (MONT, MONTU, SRP); same location, common with *Agropyron spicatum* and *Artemisia michauxiana,* 2195 m, 6 Jun 2015, *P. Lesica 11,308* (MONTU, CIC, ILL); Big Belt Mtns., limestone talus on a steep southeast-facing slope of Willow Mtn., locally common with *Penstemon attenuatus* and *Rosa woodsii,* 2040 m, T13N R2W S10 SE1/4, 28 Jun 2016, *P. Lesica 11,451with D. Hanna* (BRY, MONTU, NY, WTU).

DISCUSSION

The genus *Musineon* belongs to the western North American endemic subfamily Apioideae. Members of this subfamily are common, but the evolutionary relationships among these species remain elusive due to high levels of morphological parallelism in the characters that have traditionally been used to define them. Phylogenetic studies have confirmed that the current morphological classification does not reflect monophyletic groups within this clade. High levels of convergent evolution occur in essentially every morphological character ever used for higher classification in this group (Sun et al. 2004; Sun & Downie 2010; George et al. 2014). As a result, it is unclear how long the current delineation of genera will survive or what the next widely accepted taxonomy will look like. Based on a preliminary analysis of nuclear ribosomal DNA and chloroplast DNA markers, *Musineon glaucescens* is in the same clade with *M. divaricatum* and *M. vaginatum* as well as species of *Tauschia, Cymopterus, Aletes,* and *Harbouria*; However, the single specimen sampled of *M. glaucescens* is not sister to *M. vaginatum,* but is instead sister to *Tauschia texana* (J.F. Smith unpubl. data). However, the morphologic similarity to *M. vaginatum* compels me to place this species in the genus *Musineon* at this time.

Musineon glaucescens resembles *M. vaginatum* in having a similar habit, biternate to triternate leaves, and a similar inflorescence. *Musineon glaucescens* occurs just north of the northern margin of the range of *M. vaginatum* and may be the result of parapatric speciation as these two species have different habitats (Coyne & Orr 2004). The two species also differ by several morphological characters (Figs. 2, 3; Table 1) that may be related to habitat. Glaucous leaves are thought to evolve in response to drought stress (Guo et al. 2016), and larger fruits may be a response to stressful germination conditions (Harper 1977) which may characterize the warm, talus-slope environment. On the other hand, the broader leaf segments would usually be an indication of a more mesic environment (Fitter & Hay1981).

Fig. 2. **Top:** *Musineon vaginatum*, Missoula Co., Montana. **Bottom:** *M. glaucescens*, Lewis & Clark Co., Montana.

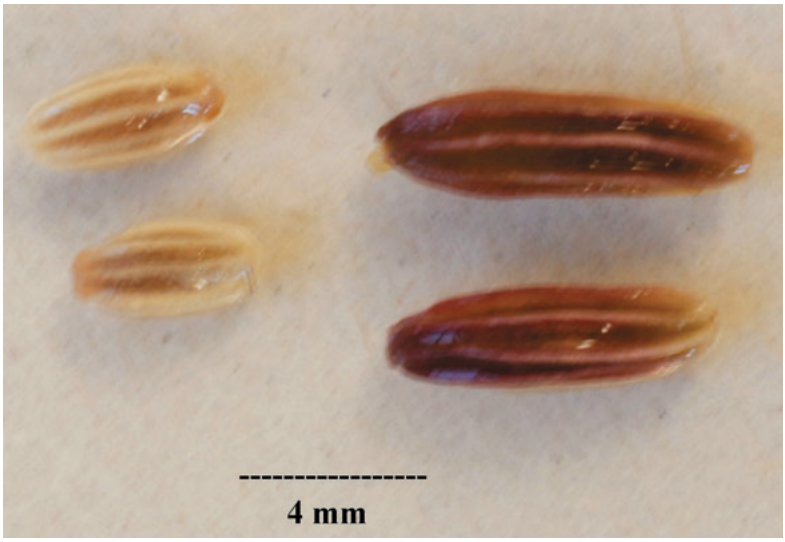

Fig. 3. Fruits of *Musineon vaginatum* (left) and *M. glaucescens* (right).

Table 1. Comparison of fruit and leaf characters between *Musineon glaucescens* and *M. vaginatum* based on 33 specimens in the collections of MONTU.

	M. glaucescens	*M. vaginatum*
Mature fruit		
length	5.0–6.8 mm	2.5–4.5 mm
diameter	1.6–3.8 mm	1.1–2.1
surface	smooth	papillose
color	purple	beige
Leaf		
ultimate lobe length/width ratio	1.7–2.6	2.1–11.4
color	glaucous	green

KEY TO SPECIES OF *MUSINEON*

1. Leaves and stems from an often-buried pseudoscape; leaves once-pinnate ____ **M. divaricatum**
1. Leaves and stems from a simple or branched, wood caudex; some leaves 2– or 3–times pinnate.
  2. Plants caulescent with 1–2 stem leaves; Montana and Wyoming.
    3. Leaves green, ultimate lobes linear; mature fruits beige, ≤4.5 mm long ____ **M. vaginatum**
    3. Leaves glaucus, ultimate lobes linear-oblanceolate; mature fruit ≥5 mm long, purple ____ **M. glaucescens**
  2. Plants acaulescent; stem leaves lacking, Utah, Colorado, southern Idaho.
    4. Involucel bractlets 4–7 mm long, surpassing the flowers ____ **M. lineare**
    4. Involucel bractlets 1–3 mm long or absent.
      5. Flowers yellow; fruit ± scaberulous; involucel bracts 1–3 mm long ____ **M. tenuifolium**
      5. Flowers white; fruit glabrous; involucel bracts absent ____ **M. naomiensis**

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