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PHLOX LONGIFOLIA NUTT. (POLEMONIACEAE) COMPLEX OF NORTH AMERICA¹

Frederick J. Peabody²

ABSTRACT.—Over 1,000 herbarium specimens including 24 type specimens were examined in an attempt to achieve a clearer understanding of the *Phlox longifolia* complex. Four variables were measured for each specimen and the data were statistically analyzed by discriminant analysis. Using a previously published system of classification for the complex, approximately 73 percent of the measured variation among the specimens was accounted for by that system. The clustering patterns produced in this first analysis indicated that a more conservative approach would be advisable. The formulation and subsequent application of a modified system produced a grouping of specimens that accounted for 95 percent of the measured variation for the four morphological characters considered. From four species and seven subspecies previously recognized, one species with five varieties is proposed. The typification of *Phlox longifolia* Nutt. and other related taxa is resolved.

The classification of plants belonging to the *Phlox longifolia* Nutt. complex has been fraught with difficulties from the very beginning of the nomenclatural history of the group. Intraspecific taxa have been attributed to one species and then another, new species have been proposed to deal with the great range of diversity within the group, and confusion has arisen as to the level or rank of recognition best suited for any one entity. The present study has two basic objectives: first, to correlate recent collections and current descriptions with the type material; and second, to review the classification of the complex in light of a broad sample.

The method proposed for the solution of the problem is twofold: A test of the most recently proposed classification system (Wherry 1955), and then a similar test of a modified system proposed by me. Statistical analyses were conducted with the use of the IBM 360 computer using the SPSS V602 program for discriminant analysis from the Sta-

tistical Package for the Social Sciences available at Brigham Young University Computer Center. Over 1,000 specimens from nine western United States herbaria were examined and included in the sample. Twenty-four type specimens from an additional 13 herbaria were also examined. Classical methods of taxonomic research were employed in reviewing type material and adjusting the nomenclature in order to bring the treatment of this complex into agreement with the International Code of Botanical Nomenclature (Stafleu et al. 1972).

The variables tested were the following: vestiture of the inflorescence herbage, corolla tube length, leaf length, and leaf width. Over the past 160 years of taxonomic history these four morphological features have proved to be adequate for separation into infraspecific taxa. They are also easily measured from dried and mounted herbarium specimens.

Following the descriptions of each taxon in the taxonomy section is a citation of repre-

¹A thesis submitted in partial completion for the degree Master of Science.

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sentative material examined, followed by a number indicating the total number of specimens examined and placed within that taxon. The standard abbreviations of herbaria are those of Holmgren and Keuken (1974). Type specimens were examined and photographed and the photographs deposited in the Herbarium of Brigham Young University (BRY); they are indicated by an asterisk (*) following the herbarium symbol designation in the list of synonyms. The standard abbreviations of serial publications are those of the Torrey Botanical Club (1969). The standard abbreviations of separate works are those of Lawrence (1968). Statistical information is available from the author upon request.

ACKNOWLEDGMENTS

The author wishes to acknowledge the many herbaria and their staffs for the loan of material for examination. Appreciation is also extended to Dr. Stanley L. Welsh for valuable assistance in research and preparation. The constant support of Robyne, my wife, is deeply appreciated.

NOMENCLATURE HISTORY

Thomas Nuttall (1834) described *Phlox longifolia* from material gathered by Wyeth in 1833 from the "valleys of the Rocky Mountains generally". Heller (1897) elevated Torrey's (1859) *P. speciosa* var. ? *stansburyi* to species rank in a cryptic note which affords little information as to its salient fea-

tures. Subsequent workers influencing this complex include: E. Nelson (1899), Brand (1907), Jones (1895, 1908), A. Nelson (1909, 1912, 1924, 1931), Wherry (1938, 1939, 1940, 1941, 1942, 1943, 1944, 1955, 1956), Peck (1941), Jepson (1943), and Mason (1951). Over the past 163 years, 16 species and 36 infraspecific taxa have been named within this complex. Of the 52 names proposed in this group only 5 are recognized as valid in the present study.

TAXONOMY OF PHLOX LONGIFOLIA COMPLEX

Taprooted perennials, 0.3-5 dm tall, from a lignous base; leaves cauline, opposite, sometimes alternate above, 5-70 (100) mm long, 1-7 mm wide, linear to oblanceolate; upper cauline leaves glabrous, pubescent or glandular-pubescent; lower cauline leaves glabrescent, basally connate or distinct; pedicels (5) 10-40 (50) mm long, glabrous, pubescent, or glandular-pubescent; calyx of 5 aristate to cuspidate, basally connate sepals with prominent herbaceous midribs, glabrous except on adaxial surface, pubescent or glandular-pubescent, distinct chartaceous intercostal membranes either plicate or flat; corolla tube (8) 10-28 mm long, usually glabrous but sometimes sparsely pilose without, the limb 5-15 mm long, incisurate, erose, or entire; stamens unequally inserted on the corolla tube, included or scarcely exerted; style 3-cleft, the ovary 3-loculed, the seeds 1 (2-4) per locule.

KEY TO VARIETIES

1. Inflorescence herbage glabrous except calyx within, or pubescent on upper leaf margins, pedicels and calyx without; leaves linear *P. longifolia* var. *longifolia*
- Inflorescence herbage glandular-pubescent, rarely simply pubescent (var. *longipes* and var. *viridis*); leaves linear to oblanceolate 2
- 2(1). Corolla tube 22-28 mm long; southwestern New Mexico westward across Arizona to southern and western Utah, Nevada and eastern California *P. longifolia* var. *stansburyi*
- Corolla tube 12-19 mm long; variously distributed throughout western North America 3

- 3(2). Leaves (even upper) distinctly oblanceolate, 3-5 mm wide; inflorescence herbage glandular-pubescent; internodes well spaced; stems stout and often trailing; southwestern South Dakota westward to eastern California
P. longifolia var. *brevifolia*
- Leaves linear to linear-lanceolate, 1-3 mm wide; inflorescence herbage rarely nonglandular-pubescent; internodes well spaced or congested; stems slender and usually ascending; variously distributed throughout western North America 4
- 4(3). Leaves 45-70 mm long, 2.5-4 mm wide; internodes well spaced; northern New Mexico and Arizona through Nevada, Utah, and western Colorado, narrowly extending into southern Idaho and Oregon
P. longifolia var. *longipes*
- Leaves 16-35 mm long, 1-2 mm wide; internodes usually congested; Washington, Oregon, Idaho, extending narrowly into extreme northern Utah and Nevada *P. longifolia* var. *viridis*

Phlox longifolia Nutt. var. *longifolia*

- Phlox longifolia* Nutt., J. Acad. Nat. Sci. Philadelphia 7: 41. 1834. Holotype: Valleys of the Rocky Mts. generally, 1833, *Wyeth* s.n. (BM^{*}). Isotype (K^{*}).
- P. humilis* Dougl. ex Hook., Fl. Boreali-Amer. 2: 72. 1838. Holotype: Oregon; barren sandy plains of the Columbia, 1826, *Douglas* s.n. (K^{*}).
- P. speciosa* Pursh var. *B* Dougl. ex Hook., Fl. Boreali-Amer. 2: 72. 1838. Holotype: Oregon; on the summit of the Blue Mountains and subalpine range of the Rockies near perpetual snow, no date, *Douglas* s.n. (K^{*}).
- P. sabini* Hook. *pro syn.*, Fl. Boreali-Amer. 2: 72. 1838.
- P. speciosa* Pursh var. *linearifolia* Hook., Hooker's J. Bot. Kew Gard. Misc. 3: 289. 1851. Holotype: Valley of the Kooskooskie River and adjoining plains, no date, *Douglas* s.n. (K^{*}).
- P. linearifolia* (Hook.) A. Gray, Proc. Amer. Acad. Arts 8: 255. 1870.
- P. longifolia* Nutt. f. *humilis* (Dougl. ex Hook.) Voss, Vil-morin Blumengartn 1: 681. 1894.
- P. longifolia* Nutt. ssp. *marginata* Brand, Das Pflanzenreich 4²⁵⁰: 65. 1907. Holotype: Oregon; steep grassy slopes near Snake River, where it is common, 23 May 1901, *Cusick* 2517, (G^{*}).
- P. longifolia* Nutt. ssp. *marginata* Brand var. *humilis* (Dougl. ex Hook.) Brand, Das Pflanzenreich 4²⁵⁰: 66. 1907.
- P. longifolia* Nutt. ssp. *linearifolia* (Hook.) Brand, Das Pflanzenreich 4²⁵⁰: 66. 1907.
- P. patula* A. Nelson, Univ. Wyoming Publ. Sci., Bot. 93: 47. 1924. Holotype: Colorado; Platte Canyon, 19 May 1894, A. Nelson 1589, (RM^{*}).
- P. marginata* (Brand) A. Nelson, Amer. J. Bot. 18: 434. 1931.
- P. cortezana* A. Nelson, Amer. J. Bot. 18: 434. 1931. Holotype: Colorado; Montezuma Co., roadside between Cortez and Mesa Verde National Park, 11 May 1925, A. Nelson 10436 (RM^{*}).

- P. longifolia* Nutt. ssp. *humilis* (Dougl. ex Hook.) Wherry, Proc. Acad. Nat. Sci. Philadelphia 90: 135. 1938.
- P. longifolia* Nutt. ssp. *calva* Wherry, Proc. Acad. Nat. Sci. Philadelphia 90: 136. 1938. Holotype: Idaho; Butte Co., 13 miles by road southwest of Darlington (43°41½'; 113°34½'), 21 June 1931. E. T. Wherry s.n. (PH^{*}).
- P. longifolia* Nutt. ssp. *typica* Wherry, *pro. typ.* Notul. Nat. Acad. Nat. Sci. Philadelphia 87: 5. 1941.
- P. longifolia* Nutt. ssp. *cortezana* (A. Nelson) Wherry, Notul. Nat. Acad. Nat. Sci. Philadelphia 87: 5. 1941.
- P. grahamii* Wherry, Brittonia 5: 60. 1943. Holotype: Utah; Uinta Co., talus slopes west side of Green River, south of mouth of Sand Wash, 4500 ft., elevation, 27 May 1923, *Graham* 7884 (CM^{*}).
- P. longifolia* Nutt. ssp. *a-longifolia* Wherry, *pro. typ.* Morris Arb. Bull. 3: 90. 1956.

Plants short to tall, 0.5-5.0 dm; internodes more or less congested or well spaced; leaves opposite, upper leaves glabrous or pubescent, nonglandular, (10) 20-50 (60) mm long, 1.0-2.5 mm wide, linear to linear-lanceolate; calyx glabrous or pubescent with intercostal membranes either plicate or flat; corolla tube 12-16 mm long (Fig. 1).

Representative material.—*Huntley* 889 (WTU); *Parker* 578 (OSC); *Davis* 334 (IDS); *Vickery* 550 (ARIZ); *Cronquist* 6237 (COLO); *Thompson* 11316 (MONTU); *Brown* 3780 (UNM). 645.

Distribution.—Central and eastern Washington, eastern and central Oregon, southern Idaho, southwestern Montana, southwestern Wyoming, Nevada, Utah, western Colorado,



Fig. 1. *Phlox longifolia* Nuttall var. *longifolia*. ISOTYPE: Valleys of the Rocky Mts. generally. Wyeth s.n., no date (BMI^{*}). Measure bar equals 1 cm.

extreme northwestern New Mexico, northern Arizona, and extreme southeastern California. This nonglandular form is the most abundant variety in northern and mesic localities (Fig. 2).

Notes—Nuttall (1834) described *Phlox longifolia* based on a specimen with long leaves as compared to the caespitose representatives of the genus, sic. *P. caespitosa*, *P. hoodii* etc. Douglas (1838) described *P. humilis* based on material similar to that of Nuttall's *P. longifolia*, selecting this epithet because the leaves were smaller than those of *P. speciosa* already described by Pursh (1814) and Lindley (1830). Gray (1870) rectified the situation by placing Douglas's *P. humilis* in synonymy with Nuttall's *P. longifolia*. At the same time Gray proposed a new species which had longer leaves and distinct replica-

tion of the intercostal membranes of the calyx, naming this species *P. linearifolia* (Hook.) A. Gray.

With the passage of years since the work of Gray (1870) and the activity of post-Gray-an monographers, the taxonomy of this group became extremely obscured. Nuttall's type was disregarded, Gray's *Phlox linearifolia* fell out of use and bi- or trinomials were applied to erroneous taxa. The longer-leaved and taller *P. linearifolia* became commonly known as *P. longifolia*, leaving the type of *P. longifolia* to be erroneously renamed at various infraspecific levels. Among these renamings are: *P. longifolia* ssp. *marginata* var. *humilis* (Dougl. ex Hook.) Brand (1907), *P. longifolia* ssp. *humilis* (Dougl. ex Hook.) Wherry (1938), and *P. longifolia* f. *humilis* (Dougl. ex Hook.) Voss (1894). This unfortunate condi-

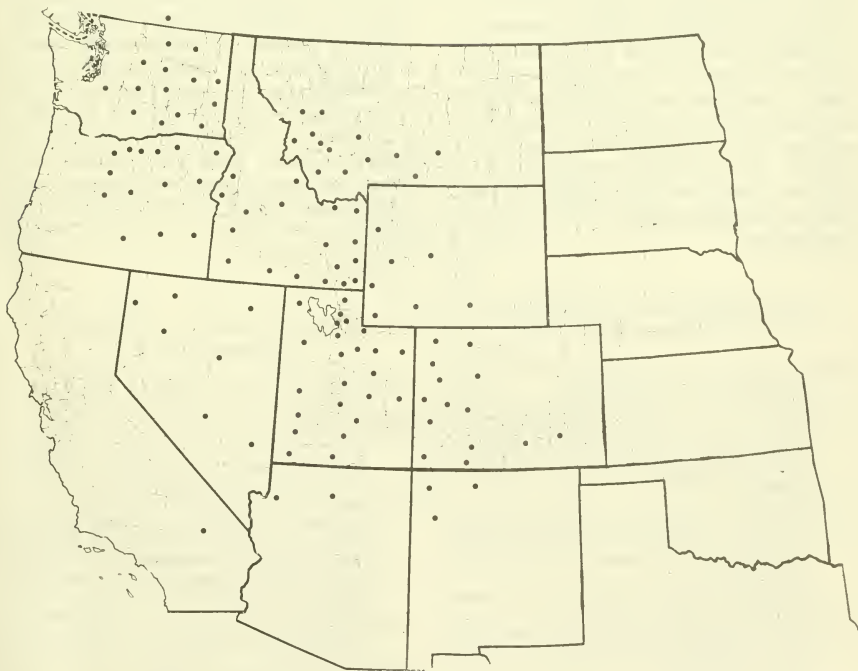


Fig. 2. Distribution of *Phlox longifolia* Nutt. var. *longifolia* over western North America.

tion has continued to the present day, causing taxonomic confusion within the complex.

Wherry (1943) proposed *Phlox grahamii* Wherry as an intermediate form between two genera (*Phlox* and *Microsteris*). His reasons were that the plant in question (Graham 7884) combines morphological characters of each genus. It is perennial and rather tall with well-spaced internodes and a distinct corolla tube like *Phlox*. The leaves, however, are relatively small, few, and some are lobed near the base; the corolla tube is strongly flaring at the base and the inflorescence is sparse as in the genus *Microsteris*.

Upon examination of this specimen, which unfortunately is the only specimen of this species ever collected or reported, I have found that it is copiously infested with a rust (*Puccinia plumbaria* Peck) according to identification made with Arthur (1962). The base of the corolla tube is filled with hyphae, causing it to flare, and one of the few upper leaves bears a number of aecia imbedded in its epidermis that caused it to lobe abnormally as it elongated in growth. The general health of the plant was obviously very poor and all of the features noted by Wherry as resembling the genus *Microsteris* are, in my opinion, the result of teratology. *Phlox grahamii* appears to be a diseased *P. longifolia* var. *longifolia* and is therefore reduced to synonymy.

Phlox longifolia Nutt. var. *stansburyi*
(Torr.) A. Gray

- Phlox longifolia* Nutt. var. *stansburyi* (Torr.) A. Gray, Proc. Am. Acad. Arts 8:255. 1870.
P. speciosa Pursh var. ? *stansburyi* Torr., Rep. U.S. Mex. Bound. Surv. 2: 145. 1859. Holotype: New Mexico; Dona Ana Co., gravelly hills near the Organ Mountains, 30 April 1852, *Bigelow s.n.* (NY).
P. stansburyi (Torr.) Heller, Bull. Torrey Bot. Club 24: 478. 1897.
P. longituba Heller, Muhlenbergia 2: 228. 1906. Isotype (?): California; Inyo Co., Sierra foothills west of Bishop in coarse granite sand, 23 May 1906, *Heller 8320* (BM*).
P. stansburyi (Torr.) Heller ssp. *eu-stansburyi* Brand, Das Pflanzenreich 4²⁰⁰: 66. 1907.
P. superba Brand, Das Pflanzenreich 4²⁰⁰: 67. 1907. Holotype: Nevada; Nye Co., Tonopah, May 1905, *Brown s.n.* (UC*).
P. stansburyi (Torr.) Heller ssp. *eu-stansburyi* Brand f. *longituba* (Heller) Wherry, Notul. Nat. Acad. Nat. Sci. Philadelphia 113: 4. 1942.

P. stansburyi (Torr.) Heller ssp. *superba* (Brand) Wherry, Notul. Nat. Acad. Sci. Philadelphia 113: 4. 1942.

Plants moderately tall, 1.5–4.0 dm, internodes well-spaced, 3–6 cm long; leaves opposite, upper leaves somewhat glandular-pubescent, 22–39 mm long, 2.1–3.8 mm wide, linear to linear-lanceolate; calyx glandular-pubescent with the intercostal membranes usually flat; corolla tube 22–28 mm long (Fig. 3).

Representative material—*Arnott 37*, (WTU), *Maguire 25123* (OSC), *Ferris 8054* (MONTU), *Hershey 2826* (UNM), *Wootton s.n.* (COLO), *Wootton s.n.* (ARIZ). 38.

Distribution—Western New Mexico, Arizona, western Utah, Nevada, and extreme eastern California (Fig. 4).

Notes—The taxon *stansburyi* proves to fit into *P. longifolia* quite well because it has many characters in common with other varieties. The long corolla tube usually cited as the distinguishing feature merely represents a point in a continuum of corolla tube length within this complex. Other features are essentially the same as in *P. longifolia* (*sensu lato*). As defined here var. *stansburyi* occurs not only in southwestern New Mexico and adjacent Arizona (Wherry 1956) but also in northern Arizona, Utah, and Nevada. As it passes northward it appears to assume some of the characteristics of other varieties, most noticeably reduction in leaf size and length of the corolla tube.

Phlox longifolia Nutt. var. *brevifolia*
(A. Gray) A. Gray

- Phlox longifolia* Nutt. var. *brevifolia* (A. Gray) A. Gray, Synop. Fl. N. Amer. Vol. 2 Pt. 1: 133. 1878.
P. longifolia Nutt. var. *stansburyi* (Torr.) A. Gray f. *brevifolia* A. Gray, Proc. Amer. Acad. Arts 8: 255. 1870. Lectotype: Nevada; Ormsby Co., near Carson City, 1865. *Anderson s.n.* (GH*).
P. longifolia Nutt. var. *stansburyi* (Torr.) A. Gray subvar. *brevifolia* (A. Gray) Watson, C. King, Report of the Geographical Expl. 40th Parallel 5: 261. 1871.
P. stansburyi (Torr.) Heller var. *brevifolia* (A. Gray) E. Nelson, Wyoming Agric. Exp. Sta. Annual Rep. 9: 27. 1899.
P. stansburyi (Torr.) Heller ssp. *eu-stansburyi* Brand var. *brevifolia* (A. Gray) Brand, Das Pflanzenreich 4²⁰⁰: 66. 1907.
P. grayi Wootton & Standley, pro. syn. Contr. U.S. Nat. Herb. 16: 161. 1913.
P. longifolia Nutt. ssp. *brevifolia* (A. Gray) H. Mason, Abrams Ill. Fl. Pac. States 3: 409. 1951.

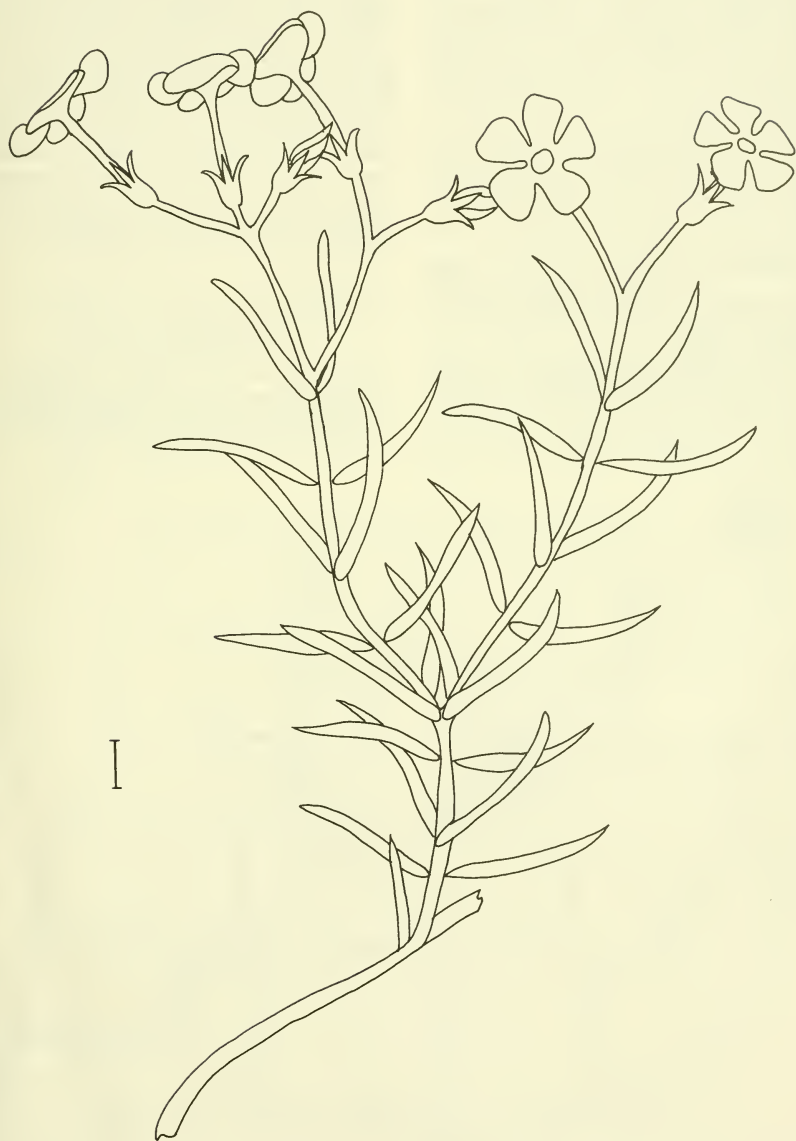


Fig. 3. *Phlox longifolia* Nutt. var. *stansburyi* (Torr.) Gray. TOPOTYPE: New Mexico, Doña Ana Co., in the Organ Mountains. E. O. Wooton s.n. 28 May 1905 (WTU*). Measure bar equals 1 cm.

Plants short, often trailing, 1-3 dm tall, internodes well spaced, 1-4 (5) cm long; leaves opposite, upper leaves glandular-pubescent, 16-30 mm long, 3-5 (6) mm wide, distinctly oblanceolate; upper sometimes linear-lanceolate; calyx glandular-pubescent, intercostal membranes usually flat; corolla tube 13-15 mm long (Fig. 5).

Representative material.—Cronquist 8894 (WTU), Lenz 21826 (OSC), Forewood s.n. (K), Welsh 9689 (BRY), Christensen s.n. (BRY), Blauer 7 (BRY), Palmer 308 (GH), Anderson s.n. (GH). 67.

Distribution.—Extreme southwest South Dakota, central western Colorado, northern Arizona, Utah, Nevada, and extreme eastern California (Fig. 6).

Notes.—Variety *brevifolia* has been named under innumerable combinations over its taxonomic history. Gray's (1870, 1878) and Watson's (1871) transference of this taxon from

one rank to another betrays its complexity. Of all varietal names applied over the past years, Gray's var. *brevifolia* antedates all and is chosen as the legitimate name. Because Gray indicated no type in the publication of this variety, a lectotype (Wherry 1955) has been designated (the reader is referred to the list of synonyms). It is estimated that the range of this taxon extends further eastward than any other within this complex, crossing the Continental Divide through Wyoming and into the Black Hills of southwestern South Dakota (fide Forewood 1888).

Phlox longifolia Nutt. var. *longipes*
(M. E. Jones) M. E. Peck

Phlox longifolia Nutt. var. *longipes* (M. E. Jones) M. E. Peck, Mann. Higher PLS. Oregon 571. 1941.

P. linearifolia (Hook.) A. Gray var. *longipes* M. E. Jones, Contr. W. Bot. 12: 53. 1908. Holotype: Idaho;



Fig. 4. Distribution of *Phlox longifolia* var. *stansburyi* (Torr.) Gray over western North America.

Washington Co., Weiser, 28 April 1900, Jones s.n. (POM^o).

- P. longifolia* Nutt. var. *puberula* E. Nelson, Wyoming Agric. Exp. Sta. Annual Rep. 9: 26. 1899. Holotype: Wyoming; Uinta Co., Evanston, 5 June 1898, A. Nelson 4544 (RM^o).
- P. viscida* E. Nelson, Wyoming Agric. Exp. Sta. Annual Rep. 9: 25. 1899. Holotype: Oregon; Columbia Co., Blue Mountains, 15 July 1896, Piper 2397 (US^o).
- P. stansburyi* (Torr.) Heller ssp. *compacta* Brand var. *viscida* (E. Nelson) Brand, Das Pflanzenreich 4²⁵⁰: 67. 1907.
- P. stansburyi* (Torr.) Heller ssp. *compacta* Brand var. *puberula* (E. Nelson) Brand, Das Pflanzenreich 4²⁵⁰: 67. 1907.
- P. stansburyi* (Torr.) Heller ssp. *eu-stansburyi* Brand var. *brevifolia* (A. Gray) Brand subvar. *microcalyx* Brand, Das Pflanzenreich 4²⁵⁰: 67. 1907. Holotype: Arizona; Yavapai Co., Prescott Mountain District, 1876, Palmer 391 (G^o).
- P. puberula* (E. Nelson) A. Nelson, Manual Bot. Rocky Mts.: 397. 1909.
- P. longifolia* Nutt. var. *filifolia* A. Nelson. Bot. Baz. (Crawfordsville) 54: 143. 1912. Holotype: Idaho; Blaine Co., Ketchum midst sagebrush, stream bottoms, alt. 5887, 19 July 1911, A. Nelson 1192 (RM^o).

- P. longifolia* Nutt. ssp. *compacta* (Brand) Wherry, Proc. Acad. Nat. Sci. Philadelphia 93: 135. 1938.
- P. longifolia* Nutt. ssp. *longipes* (M. E. Jones) Wherry, Proc. Acad. Nat. Sci. Philadelphia 93: 135. 1938.
- P. viridis* E. Nelson ssp. *longipes* (M. E. Jones) Wherry, Morris Arb. Bull. 3: 88. 1955.
- P. viridis* E. Nelson ssp. *compacta* (Brand) Wherry, Bailey 4: 98. 1956.

Plants moderately tall 1.5–4.0 dm, internodes somewhat congested or well-spaced 1–5 cm long; leaves opposite, upper leaves glandular-pubescent, 3–10 (15) mm long, 1.7–3.6 mm wide, linear to linear-lanceolate; calyx glandular-pubescent with the intercostal membranes usually flat; corolla tube 14–18 mm long (Fig. 7).

Representative material.—Whites 1037 (WTU), Peck 7790 (OSC), Davis 3082 (IDS), Cottam 5062 (ARIZ), Clokey 7630 (MONTU), Clark s.n. (UNM), Hitchcock 20432 (COLO). 122.

Distribution.—Eastern Oregon, southern Idaho, Utah, western and southern Colorado, Nevada, northern Arizona, northwestern



Fig. 5. *Phlox longifolia* Nutt. var. *brevifolia* Gray. COLLECTION: South Dakota, Black Hills. W. H. Forwood s.n. 1887 (K^o). Measure bar equals 1 cm.

New Mexico, and extreme eastern California (Fig. 8).

Notes.— Even though this taxon is found in northern as well as southern areas it appears to be more abundant in southern Utah, Arizona, New Mexico, and southwestern Colorado. The long, narrow leaves and glandular pubescence are distinctive. It appears that var. *longipes* may be a transitional form between the pubescent var. *longifolia* and the glandular-pubescent var. *stansburyi*. The overlapping pattern in distribution and morphology would point to this possibility.

Phlox longifolia Nutt. var. *viridis*
(E. Nelson) Peabody *stat. nov.*

Phlox viridis E. Nelson, Wyoming Agric. Exp. Sta. Annual Rep. 9: 25. 1899. Holotype: Washington; Kittitas Co., Ellensburg, 20 May 1897, Piper 2689 (WS*).

P. stansburyi (Torr.) Heller ssp. *compacta* Brand var. *puberula* (E. Nelson) Brand subvar. *viridis* (E. Nelson) Brand, Das Pflanzenreich 4²⁵⁰: 67. 1907.

P. longifolia Nutt. ssp. *viridis* (E. Nelson) Wherry, Notul. Nat. Acad. Nat. Sci. Philadelphia 87: 5. 1941.

P. viridis E. Nelson ssp. *a-viridis* Wherry, *pro. typ.* Morris Arb. Bull. 3: 88. 1955.

Plants short 1–3 dm, stem much branched from the base, internodes 1–2 cm long; leaves opposite, upper leaves glandular-pubescent, 16–30 mm long, 1.0–1.5 mm wide, linear; calyx glandular-pubescent, intercostal membranes usually flat; corolla tube 13–15 mm long (Fig. 9).

Representative material.— *Hitchcock* 17409 (WTU), *Peck* 25922 (OSC), *Davis* 99-36 (IDS), *Stevens* 150 (BRY), *Stevens* 161 (BRY), *Platt* 157 (BRY). 142.

Distribution.— Central Washington, central and southeastern Oregon, southern

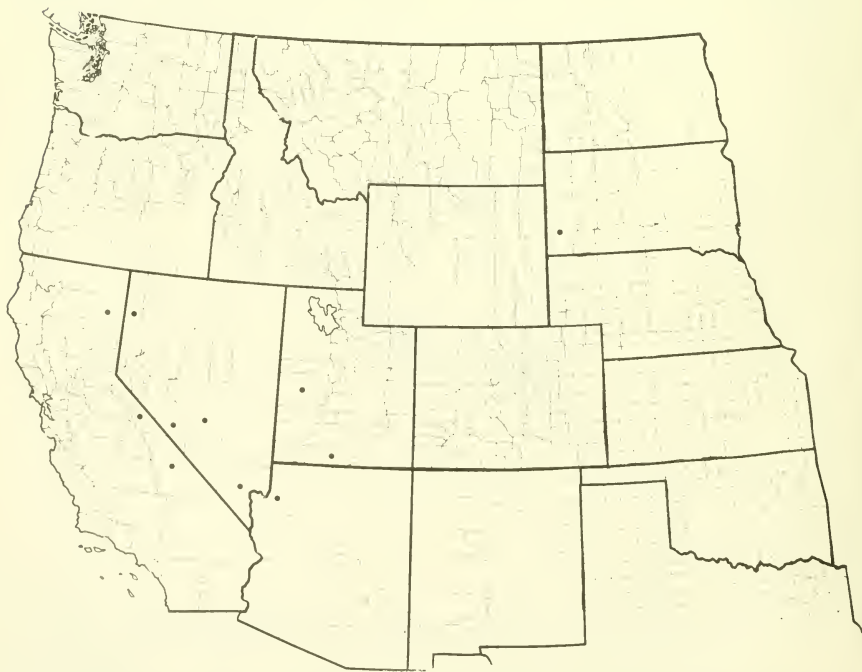


Fig. 6. Distribution of *Phlox longifolia* Nutt. var. *brevifolia* Gray over western North America.

Idaho, extreme northern Utah and Nevada (Fig. 10).

Notes.— Easily distinguished by its fine, narrow leaves, multiple branches, and usually congested internodes, var. *viridis* is primarily of northern distribution, extending southward along the western slope of the Rocky Mountains into northern Utah and Nevada.

LITERATURE CITED

- ABRAMS, L. 1954. Illustrated flora of the Pacific States. Vol. 4, Stanford University Press, Stanford, California.
- ARTHUR, J. D. 1962. Manual of the rusts of the United States and Canada. Hafner Publishing Co., New York. 438 pp.
- BENTHAM, G. 1845. Polemoniaceae. In: A. de Candolle, Prodrromus 9: 302-322.
- BRAND, A. 1907. Polemoniaceae. In: Das Pflanzenreich 4²⁵⁰: 1-203.

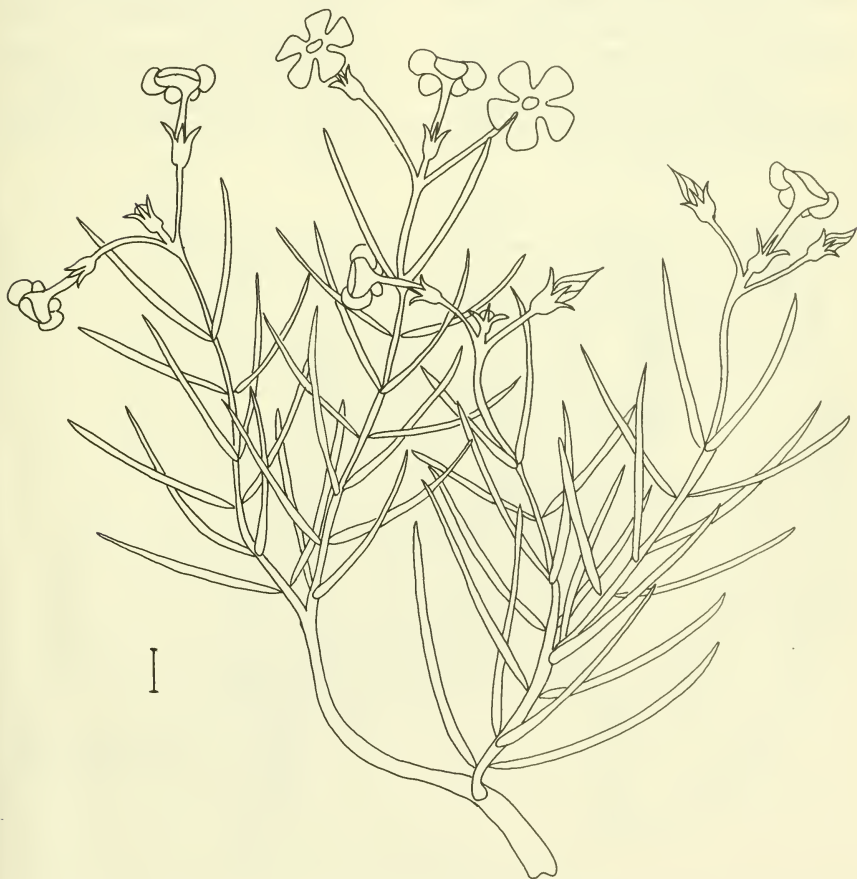


Fig. 7. *Phlox longifolia* Nutt. var. *longipes* (M. E. Jones) Peck. HOLOTYPE: Idaho, Washington Co., Weiser. M. E. Jones s.n. 28 April 1900 (POM*). Measure bar equals 1 cm.

- CHAUDHRI, M. N., I. H. VETTER, AND C. M. DEWAL. 1972. Index herbariorum, Part II-Collectors (E-H). Regnum Vegetabile, Vol. 9. Kemink en Zoon N. V. Utrecht, Netherlands. 296-473.
- CRONQUIST, A. 1964. In: C. L. Hitchcock, et al. Vascular plants of the Pacific Northwest. Univ. Wash. Publ. Biol. 17(4): 1-510.
- FISHER, R. A. 1936. The use of multiple measurements in taxonomic problems. Ann. Human Genetics 7: 179-188.
- GRAY, A. 1870. Revision of the North American Polemoniaceae. Proc. Amer. Acad. Art. 8: 247-282.
- . 1878. Polemoniaceae. Synoptical flora of North America, Vol. II, Pt. 1. John Wilson and Sons, Cambridge, Massachusetts.
- HELLER, A. A. 1897. Notes on plants of New Mexico. Bull. Torrey Bot. Club 24: 477-480.
- . 1906. Polemoniaceae. Muhlenbergia 2: 228-235.
- HOLMGREN, P. K., AND W. KEUKEN. 1974. Index herbariorum, Pt. I, The herbaria of the world. Regnum vegetabile, Vol. 92. Dosthoek, Scheltema and Holkema, Utrecht, Netherlands. 397 pp.
- HOOKE, W. J. 1829-1834. Flora Boreali-Americana. Vol. I. G. Bohn, London. 298 pp.
- . 1851. Catalogue of Mr. Geyer's plants collected in the upper Missouri. Hooker's J. Bot. Kew Gard. Misc. 3: 273-305.
- JEPSON, W. L. 1925. Manual of the flowering plants of California. Associated Student Stores, Berkeley, California. 1238 pp.
- . 1943. A flora of California, Vol. 3. University of California Press, Berkeley, California. 284 pp.
- JONES, M. E. 1895. Contributions to western botany. Contr. W. Bot. 8: 1-43.
- . 1908. Contributions to western botany, No. 12. Contr. W. Bot. 12: 1-100.
- KUNTZE, O. 1891. Rev. Gen. Bot. Pars. 2. H. Sturtz, Wursburg.
- LANJOUW, J., AND F. A. STAFLEU. 1954. Index herbariorum, Part II, Collectors (A-D). Regnum Vegetabile, Vol. 2. Kemink en Zoon N. V., Utrecht, Netherlands. 1-174.
- . 1957. Index herbariorum, Part II, Collectors (E-H). Regnum vegetabile, Vol. 9. Kemink en Zoon N.V., Utrecht, Netherlands. 175-295.
- LAWRENCE, G. M. H., ed. 1968. Botanico-Periodicum-Huntianum. S-H Service Agency, Inc., New York, 1063 pp.



Fig. 8. Distribution of *Phlox longifolia* Nutt. var. *longipes* (M. E. Jones) Peck over western North America.

- LINDLEY, J. 1830. "*Phlox speciosa*." In: Edward's Bot. Reg. 16: pl. 1351.
- MASON, H. L. 1925. Abrams illustrated flora of the Pacific States. Stanford University Press, Stanford, California.
- NELSON, A. 1909. "*Phlox puberula*." In: Nelson, A. and J. M. Coulter, New manual of botany of the central Rocky Mountains (vascular plants). American Book Co., New York. 646 pp.
- . 1912. "*Phlox longifolia* var. *filifolia*." In: Bot. Gaz. (Crawfordsville) 54: 143.
- . 1924. Taxonomic studies by Aven Nelson I. Phloxes, new and old. Univ. Wyoming Publ. Sci. Bot. 1(93): 47-68.
- . 1931. New species from mountains and deserts. Amer. J. Bot. 18: 431-441.
- . 1931. *Phlox longifolia* and *Phlox stansburyi* and their immediate relatives. Amer. J. Bot. 18: 441-442.
- NELSON, E. 1899. Revision of the western North American Phloxes. Wyoming Agric. exp. Sta. Annual Rep., No. 9: 1-36.
- NIE, N. E., ed. 1975. Statistical package for the social sciences. 2d ed. McGraw-Hill Book Co., New York.
- NUTTALL, T. 1834. Plants of the Rocky Mountains. J. Acad. Nat. Sci. Philadelphia 7: 5-60.
- PECK, M. E. 1941. A manual of the higher plants of Oregon. Binford and Mort, Portland, Oregon. 866 pp.
- . 1941. Validation of new combinations. Madrono 6: 135-136.

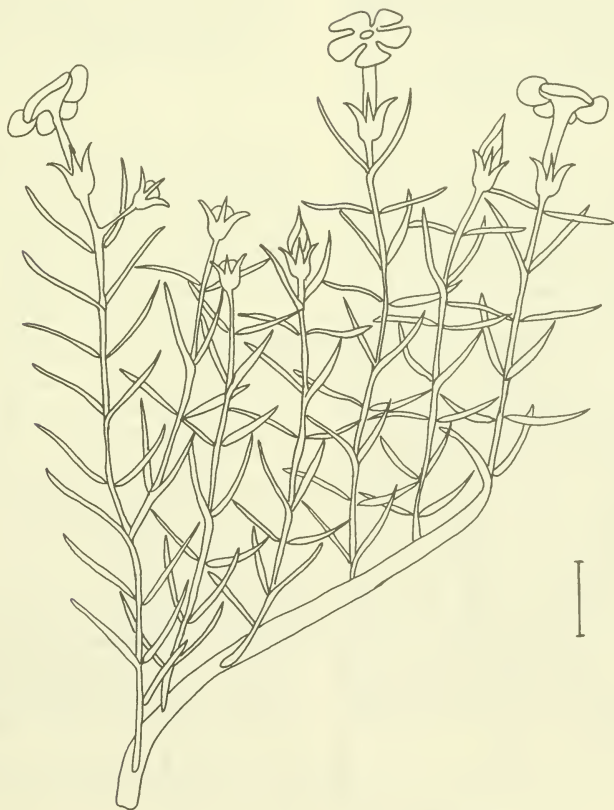


Fig. 9. *Phlox longifolia* Nutt. var. *viridis* (E. Nelson) Peabody. HOLOTYPE: Washington, Kittitas Co., Ellensburg. C. V. Piper 2689 20 May 1897 (WS^{*}). Measure bar equals 1 cm.

- PURSH, F. 1814. *Flora Americae-Septentrionalis*. In two volumes. White, Cochrane and Co., London.
- STAFLEU, F. A. 1967. Taxonomic literature. *Regnum vegetabile*, Vol. 52. Inter-documentation Co. AC, Utrecht, Netherlands, 566 pp.
- . 1972. International code of botanical nomenclature. *Regnum vegetabile*, Vol. 82. A. Oosthoek's Uitgeversmaatschappij N. V., Utrecht, Netherlands. 426 pp.
- TORREY BOTANICAL CLUB. 1969. Index to American botanical literature. In four volumes. G. K. Hall and Co., Boston, Massachusetts.
- TORREY, J. 1859. Botany of the boundary. In: Emory, Report on the United States and Mexican boundary survey, Vol. 2. C. Wendell, Printers, Washington, D.C.
- VOSS, J. 1894. *Phlox longifolia* f. *humilis*. In: Vilmorin *Blumengarten* 1: 681.
- WATSON, S. 1871. The Botany. In: C. King, Report of the geographical exploration of the fortieth parallel. Vol. 5. U.S. Government Printing Office, Washington, D.C.
- WHERRY, E. T. 1938. Phloxes of Oregon. *Proc. Acad. Nat. Sci. Philadelphia* 90: 133-140.
- . 1939. Four southwestern subspecies of *Phlox*. *J. Wash. Acad. Sci.* 29: 517-519.
- . 1940. Geographic relations in the genus *Phlox*. *Bartonia* 20: 12-14.
- . 1941. Phloxes of Idaho. *Notul. Nat. Acad. Nat. Sci. Philadelphia* 87: 5-13.
- . 1940. A provisional key to the Polemoniaceae. *Bartonia* 20: 14-17.
- . 1942. Phloxes of Nevada. *Notul. Nat. Acad. Nat. Sci. Philadelphia* 113: 4-11.
- . 1943. *Microsteris*, *Phlox*, and an intermediate. *Brittonia* 5: 60-63.
- . 1944. New Phloxes from the Rocky Mountains and neighboring regions. *Notul. Nat. Acad. Nat. Sci. Philadelphia* 146: 1-11.
- . 1955. The genus *Phlox*. *Morris Arb. Bull.* 3: 1-174.
- . 1956. Validation of new combinations in *Phlox*. *Baileya* 4: 97-98.
- WOOTON, E. O., AND P. C. STANDLEY. 1913. New Plants from New Mexico—Polemoniaceae. *Contr. U.S. Nat. Herb.* 16: 160-162.

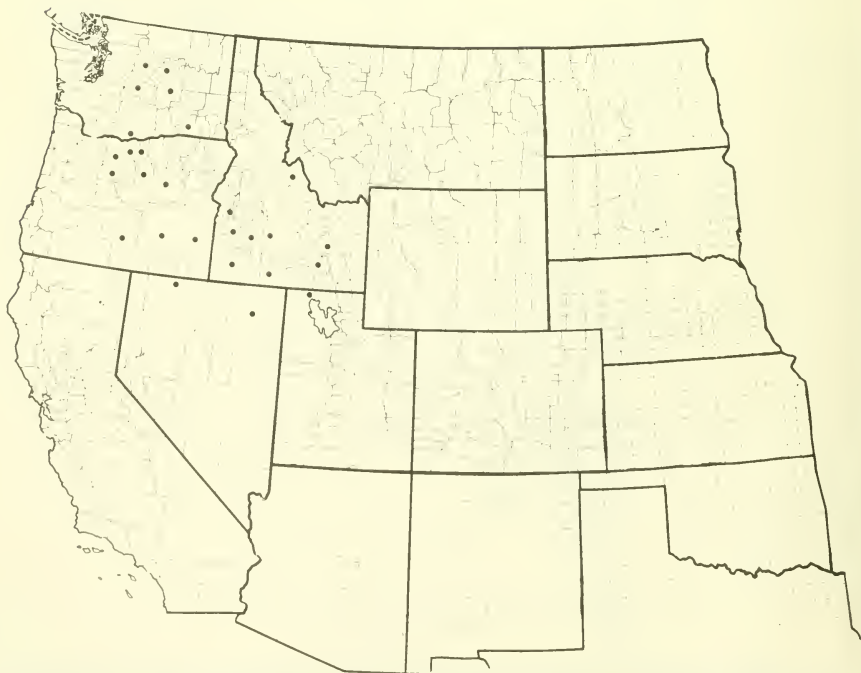


Fig. 10. Distribution of *Phlox longifolia* Nutt. var. *viridis* (E. Nelson) Peabody over western North America.