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IDENTITY OF MERTENSIA OBLONGIFOLIA (NUTT.)
G. DON (BORAGINACEAE) AND ITS ALLIES IN
WESTERN NORTH AMERICA

Ahmed M. Warfa

ABSTRACT.—The current status of Mertensia oblongifolia (Nutt.) G. Don and its allied taxa is surveyed. On the bases of continuously coherent morphological characters and/or regionally correlated variations, more than 30 taxa, including species, subspecies, varieties, and 1 forma, previously considered different from M. oblongifolia, are now placed under synonymy of this species. Those taxa currently known as M. fusiformis Greene, M. bakeri Greene, and M. bakeri var. osterhoutii Williams are among the new synonyms. Typification, taxonomy, and morphological problems of M. oblongifolia are discussed.

Key words: Mertensia oblongifolia, typification, taxonomy, morphology, allied taxa.

Nuttall (1834) described and depicted Pulmonaria oblongifolia from a collection of plants made by N.B. Wyeth in 1834 chiefly in the valleys of the Rocky Mountains, toward the sources of the Columbia River (corresponding to present-day states of Idaho and Wyoming).

As the Linnaean species of Pulmonaria (1753) in North America were placed within Mertensia (Roth 1797), P. oblongifolia Nutt. was transferred by Don (1838) into Mertensia. Except for a few additions, Don maintained Nuttall’s description of P. oblongifolia for his species and was followed by de Candolle (1846), Gray (1875), and Coulter (1885).

M. oblongifolia was later treated as Cerinthodes oblongifolium (Nutt.) Kuntze (1891). Kuntze’s contemporary botanists, such as Nelson (1899, 1900), Rydberg (1899, 1900), and Piper (1906), and subsequent workers on the genus Mertensia (Macbride 1916, Johnston 1932, Williams 1937, Higgins 1993) have recognized M. oblongifolia (Nutt.) G. Don as the correct name. In fact, Cerinthodes oblongifolium has remained inadequately known since Kuntze’s time and seems never to have been mentioned again in the literature under Mertensia species in North America.

De Candolle (1846:91) pointed out that M. oblongifolia was one of the least known species of the genus Mertensia, but added no further discussion. However, de Candolle’s report that the leaves were more or less pubescent beneath represents an important additional morphological feature in the taxon.

Macbride (1916) also argued that M. oblongifolia had been misinterpreted. He examined fragments of a specimen in the Gray Herbarium (GH) which were labeled, in Dr. Gray’s hand, “M. oblongifolia Nutt! ex sp. Wyeth! misit Durand 1861.” He noted that pedicels of these fragments were very sparsely hispid; calyx divided nearly to the base, the lobes 5 mm long, linear-lanceolate; corolla-tube glabrous within, 10 mm long, limbs 5 mm long; filaments as broad and as long as the anthers; style slightly exceeds. He concluded that the morphological characters of the fragments and Nuttall’s description agreed perfectly. Williams (1937:124) also reported the above-mentioned fragments in his monograph: “a fragment marked in Dr. Gray’s hand . . . is probably from the type specimen, Wyeth (G).” The word probably indicates doubt as to the identity of the fragment, and actually Williams’ doubt leads to lectotypification of the fragment.

However, the key problems in this study concern the typification, taxonomy, and morphology of the species, questions that I have examined in connection with a proposed revision of the genus Mertensia in North America (Warfa in preparation).

Pulmonaria oblongifolia was described by Nuttall (1834:43) as follows: “Glabriuscula, caule simplici erecto, foliis lanceolato-oblongis...
obtusiusculis, superioribus acutis, floribus tubuloso-campanulatis paniculatis pedicellatis, calyxibus abbreviatis, laciniosis linearibus acutis ciliatis.” Nuttall’s description implies that he had seen a collection or a specimen with simple, erect, and subglabrous stem, etc. In his footnote Nuttall reported: “Stem ... six to eight inches; lower leaves commencing some distance above the base of the stem ... and all more or less pubescent above; panicle formed of axillary approximating clusters of flowers ...; corolla bright blue; style somewhat exerted.” Nuttall thus explicitly stated that he studied a collection or at least a specimen with a complete habit “six to eight inches.” His careful examination of the position of the lower leaves above the base of the stem and other described features further confirms his possession of an entire specimen. Don (1838:372) also mentioned a plant of 1/2 to 3/4 feet. Unlike both Nuttall and Don, Gray (1875:53), Macbride (1916:17), and Williams (1937:123) appear to have seen only the fragments of Nuttall’s specimen at the Gray Herbarium (CH). I have seen Nuttall’s plant collection at British Museum (BM) and the fragmentary specimen preserved at GH, the same scraps seen by Gray (1875), Macbride (1916), and Williams (1937). The fragmentary specimen is very poor, consisting mostly of dissected flowers and a single small leaf. As correctly pointed out by Macbride (1916), this fragmentary material is in accordance with Nuttall’s description and the type specimen.

On the same sheet of the type specimen at BM are 2 other non-type specimens. Although these 2 latter specimens were collected much later and originate from different localities, they agree with M. oblongifolia. However, as duplicates of the type collection may possibly exist at the Herbarium of Kew Gardens (K) and/or elsewhere, I choose to designate the specimen deposited at BM as a lectotype and the fragmentary specimen preserved at GH as an isolecotype.

The synonymy of M. oblongifolia has a long, complicated history. Mertensia longiflora Greene (1898:261) was based on a collection made by Sandberg and Leiberg in 1893, tentatively identified and distributed as M. oblongifolia. It was placed in synonymy of M. oblongifolia by Piper (1906:479), who was followed by Macbride (1916:18). This synonymy was apparently rejected by Rydberg (1922:732), who kept M. longiflora a separate species. Rydberg’s position was later supported by Jepson (1925:842), Williams (1937:136), Davis (1952:592), and John (1956:348). Both Williams and John not only recognized M. longiflora as a species, but also recognized a number of synonyms under this species. However, the status of M. longiflora has remained at the specific level since then.

M. foliosa Nelson (1899:243), erected from a collection made by Evanston and again tentatively identified and distributed as M. oblongifolia, was also placed in synonymy of M. oblongifolia by Macbride (1916:18–19). Macbride placed M. nutans Howell, M. nevadensis A. Nels., M. pubescens Piper, and M. nutans subsp. subcalva Piper together with M. foliosa in synonymy of M. oblongifolia, making 3 new combinations: M. foliosa var. subcalva (Howell) Macbr., M. foliosa var. nevadensis (A. Nels.) Macbr., and M. foliosa var. pubescens (Piper) Macbr. Except for a few modifications, Macbride’s synonyms under M. oblongifolia were later supported by Williams (1937:123, 125, 130). Contrary to Macbride, Rydberg (1922:732–733) treated M. foliosa and M. nutans as different species from M. oblongifolia. Similarly, Tidestrom (1925:467) considered M. nevadensis, M. foliosa, and M. nutans subsp. subcalva entities of their own and recognized Pulmonaria oblongifolia as the only synonym under M. oblongifolia.

Besides Macbride’s observation on the relationship between M. oblongifolia and M. foliosa, Nelson (1909) studied the affinities between M. fusiformis Greene and M. congesta Greene on the one hand, and M. bakeri Greene, M. laterifolia Greene, and M. amoena A. Nels. on the other. Based on these affinities, Nelson established 3 new combinations: M. papillosa fusiformis (Greene ) A. Nels., M. bakeri amoena (A. Nels.) A. Nels., and M. bakeri laterifolia (Greene) A. Nels. Nelson then placed M. papillosa fusiformis under M. papillosa Greene, while M. bakeri amoena and M. bakeri laterifolia were both placed under M. bakeri. He also placed M. congesta under M. papillosa, and M. canescens Ryd. under M. bakeri. Nelson’s combinations and synonymy arrangements were apparently rejected by both Rydberg (1922:734, 1932) and Tidestrom (1925:467), who treated M. bakeri, M. fusiformis, M. amoena,
and M. laterifolia as species. While Rydberg placed M. congesta under M. fusiformis, M. secundorum Cockeill under M. laterifolia, and made nomenclatural transfer of M. canescens into M. cana Rydb., Tidestrom placed M. paniculata var. nicolii S. Wats. under M. bakeri. As did both Rydberg and Tidestrom, Williams (1937:100, 118) considered M. bakeri and M. fusiformis separate species each with a number of synonyms. Contrary to Rydberg, Williams placed M. secundorum under M. lanceolata (Pursh) A. DC. and M. laterifolia under M. bakeri.

Johnston (1932:84–85), aware of the strict ecological relationship between M. foliosa and its environments, studied this relationship carefully and affirmed that in response to the environment, this species exhibited 3 phases of morphological variation that correspond to (1) M. foliosa, (2) M. foliosa var. subcalva, and (3) M. foliosa var. amoena (A. Nels.) Johnston, respectively. Furthermore, he provided a more complete set of synonyms under each of these taxa and suggested that M. foliosa var. subcalva was better named M. foliosa var. subcalva s. m. Macbride, and M. cusickii Piper and M. eplicata Macbride as M. foliosa var. amoena s. m. cusickii (Piper) Johnston. M. oblongifolia was not mentioned in Johnston’s paper.

In his monumental work, A Monograph of the Genus Mertensia in North America, Williams (1937) published the following new combinations under M. oblongifolia: M. oblongifolia var. nevadensis (A. Nels.) Williams, and M. oblongifolia var. amoena (A. Nels.) Williams. He recognized 26 synonyms under M. oblongifolia and its varieties (Williams 1937:123, 125, 130), as did Davis (1952:592). Higgins (1993:88) later found Williams’ varieties of M. oblongifolia identical to the species and placed these infraspecific taxa into synonymy.

Despite the extensive literature available on the genus Mertensia in North America, the identity of M. oblongifolia and its relationship with M. bakeri, M. fusiformis, etc., have received little attention. Lack of information exchange and/or discordant opinions among early contributors may have overshadowed the significance of this relationship among the taxa in question.

The purpose of this paper is to review all literature available on the above-mentioned taxa and examine all type specimens of all taxa in this study. As a result of this review, I presently treat the species M. oblongifolia, M. bakeri, M. fusiformis, M. foliosa, and M. amoena, as well as most of their current synonyms, as a single morphologically variable but allied group (see Taxonomic Remarks and Variations). Therefore, M. oblongifolia is the only species recognized in this study, while M. fusiformis, M. bakeri, and M. bakeri var. osterhoutii Williams are among its new synonyms.

Although I have not yet examined the M. longiflora type specimen (Sandberg & Leiberg s. n.) at the herbarium of Notre Dame (ND), its current synonyms, such as M. pulchella Piper (1906), M. pulchella subsp. glauca Piper (1906), M. horneri Piper (1906), M. longiflora var. horneri Macbride (1916), and M. longiflora var. pulchella Macbride (1916), have been examined and found to be closely allied to M. oblongifolia. However, as I have not consulted the type material of M. longiflora, these taxa are not included in this study. Both M. longiflora and its synonyms will be placed either in synonymy to M. oblongifolia or as infraspecific taxa to it.

M. praecox Smiley, currently placed under M. oblongifolia, is now considered different from this species but rather close to M. arizonica Greene. Also, M. stenoloba Greene (1901) and M. symphytoides Greene (1901), both currently synonyms to M. oblongifolia, were not treated in this study because I was unable to examine the type specimens of these taxa, which are probably at the herbarium of ND as indicated by Williams (1937:126, 130) and/or elsewhere. However, M. praecox, M. stenoloba, and M. symphytoides will be treated together with the remaining taxa of the genus Mertensia in North America.

**Materials and Methods**

This paper is based on a study of herbarium type material obtained on loan from BM, BRY, CAS, F, GH, ORE, RM, US, and WILLS herbaria (abbreviations according to Holmgren et al. 1990), as well as all literature available on the subject. In addition, I consulted a large set of M. oblongifolia collections, deposited at BRY and representing the states and counties in which the species occurs.

Only well-developed flowers, nutlets, and vegetative parts were used for measurements. Floral parts (when small) were measured
under a Bausch & Lomb stereomicroscope after softening in ethanol alcohol; a ruler scaled in mm was used for measuring larger plant parts.

In this study I have generally followed taxonomic concepts commonly used in taxonomic revisions based mainly on herbarium material. I consider morphologically coherent units to be species; if considerable intraspecific variation is evident, I generally discuss it under Taxonomic Remarks and Variations. All synonyms are listed in chronological order under the species.


Perennial 10–50 cm tall, with fairly woody, thick, short, erect or vertical rootstocks, usually branched at the summit; roots numerous slender, fibrous, intermingled with few large woody ones, and the 1–several crowns closely covered or clothed with dead brown leaf bases and dead petioles; stems 1 or more from each elongated crown, straight and simple, ascending to erect, slightly to fairly conspicuously strigate or angled, smooth or rough, glabrous or densely pubescent with fine, relatively long, spreading or closely appressed or crisped-retroflexed hairs. Leaves alternate, green, thick, occasionally ample, radical or lower leaves commencing some distance above the base of the stem, few, scattered, petiole, the uppermost numerous or crowded at the summit, sesile to subsessile, with lamina linear-lanceolate to lanceolate-oblong or spatulate to narrowly oblong-ovate, rarely elliptic, 3–12 × 0.5–2.5 (4.5) cm, attenuated or tapering, rarely rounded at the base, acuminate to obtuse, rarely rounded at the apex, entire, scabrous or sparsely to densely ciliate at the margins, glabrous to minutely scabrous on both sides, or sparsely to densely pubescent above, glabrous to scabrous beneath, or densely pubescent on both sides; midrib prominent; petiole winged, 6–12 cm long, glabrous or pubescent all over. Inflorescence congested, becoming panicled with age, with few branches to rather crowded, formed of axillary approximating clusters of flowers; peduncles up to 6 cm long; pedicles very slender and often drooping, 1–10 mm long, glabrous or pubescent; calyx divided nearly to the base, 3–5 mm long, enlarging in fruit, glabrous or pubescent, lobes 5, 2–3 mm long, narrowly linear to lanceolate-triangular, acuminate to acute, sparsely to densely ciliate or hispid at the margins. Plant hermaphrodite; flowers bright blue, occasionally subtended by lanceolate foliar bracts; corolla tubular-campanulate, up to 15 mm long, tube 5–12 × 3 mm, lobes 4–5 mm long, obtuse; stamens attached at the throat of corolla, free part of filaments 2–4 mm long, usually dilated, crests or appendages in the throat between the bases of the filaments conspicuous, with a 10-toothed ring at the base of the tube; anthers 1.2–2 mm long, oblong and straight; style 10 mm long, usually enclosed or somewhat exerted; nutlets 3 mm long, alveolar and white spotted, strongly muricate, rugose.

**Distribution.** *Mertensia oblongifolia* is widespread throughout the Mountain and Pacific states of North America.

**Habitat.** *M. oblongifolia* is known in clumps and moist open slopes. It is also found on plains, hillsides, and/or mountains with pine woods. It has an altitudinal range from 7800 to 13,000 feet (2377–3962 m).

**Taxonomic Remarks and Variations.** *Mertensia oblongifolia* is one of the most morphologically variable species of the genus. The variation is probably correlated with geological and/or ecological responses. The subconical to conical, or shortly fascicled to cushion-shaped, or rarely tapering rootstock (caudex) of most type specimens of synonyms examined supports such variation. Basal and upper leaves, often monomorphic in shape, size, and pubescence for most synonyms of *M. oblongifolia*, or rarely dimorphic in some type specimens such as *M. cusickii* (Cusick 2582) and *M. epilcata*.
(Macbride 856), both at RM, further confirm this variation. Regarding the indumentum, M. oblongifolia varies from entirely glabrous to completely pubescent.

VERNACULAR NAMES.—Bluebell, bluebells, spindle bluebell, western bluebell.

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