

FIG. 1. Map showing distributions of *Penstemon dolius* var. *dolius* and var. *duchesnensis*.

of central and western Utah and eastern Nevada to be worthy of varietal recognition. The two varieties can be distinguished by the following characters.

- 1 Principal leaves 3–5.5 cm long; stems 5–20 cm long, prostrate, decumbent or rarely erect; staminode with a dense terminal tuft of hairs and sparsely hairy below; corolla usually sky blue; east-central Great Basin _____ var. *dolius*
- 1 Principal leaves 1–3 cm long; stems 2–6 (7) cm long, erect; staminode densely bearded throughout most of its length; corolla dark blue to purplish-blue; Uinta Basin _____ var. *duchesnensis* N. Holmgren

PENSTEMON DOLIUS M. E. Jones ex Pennell var. DOLIUS

Penstemon dolius M. E. Jones ex Pennell, Contr. U.S. Natl. Herb. 20: 341. 1920. TYPE: UNITED STATES. UTAH. Tooele Co.: Deep Creek Range, Willow Spring Pass, NW of Callao, 5 Jun 1891, M. E. Jones s.n. (HOLOTYPE: POM).

Dry gravelly alluvial fans, often in alkaline soils, in shadscale, sagebrush and pinyon-juniper woodland communities, 1500–2000 m (5000–6700 ft) elevation. Eastern Nevada from eastern Elko Co., White Pine Co. and extreme northeastern Nye Co. across the Bonneville Basin of Utah in southwestern Tooele, western Juab, Millard and Beaver cos. to Gunnison Valley in San Pete and Sevier cos. (Fig. 1). May–June.

Penstemon dolius var. *duchesnensis* N. Holmgren, var. nov. (Fig. 6)

A var. *dolio* caulibus plerumque brevioribus 2–6 (7) (nec 5–20) cm longis erectis (nec decumbentibus prostratisve), foliis majoribus 1–3 (nec 3–5.5) cm longis, corolla saturatius coerulea, staminodioque fere tota longitudine (nec plerumque apicem versus) barbato diversa.

TYPE: UNITED STATES. UTAH. Duchesne Co.: Uinta Basin, along U.S. Highway 40, ca 16 km (10 mi) E of Duchesne, 2 km (1.3 mi) W of Bridgeland

turnoff, T4S, R3W, S8, 1650 m (5400 ft) elevation, 25 May 1978, *N. Holmgren, P. Holmgren & R. Barneby 8762* (HOLOTYPE: NY; ISOTYPES: BRY, UT, UTC, and others to be distributed).

Dry gravelly, sandy or clay, often alkaline soils in hills with sagebrush, pinyon pine and juniper associations, 1500–2000 m (5000–6600 ft) elevation. Endemic to the western Uinta Basin, in the vicinity of Duchesne, Duchesne Co., Utah (Fig. 1). May–early June.

Pennell (1920, p. 341) observed that the *Jones s.n.* (Theodore to Myton) “collection differs in its dwarf habit and more widely spreading corolla lobes, and only because of the variability in the corolla lobes of the type of *P. dolius* is it placed with this species.”

Specimens examined: UTAH. DUCHESNE Co., E Uinta Basin: 2 mi W of Duchesne, *A. & M. Collotzi 443* (NY, UTC); 7 mi W of Duchesne, *Cronquist 9058* (GH, NY, UC, UTC); 2.5 mi SW of Duchesne, *N. & P. Holmgren 5224A* (NY); 3.8 mi E of Duchesne, *N. Holmgren et al. 1787* (BRY, GH, NY, UTC); 10 mi W of Duchesne, *N. Holmgren et al. 1942* (BRY, NY, UTC); Theodore [Duchesne], benches of the Uintas, 12 May 1908, *Jones s.n.* (POM); Theodore, 14 May 1908, *Jones s.n.* (POM); Theodore to Myton, 19 May 1908, *Jones s.n.* (NY, POM, US); 3 mi W of Duchesne, *Ripley & Barneby 4671* (NY); 6 mi W of Duchesne, W of Starvation Reservoir, *Woodruff 1058* (UT, UTC).

Reexamination of *Penstemon miser*

Keck (1938) considered the following three taxa as one variable species bearing the name *P. miser* A. Gray. The geographical distinctness of these three species (Fig. 4) was not as obvious in 1938 with the meager sampling of collections (14 cited by Keck vs 81 cited here) at Keck’s disposal. Although he did not recognize that the morphological differences were in geographically coherent populations he came very close to this revelation, as evidenced by his discussion (Keck, 1938, pp. 247, 248).

The variability in flower-size in *P. miser* [sens. lat.] is perplexing. Material from Malheur Co., Oregon [*P. miser* sens. strict.] is relatively small-flowered (15 mm. long, 5–6 mm. wide), with a gradually ampliate but narrow throat; that from Harney Co. [*P. janishiae*] is appreciably larger in this respect, while in that from Modoc Co., California [*P. janishiae*], it is half again as long and 9 mm. wide, the ampliate throat flaring abruptly from the narrow tube. In eastern Nevada the situation is repeated with even more variation. In Elko Co. the collections [*P. janishiae*] tend to be rather uniformly larger than the type and more ampliate, but less abruptly ventricose than the Applegate collection from Modoc County. *Keck 605* and *616* [both *P. barnebyi*] are similar, with corollas 13–14 mm. long and only 4.5 mm. wide. In startling contrast is the collection from relatively nearby in Nye County, *Goddard [P. janishiae]*, in which the flowers are 28 mm. or more long and 10 mm. wide! It is determined from an ample number of collections that differences in flower-size run counter to geographic divisions, so we cannot do otherwise on the basis of present evidence than admit these striking variations within the same taxonomic unit. The only other character that is noticeably variable is the shape of basal leaves, which may be nearly linear or almost oval in the same local colony. In other respects this species is quite uniform and there is no indication that it is unnatural.

Penstemon miser, *P. janishiae* and *P. barnebyi* belong to a related group of

ventrally, the tube 5–7 mm long, strongly bilabiate, the lips deeply divided, the upper projecting to slightly arched, 4.5–7 (8) mm long, the lobes of the lower lip spreading to slightly reflexed, blue-purple, blue-violet to magenta, sometimes pale blue, with red-violet guidelines on the lobes, glandular-pubescent externally, the palate flat, sparsely white bearded; *staminode* only somewhat exerted, recurved apically but not coiled, orange-yellow bearded with hairs 0.7–1.2 mm long; *fertile stamens* reaching the orifice, the anther-sacs 0.7–1.0 (1.2) mm long (after dehiscence), dehiscing the full length and becoming explanate, cream to dark purple, essentially glabrous; *capsule* (6) 8–12 mm long, broadly ovoid, acuminate; *seeds* ca 1.4–2.0 mm long.

Diatomite and ash soils, often weathered to clay, in sparse sagebrush and pinyon-juniper communities, 750–1300 m (2500–4500 ft) elevation. Southern Baker Co. and the northern two-thirds of Malheur Co., Oregon and adjacent Owyhee Co., Idaho (Fig. 4). Late May–June.

The abridgment of *P. miser* results in a more uniform taxon but there may yet be reason for further subdivision. Plants indicated as coming from diatomite soils are equally pubescent on both surfaces of the leaves, whereas those indicated to be from ash soils are pubescent on the upper leaf surface and glabrous below. Plants with uniformly pubescent leaves such as those on the type collection (*Cusick 1239*) seem to be restricted to northern Malheur County. Plants having leaves with glabrous undersides are the common form in the Succor Creek region of central Malheur County as well as in northeastern Malheur County, southern Baker County and adjacent Idaho. More field study will be necessary to determine whether or not these forms are restricted to these special edaphic conditions. Patricia Packard (pers. comm.) has observed pinker corollas in the Succor Creek plants than those in the region of the Malheur River.

Specimens examined: OREGON: MALHEUR Co.: 3 mi S of Harper, *Cronquist 8177* (NY); hills of Crooked [Creek] River, *Cusick 1672* (MSU); Deadman Gulch at S end of Succor Creek road, *Ertter 1980* (CIC, NY); T19S, R41E, S11, *Grimes 1131* (CIC, NY); about 5 mi S of Rockville, *Grimes 1164* (CIC, NY); 6.6 mi NW of Harper, *Halse 1148* (OSC); 7.5 km NNW of Harper, N. & P. *Holmgren 8812* (NY, UTC); 2.5 km SW of Westfall, N. & P. *Holmgren 8831* (NY, UTC); Matheur [sic] Valley near Harper Ranch, *Leiberg 2226* (GH, NY, PH, UC); road from Harper to Westfall, *Packard 76-47* (CIC); McCarty Ridge E of Jamison, *Packard 78-110* (CIC, NY); Chalk Basin, *Packard 78-227* (CIC); Dry Creek road, *Packard & Grimes 78-151* (CIC, NY); Wild Horse Canyon out of Dry Creek Canyon, *Packard & Grimes 78-168* (CIC, NY); T24S, R44E, S22, *Packard & Grimes 78-183* (CIC, NY); Bensley Flat, T24S, R44E, S28, *Packard & Grimes 78-197* (CIC); 1 mi N of Harper, *Peck 21301* (WILLU); 6 mi NW of Harper, *Peck 21318* (WILLU); Rockville, *Train 520* (PH). BAKER Co.: 1 mi E of Quartz, *Head 542* (BRY, NY, OSC); 4 mi E of Baker City, *Ripley & Barneby 6576* (NY, PH).

Penstemon janishiae N. Holmgren, sp. nov. (Fig. 3)

Foliis puberulis, staminodio exserto, corolla glanduloso-puberula, corollae faucibus ventre rotundatis, antherisque explanatis *P. miserum* A. Gray simulans, sed floribus plerumque majoribus 18–28 (nec 14–22) mm longis, corollae faucibus magis inflatis 7–12 (nec 3–7) mm diam, labio superiori (6.5) 8–13 (nec 4.5–7) mm longo, staminodioque magis exserto annulatum recurvo diversa.

Perennial herb with well developed basal leaves (mostly from short, sterile stems); *flowering stems* erect or ascending, 0.8–2 (2.5) dm tall, few to several clustered on a frequently branched, woody caudex, surmounting a taproot; *herbage* retrorsely puberulent; *leaves* entire to toothed, 2–5 (6) cm long, 5–10 (16) mm broad, the basal and lower cauline leaves oblanceolate, petiolate, the upper cauline leaves lanceolate, sessile; *thyrses* not secund, of 2–5 verticillasters, leafy, the cymes 2–3 (4)-flowered, the axis, peduncles and pedicels glandular-pubescent;

sepals 6–10 mm long at anthesis, sometimes to 13 mm in fruit, lanceolate, acute, glandular-pubescent, the margins scarious proximally; *corolla* 18–28 mm long, more or less abruptly and broadly ventricose-ampliate, the throat 7–12 mm broad (in pressed specimens), rounded ventrally, the tube (6) 8–12 mm long, strongly bilabiate, the clefts separating the lips cutting deeply into the rounded throat, the upper lip projecting-arched, (6.5) 8–13 mm long, the lobes of the lower lip reflexed or spreading, dull purple, violet or pink with dark purple or red-violet guidelines in the throat and lower lip, the lobes sometimes with a bluish tinge, glandular-pubescent externally, the palate flat, white to pale-yellow bearded; *staminode* conspicuously exserted, coiled apically, densely orange-yellow bearded with hairs 1.0–1.2 mm long; *fertile stamens* reaching the orifice, the anther-sacs 0.8–1.2 mm long (after dehiscence), dehiscing the full length and becoming explanate, cream to blue, essentially glabrous; *capsule* 7–11 mm long, broadly ovoid, acuminate; *seeds* ca 1.6–2.0 mm long.

TYPE: UNITED STATES. NEVADA. Eureka Co.: Antelope Valley, U.S. Highway 50, 41.5 km (25.8 mi) W of Eureka, T19N, R50E, S18, 1875 m (6150 ft) elev., 17 Jun 1978, barren clay hills in sagebrush country, *N. & P. Holmgren 8966* (HOLOTYPE: NY; ISOTYPES: BRY, RENO, UTC, and others to be distributed).

Clay soils derived from volcanic rock in sagebrush, juniper and pinyon-juniper communities, 1300–2250 m (4400–7400 ft) elevation. Bicentric distribution, the western populations ranging from Lassen and Modoc cos., California through northern Washoe Co., Nevada to southern Harney Co., Oregon, and the eastern populations ranging in Nevada from northwestern Nye Co. through southern Lander, southern Eureka and northwestern White Pine cos. to central Elko Co. and Owyhee Co., Idaho (Fig. 4). Late May–June.

The distribution map (Fig. 4) shows *P. janishiae* occupying two disjunct regions. The closest known populations are separated by more than 200 kilometers (130 miles). No apparent morphological differences accompany the geographically unjoined populations. It may be significant that the interval is occupied by the Lahontan Basin, consisting of extensive lowland deserts extending below 1500 meters (5000 feet) elevation and receiving an annual precipitation of about 15 centimeters (six inches) or less, whereas the regions inhabited by *P. janishiae* are higher and receive more than 25 centimeters (10 inches) precipitation. In the interior of the Great Basin the populations remain above 1800 meters (5800 feet) elevation. Climatic fluctuations of the recent past are very likely responsible for this present distributional discontinuity. The Owyhee County, Idaho location is an anomaly and no speculations are made here.

It is a pleasure to name this attractive species in honor of Jeanne Russell Janish, accomplished botanical artist. Munz was correct when he wrote in the acknowledgments to his *Flora of Southern California* (1974) that Jeanne Janish “has illustrated western plant species more widely than any other artist.” She provided the majority of the illustrations for volumes two, three and four of Abrams’ *Illustrated Flora of the Pacific States*, all of the illustrations for parts one through four of the Hitchcock, Cronquist, Ownbey & Thompson, *Vascular Plants of the Pacific Northwest*, and the majority for volumes one and six of *Intermountain Flora*. The illustrations in the forthcoming volumes two, three and four of *Intermountain Flora* will include many of hers. Her work also appears in numerous local floras and technical articles. The wild flower enthusiast is familiar with her work in the series *Flowers of the Southwest*, which includes the deserts (Dodge & Janish, 1965), the mountains (Arnberger & Janish, 1968) and mesas (Patraw & Janish, 1970), and the book *Death Valley Wildflowers* (Ferris & Janish, 1962). Her knowledge of

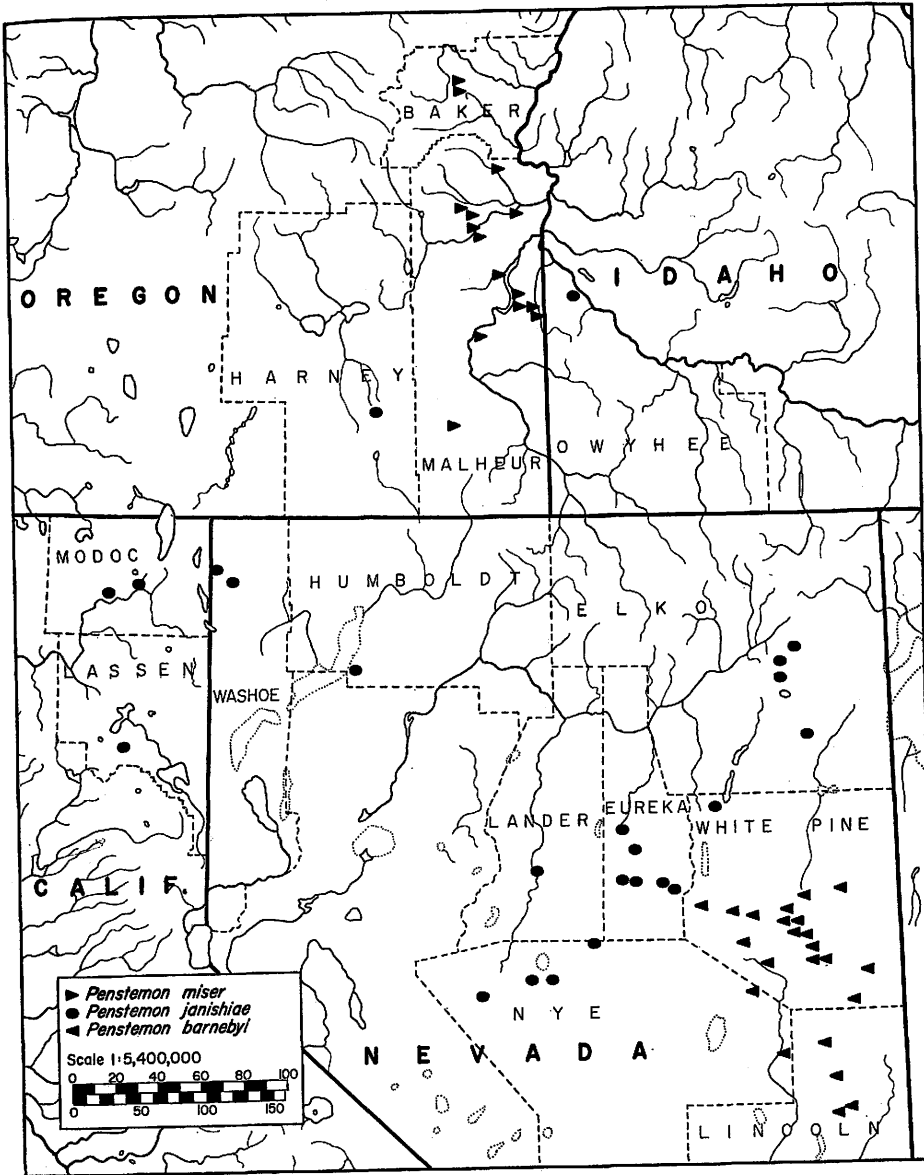


FIG. 4. Map showing distributions of *Penstemon miser*, *P. janishiae* and *P. barnebyi*.

botany, her ability to correctly observe details and to create botanically accurate, aesthetically appealing, lifelike drawings from dried and pressed herbarium specimens has made her an asset to botanists. She is the foremost botanical illustrator in western United States floristics.

Specimens examined: IDAHO: OWYHEE Co.: SW of Hot Springs, Ripley & Barneby 6510 (NY, PH). OREGON: HARNEY Co.: E base of "Stein's Mt.," Train s.n. (NY, OSC). NEVADA: ELKO Co.: 15 mi from Wells on U.S. 40, Cooper et al. 134 (NESH); between Twin Bridges and Lee, A. Holmgren 838 (UTC); Spruce Mountain, A. Holmgren 1176 (UTC);

Sprucemont, 21 Jul 1891, *Jones s.n.* (POM); 8 mi S of Wells, *Keck 921* (NY); E of Wells, 25 May 1939, *A. Smith s.n.* (UTC). WHITE PINE Co.: Overland Pass, S end of Ruby Mountains, *Mason 4823* (UC). EUREKA Co.: 8 mi W of Eureka, *N. Holmgren & Reveal 909* (NY, UTC); Eureka, *Kennedy [845]* (NESH); 8 mi W of Eureka, *Ripley & Barneby 6206* (NY, PH); canyon E of Eureka, *Ripley & Barneby 9329* (NY, PH); Roberts Station, *Watson 778* (GH, NY); road to Pete Hanson Creek, NW side of Roberts Mountain, *Williams 77-40-1* (NY); 25 mi W of Eureka, *Worth 516* (PH); $\frac{1}{4}$ mi E of Eureka, *Worth 517* (PH). LANDER Co.: 6 mi NW of Austin, *Ripley & Barneby 5928* (NY, PH). NYE Co.: S of Twin River, 8 Jun 1933, *Goddard s.n.* (NY, UC); 10 mi NW of Potts, *Goodner & Henning 339* (RENO, UC); 1 mi S of Round Mountain, *Train 2747* (NY, RENO, UC, UTC); near Ichthyosaur Paleontologic State Monument, *Williams 73-F-1* (NY, RENO). WASHOE Co.: 3 mi S of Vya, *Bacigalupi et al. 5708* (JEPS); canyon 7 mi W of Vya, *Ripley & Barneby 6013* (PH). CALIFORNIA: MODOC Co.: ca 4 mi W of Canby, *Davidson 2137* (RSA); 5.6 km W of downtown Alturas, *N. & P. Holmgren 8883* (NY); mesa NW of Alturas, *Ripley & Barneby 5990* (NY, PH). LASSEN Co.: top of Diamond Mountain, 28 Jun 1897, *Jones s.n.* (POM); summit and E slope of Diamond Mountain, *Stebbins & Jenkins 2282* (NY, UC).

Penstemon barnebyi N. Holmgren, sp. nov. (Fig. 5)

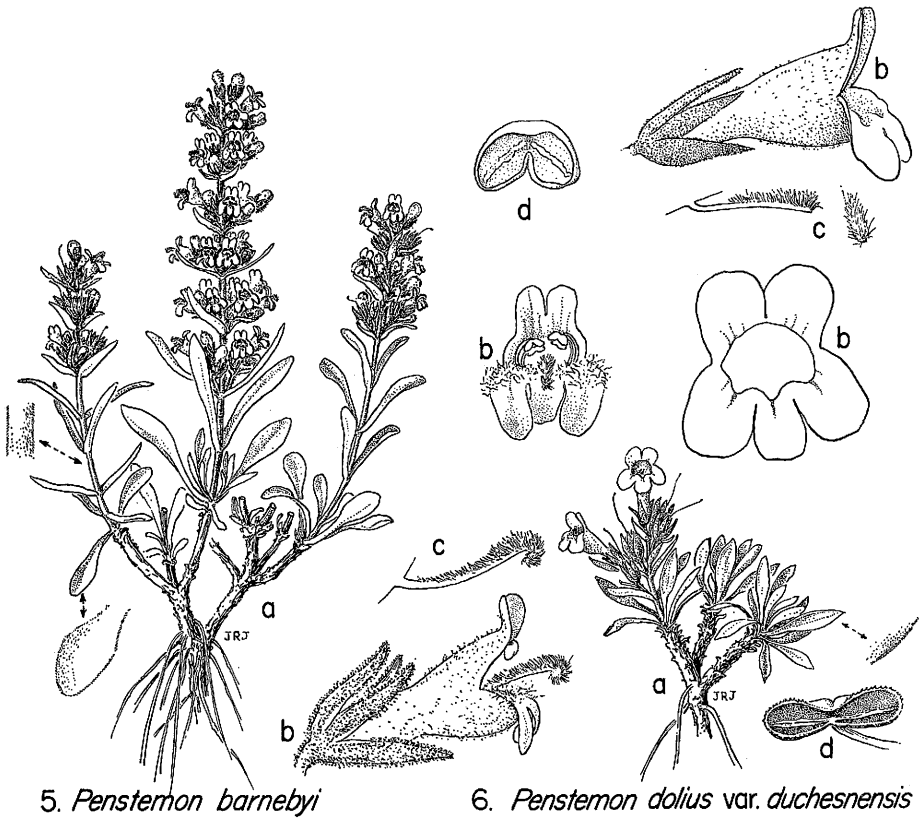
Foliis puberulis, staminodio exserto, corolla glanduloso-puberula, corollae faucibus ventre rotundatis, antherisque explanatis *P. miserum* A. Gray simulans, sed corolla minori 10–14 (nec 15–20 raro 14) mm longa, capsulisque minoribus 3–6 (nec 7–12 raro 6) mm longis diversa.

Perennial herb with well developed basal leaves (mostly from short, sterile stems); *flowering stems* suberect to erect, 0.6–2 (3) dm tall, few to several clustered on a thick, sometimes branched caudex, surmounting a taproot; *herbage* retrorsely-puberulent; *leaves* entire or obscurely toothed, 2–5.5 (7.5) cm long, 4–10 mm broad, the basal and lower cauline leaves lance-elliptic to spatulate, obtuse to rounded, petiolate, the upper cauline ones lanceolate, acute to obtuse, sessile; *thyrses* not secund, narrow, of 3–6 verticillasters, leafy, the cymes compressed, ca 3–5-flowered, the axis, peduncles and pedicels glandular-pubescent; *sepals* 4.5–7 cm long at anthesis, sometimes to 12 mm in fruit, linear-lanceolate to lanceolate, acute, glandular-pubescent, sometimes reddish-brown, the margins scarious proximally; *corolla* 10–13 (14) mm long, more or less abruptly ventricose-ampliate, the throat 4–5 mm broad (in pressed specimens), rounded ventrally, the tube 4–5 (6) mm long, strongly bilabiate, the upper lip projecting-arched, (3) 4–4.5 (5.5) mm long, the lobes of the lower lip reflexed, violet, the lobes blue towards the tips, the throat white within with red-violet guidelines and the tube yellowish, glandular-pubescent externally, the palate pale yellow to densely brownish-yellow bearded; *staminode* conspicuously exserted, coiled apically, densely orange-yellow bearded; *fertile stamens* included, the anther-sacs 0.7–0.9 mm long (after dehiscence), dehiscing the full length and becoming explanate, blue, essentially glabrous; *capsule* 3–6 mm long, broadly ovoid, acuminate; *seeds* ca 1.5–2.0 mm long.

TYPE: UNITED STATES. NEVADA. White Pine Co.: N end of White River Valley, 4.3 km (2.7 mi) up (W) White River road from U.S. Highway 6, 14.4 km (9 mi) airline distance W of Preston, T12N, R60E, S3, 1900 m (6250 ft) elevation, among sagebrush in open pinyon-juniper country, 23 Jun 1977, *N. & P. Holmgren 8492* (HOLOTYPE: NY; ISOTYPES: BRY, RENO, UTC, and others to be distributed).

Alluvial gravels or silts derived from limestone, in sagebrush and pinyon-juniper communities, 1500–2500 m (5000–8200 ft) elevation. Endemic to east-central Nevada from the southern half of White Pine Co. to northern Lincoln Co. and northeastern Nye Co. (Fig. 4). Late May–June.

Penstemon barnebyi is a close relative of *P. miser* and *P. janishiae*, but because of its smaller flowers it more closely resembles *P. concinnus* Keck of the adjacent

5. *Penstemon barnebyi*6. *Penstemon dolius* var. *duchesnensis*

FIGS. 5 and 6. Fig. 5. *Penstemon barnebyi* N. Holmgren. A. Habit, $\times \frac{1}{2}$. B. Flowers, $\times 3$. C. Staminode, $\times 3$. D. Anther (dehisced), $\times 12$. Fig. 6. *Penstemon dolius* var. *duchesnensis* N. Holmgren. A. Habit, $\times \frac{1}{2}$. B. Flower, $\times 2$. C. Staminode, $\times 2$. D. Anther (dehisced), $\times 8$. Both drawings by Jeanne R. Janish.

Bonneville Basin and *P. atwoodii* Welsh of the Kaiparowits Plateau. It is possible that these three small-flowered species have a common ancestor which became fragmented during the climatic shifts of the Pleistocene.

Nearly fourteen years ago, while discussing the Intermountain flora with me, Rupert C. Barneby pointed out some of the dissimilarities between this small-flowered *Penstemon* of limestone alluvial soils and the large-flowered one on weathered volcanic soils to the west (*P. janishiae*). The results of the present study confirm his observations. It gives me great pleasure to name this species after him in commemoration of the many such enlightening discussions on the western floras. His vast knowledge, intellect, enthusiasm, insatiable curiosity, boundless energy and keen sense of humor have been a constant source of inspiration and help to me.

Specimens examined: NEVADA: WHITE PINE Co.: 33 mi W of Ely on U.S. Highway 50, N. Holmgren & Reveal 920 (BRY, NY, UTC); Pole Canyon, Snake Range, N. Holmgren & Reveal 968 (BRY, NY, UTC, WTU); upper White River Valley, N. & P. Holmgren 5267 (topotype: NA, NY, UTC); 7.7 km SW of Murry Summit on U.S. Highway 6, N. & P. Holmgren 8976 (NY); 7 mi SW of Ely, Keck 616 (NY); 5 mi W of Conners Pass, Schell Creek Range, McMillan et al. 24 (RSA, UT); 9 mi W of Ely, Moore & Franklin 307 (NA); 3 mi S

of Ruth, *Moore & Franklin 340* (NA); 5 mi W of Kimberly, *Moore & Franklin 375* (NA); 4 mi N of Keystone, *Moore & Franklin 396* (NA); 15 mi W of Ely, *Moore & Franklin 454* (NA, RENO, UC); 15 mi N of Ely, *Moore & Franklin 631* (NA); Aurum, *Moore & Franklin 818* (NA); Steptoe Creek, NE of Ely, *Pennell & Schaeffer 23070* (GH, NA, NY, PH, UC, UT, UTC); Connors Pass, Schell Creek Range, *Pennell & Schaeffer 23219* (GH, NA, NY, PH, UC); Pancake Summit, *Ripley & Barneby 6258* (PH); foothills of Egan Range, S of Ely, *Ripley & Barneby 6297* (PH); Fortification Range, W of Shoshone, *Ripley & Barneby 6318* (NY); White Pine Range, N of Hamilton, *Ripley & Barneby 9288* (NY, PH), *9319* (NY, PH); Little Antelope Summit, Highway 50, *Williams 67-WP-3* (RENO); just outside of Ely, *Worth 506* (NA). NYE Co.: White River Valley, near Adams McGill Reservoir, *N. & P. Holmgren 8978* (NY); 4.8 mi E of Currant, at White Pine Co. line, *Keck 605* (NY, PH, POM, UC); near Sunnyside, *Ripley & Barneby 3619* (NY). LINCOLN Co.: S Schell Creek Range, road to Patterson Pass, *N. Holmgren & Jensen 3537* (NY, UC, UTC); 25 mi N of Pioche, Fairview Range, *N. Holmgren & Jensen 3555* (NY, RSA, UC, UTC, WTU); Abbotsford, 20 mi W of Pioche, *Moore & Franklin 831* (NA, RENO); N of Pioche, *Ripley & Barneby 6349* (NY, PH).

New Taxa of Section *Coerulei*

Taxonomically section *Coerulei* Pennell (sect. *Annularius* Keck) is the most difficult assemblage of all *Penstemon* groups. It has been neglected or avoided by monographers, so no all-inclusive study has been done other than the compilation by Bennett (1966) for the American *Penstemon* Society. A brief description and discussion of the section is given in an earlier paper (Holmgren, 1978a) in which I described a new species, *P. inmanifestus*, from the central Great Basin.

Penstemon angustifolius and *P. acuminatus* (both treated below) are fairly distinct both morphologically and geographically but are more or less linked in both respects through *P. nitidus* Dougl. ex Benth. The geographical range of *P. acuminatus* remains separate, but *P. nitidus* and *P. angustifolius* come together in eastern Montana, North Dakota and northeastern Wyoming. In the region of overlap the race of *P. angustifolius* (var. *angustifolius*) is an exceptionally narrow-leaved one, but the distinction is not always very sharp and, as Cronquist points out (1959, p. 395), "it is possible that monographic study will necessitate the treatment of these several taxa (except *P. acuminatus*) as geographical races of a single species, under the binomial *P. angustifolius* Pursh." These three species have in common narrowly lanceolate sepals and are the northern representatives of sect. *Coerulei*. It is usually possible to distinguish them by the following combination of characters.

- 1 Cauline leaves linear to narrowly lanceolate, or if broader the apex caudate; corolla 15–22 mm long; anther-sacs (1.0) 1.2–1.5 mm long; common in sandy soils of the Great Plains ranging southeast to the Colorado Plateau — *P. angustifolius* Nutt. ex Pursh
- 1 Cauline leaves lanceolate to orbicular, acuminate or mucronate; corolla 11–18 (20) mm long; anther-sacs 0.7–1.2 (1.5) mm long.
- 2 Cauline leaves ovate to orbicular, broadly rounded apically with a mucronate tip; staminode bearded 2–5 mm of its distal length with hairs 0.5–1.2 mm long; mostly on gravelly or clay banks and talus in Montana and adjacent parts of Alberta, Manitoba, North Dakota, Wyoming and Idaho — *P. nitidus* Dougl. ex Benth.
- 2 Cauline leaves lanceolate to ovate, tapering to an acute apex; staminode bearded 1–1.5 mm of its distal length with hairs 0.5 mm long or less; usually in loose sandy soils of the Snake River Plains and western Great Basin — *P. acuminatus* Dougl. ex Lindl.

Penstemon mucronatus, the third *Coerulei* species treated below, is characterized by broad, scarious-margined sepals and greatly broadened staminodes, which aligns it with *P. pachyphyllus* A. Gray ex Rydb., *P. osterhoutii* Pennell and possibly *P. cyathophorus* Rydb. and *P. harringtonii* Penland.

PENSTEMON ANGUSTIFOLIUS Nutt. ex Pursh

Short-lived perennial herb; stems erect or ascending, 1–4 (6) dm tall, single or few arising from a more or less woody crown, usually surmounting a taproot; herb-

age glabrous and glaucous; *leaves* entire, fleshy, mostly cauline, the basal and lower cauline leaves (4) 5–9 cm long, 2–16 mm broad, linear to narrowly oblanceolate, occasionally broader in southern varieties, obtuse to rounded apically, tapering to a petiolar base, ascending, the upper leaves 3–10 cm long, 3–20 (40) mm broad, linear to lanceolate or narrowly ovate, acuminate, the narrow tip often long acuminate to caudate in the broader ones, sessile; *thyse* not secund, leafy, of 6–16 verticillasters, interrupted or aggregated into a continuous thyse, the cymes usually many-flowered, glabrous; *sepals* (4) 5–7 mm long at anthesis, to 8.5 mm in fruit, lanceolate to narrowly ovate, acuminate, glabrous or sometimes scabrid-puberulent in var. *angustifolius*, becoming ribbed with age, the margins narrowly scarious, sometimes only near the base; *corolla* 15–20 (22) mm long, moderately ampliate, the tube 5–8 mm long, the lobes spreading or projecting, the limb blue to blue-purple or pink-lavender to pink, often with darker guidelines within the throat, glabrous externally, the palate sometimes with a few scattered whitish hairs; *staminode* reaching the orifice, expanded distally, 1.0–1.2 mm broad, bearded at the tip with short, yellow hairs, the hairs 0.5–0.8 mm long, the tip recurved; *fertile stamens* included, the anther-sacs (0.9) 1.2–1.5 mm long (after dehiscence), dehiscing the full length and across the connective, spreading but not explanate, glabrous except for the papillate-toothed sutures; *capsule* 8–12 mm long.

The previously named varieties have been variously regarded taxonomically, as their nomenclatural history reveals. The varieties of *P. angustifolius* can be distinguished by the following characters.

- 1 Cauline leaves linear to narrowly lanceolate, usually less than 6 mm broad; bracts and upper leaves gradually tapering from near the base.
- 2 Thyse 5–12 (28) cm long, the 3–10 verticillasters more or less aggregated into a continuous thyse, the cymes with short but apparent pedicels and peduncles; plants 1–3 (3.5) dm tall; corolla 14–17 (20) mm long; northern Great Plains var. *angustifolius*
- 2 Thyse (10) 18–36 cm long, the 8–16 verticillasters relatively remote and distinct, the cymes with sessile to subsessile flowers; plants 2.5–4 dm tall; corolla (18) 20–22 mm long; eastern Uinta Basin var. *vernalensis* N. Holmgren
- 1 Cauline leaves lanceolate to ovate, more than 6 mm broad; bracts and upper leaves more or less abruptly tapering from the widened middle forming an acuminate to caudate apex.
- 3 Corolla blue to bluish-purple; southern Great Plains and northern New Mexico var. *caudatus* (Heller) Rydb.
- 3 Corolla lavender to pink; Colorado Plateau var. *venosus* (Keck) N. Holmgren

PENSTEMON ANGUSTIFOLIUS Nutt. ex Pursh var. ANGUSTIFOLIUS

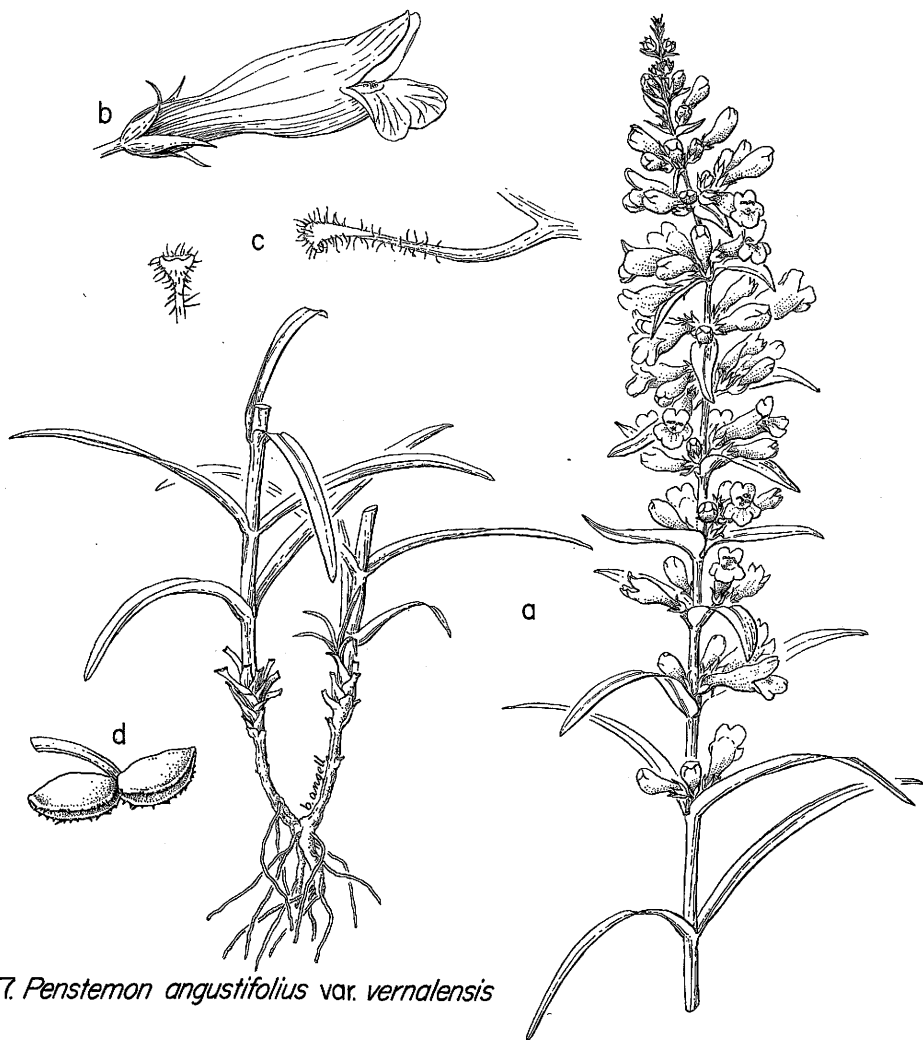
Pentstemon angustifolium Nutt. Fraser's Cat. Pls. Upper Louisiana 2. 1813, nomen nudum; Nutt. ex Pursh, Fl. Amer. Sept. 738. 1814. *Chelone angustifolia* Steudel, Nomencl. Bot., ed. 1. 186. 1821. TYPE: UNITED STATES. NORTH DAKOTA: "In upper Louisiana," near the Minataree village, possibly Mercer Co., fide Pennell (1935), *Bradbury s.n.*

Pentstemon caeruleum Nutt. Gen. N. Amer. Pl. 2: 52. 1818. *Chelone coerulea* Sprengel, Syst. Veg. 2: 813. 1825. TYPE: UNITED STATES. NORTH DAKOTA: "Hab. on the plains of the Missouri, near Fort Mandan and the Indian towns," *Nuttall s.n.*

Dry sandy or gravelly soils on hills and prairies, 600–2200 m (2000–7200 ft) elevation. Northern Great Plains from the eastern parts of Montana, Wyoming and Colorado to North and South Dakota, Nebraska and western Kansas.

Penstemon angustifolius var. *vernalensis* N. Holmgren, var. nov. (Fig. 7)

Foliis linearibus vel anguste lanceolatis, bracteis lanceolatis acutis, corollaque coerulea var. *angustifolio* similis, sed statura majori 2.5–4.5 (nec 1–3) dm alta, inflorescentia angusta elongata e verticillastris 6–16 discretis (nec 3–10 confertis) constanti, necnon floribus subsessilibus (nec breviter pedunculatis simul ac pedicellatis) diversa.



7. *Penstemon angustifolius* var. *vernalensis*

FIG. 7. *Penstemon angustifolius* var. *vernalensis* N. Holmgren. A. Habit, $\times \frac{1}{2}$. B. Flower, $\times 2$. C. Staminode, $\times 3$. D. Anther (dehisced), $\times 10$. Drawing by Bobbi Angell.

TYPE: UNITED STATES. UTAH. Uintah Co.: Uinta Basin, 5 km (3.1 mi) N of downtown Maeser, on Red Cloud Loop Road, T3S, R21E, S33, 1770 m (5800 ft) elevation, 25 May 1978, N. Holmgren, P. Holmgren & R. Barneby 8748 (HOLOTYPE: NY; ISOTYPES: BRY, UT, UTC, and others to be distributed).

Sandy soils in sagebrush vegetation, sometimes with scattered junipers, 1500–1800 m (5000–5800 ft) elevation. Endemic to the eastern Uinta Basin where it is known from four sites near Vernal: in Uintah Co., Utah, the type locality 8 km to the northwest; 10 km east, and 20 km southeast; and in Rio Blanco Co., Colorado, 58 km to the east-southeast near the Moffat Co. line (Fig. 12).

Specimens examined: UTAH: UINTAH CO.: Docks Bench on Taylor Mountain road N of Maeser, Atwood 6429 (approximate topotype: BRY); 1 mi SW of Dinosaur Natl. Monument,

Neese 4785 (BRY, NY); SE of Jensen, *Ripley & Barneby 10615* (NY). COLORADO: RIO BLANCO Co.: near Caisson, *Ripley & Barneby 7790* (NY).

PENSTEMON ANGUSTIFOLIUS var. CAUDATUS (Heller) Rydb.

Penstemon caudatus Heller, Minnesota Bot. Stud. 2: 34. 1898. *P. angustifolius* (f.) *caudatus* Rydb. Bull. Torrey Bot. Club 33: 151. (7 Apr) 1906. *P. angustifolius* var. *caudatus* Rydb. Fl. Colorado (Agric. Exp. Sta. Colorado Agric. College 100:) 309. (Aug) 1906. *P. secundiflorus* var. *caudatus* A. Nels. in Coult. & Nels. New Manual Bot. Centr. Rocky Mts. 444. 1909. *P. angustifolius* (subsp.) *caudatus* Pennell, Contr. U.S. Natl. Herb. 20: 362. 1920. *P. angustifolius* subsp. *caudatus* Keck in Kearney & Peebles, J. Wash. Acad. Sci. 29: 490. 1939. TYPE: UNITED STATES. NEW MEXICO. Taos Co.: Barranca, 6900 ft, 26 May 1897, A. & E. Heller 3581 (ISOTYPES: NY—2 sheets).

Sandy or gravelly soils on prairies and hills from 1200 to 2600 m (4000–8500 ft) elevation. Southeastern Colorado and western Kansas to western Oklahoma and northern New Mexico.

Rydberg successively elevated the rank of this taxon. He first (1906, p. 151) characterized it as a mere form, referring to it as “the southern more luxuriant and broad-leaved form of *P. angustifolius*,” to which he added that “the two grade absolutely into each other in Colorado.” Later, in *Flora of Colorado* (1906b, p. 309) he referred to it as “a taller variety with broader leaves from Colorado and New Mexico.” In *Rocky Mountain Flora* (1917 [1918]), he treated it as a species. Pennell’s opinion also fluctuated. In 1920 (p. 362) he considered it as “variable and very inconsistently distinguished; perhaps a robust form, rather than a geographical subspecies . . .” In 1922 (p. 73) he wrote that it “seems to be too inconsistently distinguishable to be considered as more than a form.” By 1935, after studying more specimens, he treated it as a species. In the text (p. 266) he wrote with confidence, “appearing not intergrading with the preceding [*P. angustifolius*],” but later, presumably closer to press time, he wrote an addendum (p. 633) stating that “the distinctness of these two species is only tentatively advocated now; their ranges touch in Colorado and the problem can best be decided by further field-study there.”

PENSTEMON ANGUSTIFOLIUS var. VENOSUS (Keck) N. Holmgren

Penstemon angustifolius subsp. *venosus* Keck in Kearney & Peebles, J. Wash. Acad. Sci. 29: 490. 1939. *P. venosus* Reveal, Great Basin Naturalist 34: 311. 1974. *P. angustifolius* var. *venosus* N. Holmgren, Brittonia 31: 104. 1979. TYPE: UNITED STATES. ARIZONA. Coconino Co.: 12 mi NE of Tuba City, 5300 ft, 3 Jun 1935, *Peebles & Fulton 11877* (HOLOTYPE: US).

Sandy soils in black brush, sagebrush and pinyon-juniper woodland from 1500 to 1700 m (5000–5800 ft) elevation. Canyon Lands, in Utah from western parts of Wayne, Garfield and Kane cos. and San Juan Co., in Arizona from eastern Coconino Co. and northern parts of Navajo and Apache cos., and in New Mexico in San Juan Co.

PENSTEMON ACUMINATUS Dougl. ex Lindl.

Short-lived perennial herb, usually with well developed basal leaves; *stems* erect or ascending, 2.5–6 dm tall, single to few or sometimes several arising from a thick crown or short-branched caudex, surmounting a taproot; *herbage* glabrous and glaucous, sometimes glutinous with sand grains adhering; *leaves* entire, fleshy, the basal and lower cauline leaves 4–10 cm long, 7–15 (20) mm broad, oblanceolate, tapering to a petiolar base, the upper cauline ones 2–7 cm long, 10–35 mm broad,

lanceolate to ovate, acute to acuminate, sessile and somewhat clasping; *thyse* not secund, narrow and elongate, of (5) 7–15 verticillasters, the cymes congested with many flowers, the bracts usually broader than long, the cordate bases overlapping and concealing the pedicels and peduncles, glabrous; *sepals* 4.5–6.5 mm long at anthesis, to 7.5 mm in fruit, narrow lanceolate, narrowly scarious margined proximally if at all, glabrous or sometimes scabrid on the margins, becoming ribbed with age; *corolla* 11–18 (20) mm long, tubular-salverform, the tube moderately amplicate, the lobes subequal, spreading, the limb pale blue to pale lavender with violet or purple lines inside a white throat ventrally, glabrous within and without, including the palate; *staminode* reaching the orifice, expanded and uncinately distally with short yellow-orange hairs on the 2 ridges, the hairs less than 0.5 mm long; *fertile stamens* reaching the orifice to slightly exerted, the anther-sacs 0.7–1.3 (1.5) mm long (after dehiscence), dehiscing the full length and across the connective, becoming opposite but not explanate, dark purple on back, glabrous except for the occasional presence of minutely papillate-toothed sutures; *capsule* 7–13 mm long; *seeds* 1.8–3.5 mm long.

The distribution of *P. acuminatus* (Fig. 9) is divided into two segments by a mountainous interval. Sufficient morphological differences accompany these detached ranges to distinguish the following two varieties.

- 1 Corolla 11–15 mm long; anther-sacs 0.7–1.0 mm long; calyx 4.5–6.5 (7.5) mm long; Snake River Plains and western Great Basin valleys and deserts var. *latebracteatus* N. Holmgren
 1 Corolla (14) 15–20 mm long; anther-sacs 0.9–1.3 (1.5) mm long; calyx 5–10 mm long; Columbia River Basin of Washington and adjacent Oregon var. *acuminatus*

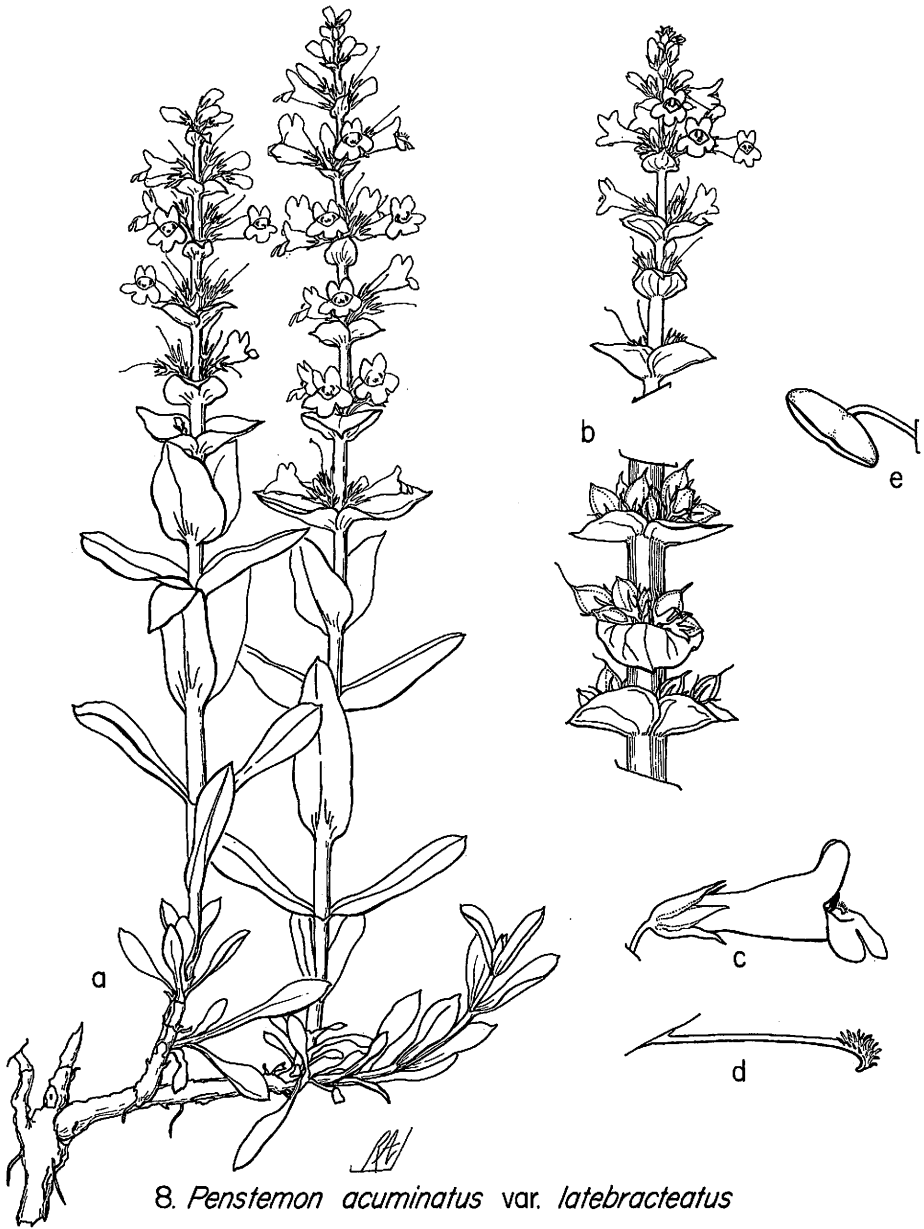
***Penstemon acuminatus* var. *latebracteatus* N. Holmgren, var. nov. (Fig. 8)**

A var. *acuminato* floris plerumque minoris corolla 11–15 (nec 15–20 raro 14) mm longa, antherarum thecis 0.7–1 (nec 0.9–1.5) mm longis, calyceque 4.5–6.5 (nec 5–10) mm longo diversa.

TYPE: UNITED STATES. OREGON. Harney Co.: Pueblo Valley, 16 km (10 mi) airline distance SE of Fields on Trout Creek Road, T39S, R35E, S25, 1280 m (4200 ft) elevation, loose sandy soil with sagebrush, shadscale and rabbitbrush, 21 May 1978, N. & P. Holmgren 8741 (HOLOTYPE: NY; ISOTYPES: BRY, UTC, and others to be distributed).

Plains and desert valleys in sandy soils, often on dunes, in sagebrush and shadscale communities, 600–1400 m (2000–4600 ft) elevation. Western Snake River Plains in Idaho from Lincoln, Jerome and Twin Falls cos. westward to Owyhee, Canyon, Payette and Washington cos., southwest through Malheur and Harney cos., Oregon and south through Humboldt Co., Nevada to northern Mineral Co. (Fig. 9). May–June.

Specimens examined: IDAHO: LINCOLN Co.: about 2 mi N of Richfield, *Pyrah 85* (BRY). JEROME Co.: U.S. Highway 93, between I-80 and Twin Falls, N. & P. Holmgren 8745 (NY). GOODING Co.: 8 mi S of Gooding, *Christ & Ward 7186* (NY); 5 mi E of Gooding, *Pyrah 105* (BRY). TWIN FALLS Co.: 5 mi SW of Bliss, *s. nom.* (UTC). ELMORE Co.: between King Hill and Glens Ferry, *Christ 10190* (NY); Glens Ferry, 17 Jun 1911, *Jones s.n.* (POM); King Hill, *Nelson & Macbride 1152* (GH, NY, POM, UC); S of King Hill, *F. & J. Pennell 26827* (GH, NY); near Glens Ferry, *Warren 1420* (PH). OWYHEE Co.: 8 mi N of Murphy, *Baker 10092* (NY); Bruneau, *Christ* (or *Ayres*) *4490* (NY); Indian Cove near Hammett, 18 May 1938, *Christ s.n.* (NY); bluffs N of Bruneau, *Christ & Ward 6920* (NY); about 10 mi NE of Bruneau, *Hitchcock & Muhlick 22549* (NY); 6.5 mi SW of Bruneau, N. & P. Holmgren 4942 (NY, UTC); 2 mi N of Murphy, *Maguire & A. Holmgren 26193* (GH, NY, PH, UC, UTC); Murphy, *Teape 3335* (NY). ADA Co.: Boise, 15 May 1938, *Lindley s.n.* (UC). CANYON Co.:



8. *Penstemon acuminatus* var. *latebracteatus*

FIG. 8. *Penstemon acuminatus* var. *latebracteatus* N. Holmgren. A. Habit, $\times \frac{1}{2}$. B. Inflorescence, $\times \frac{1}{2}$. C. Flower, $\times 2$. D. Staminode, $\times 3$. E. Anther, $\times 4$. Drawing by Robin Jess.

Lowell Butte near Caldwell, *Cronquist* 109-36 (UTC), *Porter s.n.* (UTC); 5 mi SW of Caldwell, *Davis* 46-36 (NY); 9 May 1936, *Garst s.n.* (UC); Caldwell, *Tucker* 22 (NY). PAYETTE Co.: Payette, along Payette River, *Christ* 9482 (NY); 1 mi E of Payette, *J. & C. Christ* 17280 (NY); Payette (Snake River bluffs), *Macbride* 864 (UC), 867 (GH, NY, POM, UTC); 2 mi E of Payette, *Pennell* 15326 (NY, PH). WASHINGTON Co.: Olds Ferry, *Christ* 9379 (NY).

OREGON: MALHEUR Co.: 11 mi SW of Vale, *Cronquist 8179* (GH, NY, OSC, RSA, UC, UTC); 6 mi SW of Rome, along Crooked Creek, *Cronquist 8395* (NY, UTC); Malheur region, *Cusick 1937* (GH, UC); N of Vale, 23 May 1940, *Gilkey s.n.* (OSC); 5 mi SW of Vale, *Hitchcock 20622* (NY); near Vale, *Leiberg 2055* (GH, NY, UC); Kane Springs, 18 airline mi SW of Vale, *Maser 18-3* (OSC); 10 mi S of Sheaville, *Peck 20579* (OSC); Adrian, *Peck 28726* (WILLU); W of Hope, 23 Jun 1947, *Powers s.n.* (OSC); Crooked Creek, 50 mi N of McDermitt, *Ripley & Barneby 9394* (PH); Sucker Creek, *Snowberger 66* (PH). HARNEY Co.: Wildhorse Creek, E base of Steens Mts., *Applegate 5636* (NY, PH, UC); 1 mi N of Andrews near E base of Steens Mts., *Cronquist 8306* (GH, NY, UTC); 2 mi N of Denio, *Peck 25587* (OSC, UC, WILLU); 8 mi NE of Denio, *Peck 25607* (UC, WILLU); Andrews-Folly Farm road, *Steward & Hansen 1836* (OSC). NEVADA: HUMBOLDT Co.: 15 mi N of Winnemucca, *Breene 197* (RENO); 10 mi N of Winnemucca, *Cronquist 8441* (NY); 9 mi N of Winnemucca, *Gentry & Davidse 1504* (BRY, GH, NY, PH, RSA, UC, UTC); 4.5 mi W of Winnemucca, *N. & P. Holmgren 3941* (NY, UC, UTC); 8 mi N of Winnemucca, *N. Holmgren & Reveal 908* (BRY, NY, UTC), *Tiehm & Williams 1309* (RENO); dunes just W of Winnemucca, *Keck 945* (PH, UC); Winnemucca Dunes, *Robertson 271* (NESH, NY). PERSHING Co.: 4 mi N of Lovelock, *Alexander & Kellogg 4604* (PH, UC, UTC); Imlay-Jungo road, *Alexander & Kellogg 4621* (UC); 25 mi SW of Winnemucca, *Cronquist & A. Holmgren 8445* (NY); Oreauna, 28 May 1903, *Jones s.n.* (POM); near Imlay, *Mason 4608* (PH, UC); near Humboldt House along Humboldt River, *Ripley & Barneby 4547* (NY); Lovelock sanddunes, *Train 53* (RENO, UT); near Humboldt Lake, *Watson 775* (GH, NY). WASHOE Co.: Empire City, Jun 1892, *Jones s.n.* (POM). LANDER Co.: Battle Mountain, *Jones 26598* (POM). CHURCHILL Co.: 22 mi S of Fallon, *Billings 1514* (RENO); sand hills W of Fallon, *Curtis 35* (RENO); Soda Lake, 30 Apr 1925, *Headley s.n.* (RENO); near foot of Sand Mountain, about 27 mi SE of Fallon, 30 May 1942, *Mills s.n.* (NY, UC); 9 mi W of Fallon, *Mills & Beach 1087* (NY, UC); 2 mi E of Frenchman Station, *Mills & Beach C-23* (UC); near Fallon, 2 Jun 1934, *Moon s.n.* (RENO); 24 mi S of Fallon, *Tiehm et al. 710* (RENO); 5 mi E of Tarzyn road from Lovelock Highway, *Tiehm et al. 1036* (RENO). MINERAL Co.: 10 mi NE of Schurz, *Breene 114* (RENO), *Murphy 22* (RENO, UC); N of Schurz, *Ripley & Barneby 4445* (NY).

PENSTEMON ACUMINATUS Dougl. ex Lindl. var. **ACUMINATUS**

Penstemon acuminatum Dougl. ex Lindl. Bot. Reg. 15: pl. 1285. 1829. TYPE: UNITED STATES. WASHINGTON: "Barren soil, Interior of the Columbia," *Douglas s.n.*

Usually in sandy soils, often on dunes at low elevations. Columbia River Basin in south-central Washington from southern Douglas Co. to Klickitat, Benton and Walla Walla cos. and adjacent Oregon from Sherman to Wallowa cos. (Fig. 9). April–May.

Penstemon mucronatus N. Holmgren, sp. nov. (Fig. 10)

Foliis integerrimis glabris glaucis sect. *Coeruleis* Pennell pertinens, foliis caulinis late ovatis apice acuminatis staminodioque lato *P. pachyphyllo* A. Gray ex Rydberg similis, sed staminodii pilis abbreviatis 0.3–0.8 (1) (nec 1–2) mm longis diversa.

Short-lived perennial herb; *stems* erect or ascending, 1–2.5 (4) dm tall, single to few arising from a thick crown or short-branched caudex; *herbage* glabrous and glaucous; *leaves* entire, fleshy, the basal and lower cauline 3–6 (10) cm long, (10) 13–24 cm broad, oblanceolate, rounded or obtuse to acute, the upper cauline leaves (1) 2–3 cm long, 8–20 (30) mm broad, broadly ovate, mucronate; *thyrses* not secund, of 6–8 distinct verticillasters, the cymes several-flowered, glabrous; *sepals* (3.5) 5–6.5 mm long, broadly lanceolate, acute to acuminate, glabrous, becoming ribbed with age, the margins broadly scarious, entire to slightly erose; *corolla* 13–17 (20) mm long, tubular-salverform, the tube 7–9 (10) mm long, the throat not very deep and 4.5–5.5 (7) mm broad (in pressed specimens), only slightly bilabiate, the lobes of the upper lip smaller than the lower, rounded, spreading, the lobes blue, the throat violet with dark reddish purple guidelines inside and onto the lobes, wholly glabrous except for the sparsely bearded palate; *staminode* reaching

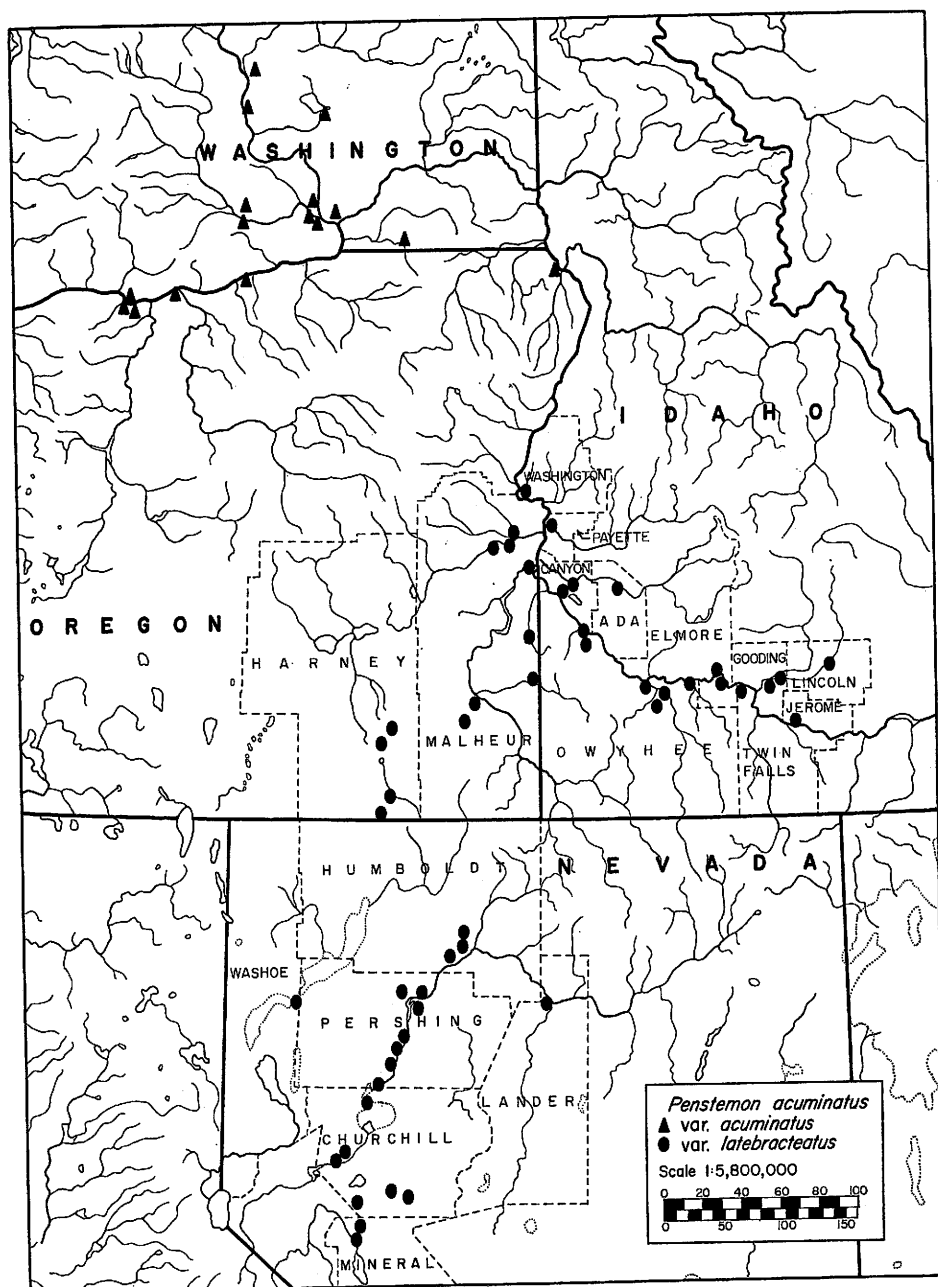


FIG. 9. Map showing distributions of *Penstemon acuminatus* vars. *acuminatus* and *latebracteatus*.

the orifice, distally expanded, 0.8–1.4 mm broad, and uncinuate, bearded on the ridges with relatively short, brownish yellow to golden-yellow hairs, the hairs 0.3–0.8 (1.0) mm long; fertile stamens included, the anther-sacs 0.7–1.0 (1.1) mm long (after dehiscence), dehiscing the full length, becoming opposite but not ex-

planate, blackish on back, glabrous except for the papillate-toothed sutures; capsule ca 8–10 mm long.

TYPE: UNITED STATES. UTAH. Daggett Co.: Utah Highway 44, 6.5 km (4 mi) airline distance S of Manila, ca 0.8 km (0.5 mi) N of Sheep Creek crossing, T4N, R20E, S6, 1980 m (6500 ft) elevation, sandy slopes, 25 May 1978, *N. Holmgren, P. Holmgren & R. Barneby 8747* (HOLOTYPE: NY; ISOTYPES: BRY, UT, UTC, and others to be distributed).

Dry juniper and pinyon-juniper woodlands in sandy and gravelly soils, 1500–2400 m (5000–8000 ft) elevation. Eastern end of the Uinta Mountains and low hills of the East Tavaputs Plateau of northeastern Utah, northwestern Colorado and adjacent Wyoming (Fig. 12). May–June.

The ovate to orbicular, mucronate-tipped leaves of *P. mucronatus* resemble those of *P. pachyphyllus* A. Gray ex Rydb., which lies to the west and south in northeastern Utah, and *P. cyathophorus* Rydb. from further east in north-central Colorado and adjacent Wyoming. The staminode of *P. mucronatus* is broad as in *P. pachyphyllus* but the bearding is of short, straight hairs 0.3–0.8 (1.0) mm in length rather than of long, densely tangled hairs of 1.0–2.0 mm length as in the latter. *Penstemon cyathophorus* differs from both these species by its exerted stamens and parallel anther-sacs. Also included in this alliance are *P. osterhoutii* Pennell and *P. harringtonii* Penland (see Penland, 1958).

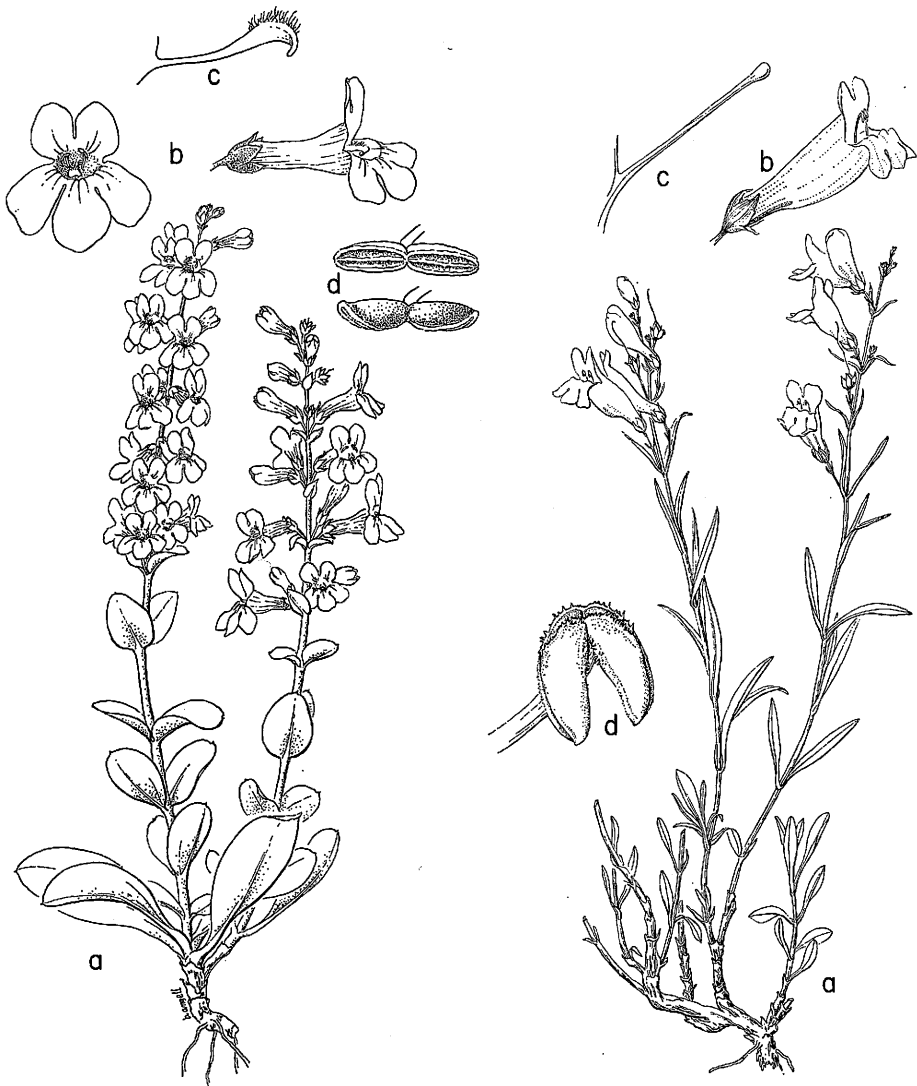
Specimens examined: WYOMING. SWEETWATER Co.: 2.3 mi N of Utah border on Wyo. Highway 530, *N. & P. Holmgren 5038* (NY, UTC); 44 mi S of Green River, *Ripley & Barneby 7900* (NY); 2 mi N of Linwood, Utah, *Rollins 2263* (GH, PH). UTAH: DAGGETT Co.: 1 mi S of Manila, *Flowers et al. 159* (UT); 2.7 km NE of Sheep Creek Bridge on Utah Highway 44, *N. & P. Holmgren 8378* (NY); Sheep Creek, in 1933, *Johnson s.n.* (PH); Sheep Creek Gap, *Neese & Peterson 5387* (BRY, NY); 3.6 mi W of Manila, *Neese & Peterson 5414* (BRY, NY); 4 mi W of Manila, *Reveal 2359* (UTC); dry hill S of Manila, *Williams 411* (GH, NY). UINTAH Co.: S slope of Diamond Mountain, *Graham 8075* (NY, PH); 15.2 mi N of Vernal, *N. & P. Holmgren 5102* (NY); ca 1 mi E of Hill Creek, *Neese & Peterson 4691* (BRY, NY); ca 3 mi W of Dinosaur Natl. Monument, *Neese 4825* (BRY, NY); ca 30 mi S of Ouray, *Neese 4981* (BRY, NY); Split Mountain Gorge, *Welsh 236* (BRY); ca 7 mi S of Bonanza, *Welsh 5378* (NY). COLORADO: MOFFAT Co.: Skull Creek, a little more than a mi N of U.S. 40, *Cronquist 11117* (NY); 3 km N of Elk Springs, *N. & P. Holmgren 8380* (NY); Elk Springs, 7 Jun 1951, *Ripley & Barneby 10604* (PH); along road to Roundtop Mountain from Artesia, *Weber 7409* (PH).

A New *Saccanthera* *Penstemon*

Keck's most detailed and thorough comparative monograph in his series "Studies in *Penstemon*" was his first, "A Systematic Treatment of the Section *Saccanthera*" (1932). Section *Saccanthera*, easily recognized by its characteristic saccate anthers, is so distinct as to be best treated as a subgenus. The species are also relatively well defined.

The greatest development in the subgenus is the group of entire-leaved species centering in California; a second center of development in the Pacific Northwest comprises the serrulate- to parted-leaved species; and a third center is in the Intermountain Region. This third group of species, which centers in Utah, has a glabrous staminode, entire leaves well distributed on the stem, and a glabrous palate, characters which link them to the California members. They are distinctive in having dark purple to black anthers that dehisce for less than half the length of each anther-sac.

Species of this Intermountain alliance, which could be referred to as the *P. kingii* group, can be distinguished by the following characters.

10. *Penstemon mucronatus*11. *Penstemon patricus*

FIGS. 10 and 11. Fig. 10. *Penstemon mucronatus* N. Holmgren. A. Habit, $\times \frac{1}{2}$. B. Flowers, $\times 1\frac{1}{2}$. C. Staminode, $\times 2$. D. Anthers (dehisced), $\times 10$. Fig. 11. *Penstemon patricus* N. Holmgren. A. Habit, $\times \frac{1}{2}$. B. Flower, $\times 1$. C. Staminode, $\times 2$. D. Anther, $\times 10$. Both drawings by Bobbi Angell.

1 Leaves puberulent.

2 Corolla glabrous, blue; inflorescence not glandular-pubescent; southwestern Idaho and eastern Oregon *P. cusickii* A. Gray

2 Corolla glandular-pubescent, violet to purplish blue; inflorescence, at least the pedicels, glandular-pubescent; endemic to Nevada from the northeastern hills to the central mountains *P. kingii* S. Wats.

1 Leaves glabrous.

3 Corolla 14–20 mm long, the lobes blue or lavender; anther-sacs 1.0–1.4 mm long; Wasatch Range from southeastern Idaho, southward through northern Utah to

- the adjacent Wasatch Plateau and San Pitch Mountains of central Utah, and recurring in the Pine Valley and Beaver Dam mountains of southwestern Utah ----
P. leonardii Rydb.
- 3 Corolla 20–30 mm long, the lobes lavender to light violet, with a tinge of blue in *P. patricus*; anther-sacs 1.4–1.7 mm long.
- 4 Calyx segments 3.5–7 mm long, lanceolate to narrowly ovate, attenuate to caudate; stems puberulent.
- 5 Pedicels glabrous; leaves (ob)lanceolate to linear, 1.5–3 (4.5) cm long, 2–7 (9) mm broad; endemic to the Deep Creek Range of west-central Utah ----
P. patricus N. Holmgren
- 5 Pedicels glandular-puberulent at the summit; leaves elliptic, (3) 3.5–6 cm long, 7–16 (20) mm broad; endemic to the Wasatch Range of Utah from near Ogden City to American Fork Canyon and in Indian Canyon southwest of Duchesne ----
P. platyphyllus Rydb.
- 4 Calyx segments 2–3.2 mm long, broadly ovate, rounded, obtuse or mucronate; stems glabrous; southern Wasatch Range from American Fork Canyon to the slopes of Mt. Nebo and collected in the Fish Lake (*Lindsay 774*, BRY) and Markagunt (*Woodberry s.n.*, BRY) plateaus of central and southern Utah ----
P. sepalulus A. Nels.

Penstemon patricus N. Holmgren, sp. nov. (Fig. 11)

Corolla saepissime lavandulacea 20–25 mm longa, calyce 3.5–5 mm longo, necnon antherarum thecis (1.2) 1.4–1.9 mm longis *P. platyphylo* Rydb. similis, sed pedicellis glabris (nec granuloso-puberulis), foliisque lanceolatis vel linearibus 1.4–3 (4.5) × 0.2–0.7 (0.9) (nec 3.5–6 × 0.7–1.6 raro 2) cm diversa.

Suffrutescent perennial; *stems* ascending, often decumbent at the base, (1.2) 1.7–2.5 dm long, usually several from a relatively much-branched, woody caudex, puberulent; *leaves* entire, all cauline, 1.5–3 (4.5) cm long, 2–7 (9) mm broad, the lower oblanceolate, rounded to obtuse, the upper (ob)lanceolate to linear, acute, cuneate at the base, glabrous; *inflorescence* racemose, of 2–4 (6) verticillasters, with the cymes reduced to 1 flower, the pedicels 2–3-bracteolate, glabrous; *calyx* 3.5–5 mm long, lanceolate to narrowly ovate, acuminate or caudate-tipped, the tip recurved, glabrous, the margins scarious at the base and slightly erose; *corolla* 20–25 mm long, ampliate, the throat 6–8 (10) mm broad (in pressed specimens), the tube 6–8 mm long, the upper lip projecting, the lower lip reflexed, the limb violet with a tinge of blue to lavender, glabrous throughout; *staminode* included, slightly dilated apically, white, glabrous; *fertile stamens* reaching the orifice or the anterior (upper) pair often exerted, the anther-sacs (1.2) 1.4–1.9 mm long, remaining horseshoe-shaped and dehiscing across the confluent apices for less than ½ the length of the sacs, the apex retuse to rounded, the sutures papillate-toothed, the inner margins finely papillate-puberulent; *capsule* ca 7–8 mm long; *seeds* ca 2 mm long, angular, light brown, finely reticulate.

TYPE: UNITED STATES. UTAH. Juab Co.: Thoms Creek Canyon, 13 km (8 mi) airline distance WSW of Callao, T11S, R18W, S16, 2440 m (8000 ft) elevation, on crumbly granite slopes, 16 Jul 1978, *N. Holmgren, P. Holmgren & R. Kern 9018* (HOLOTYPE: NY; ISOTYPES: BRY, UT, UTC, and others to be distributed).

Cracks and crevices of granite outcrops and rocky slopes, in pinyon-juniper, mountain mahogany and spruce associations, (2000) 2300–3200 m (6500–10,500 ft) elevation. Endemic to the Deep Creek Range of western Juab and Tooele cos., Utah, and adjacent White Pine Co., Nevada (Fig. 12). July.

In height and leaf size *P. patricus* resembles *P. leonardii*, in calyx, corolla and anther-sac size it resembles *P. platyphyllus* and in glabrous inflorescence it resembles *P. sepalulus*.

Keck included all Deep Creek Range collections in *P. platyphyllus* except *Jones*

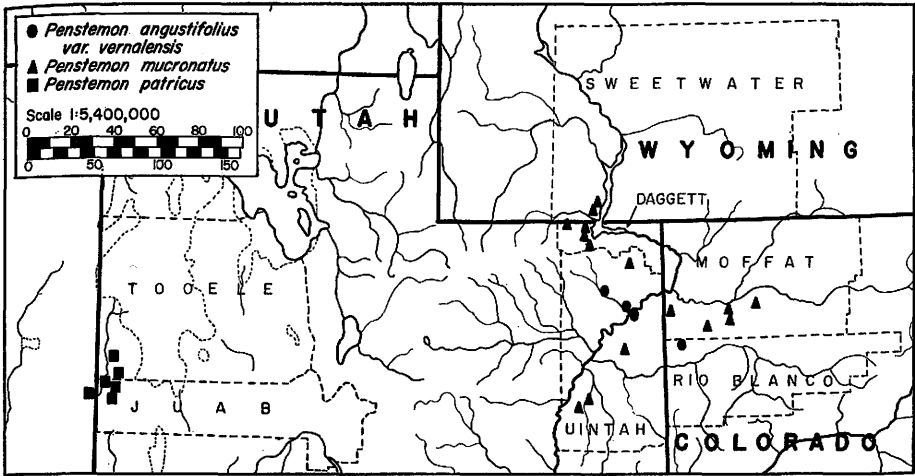


FIG. 12. Map showing distributions of *Penstemon angustifolius* var. *vernalensis*, *P. mucronatus* and *P. patricus*.

s.n. (11 Oct 1901, POM) which he designated as an apparent hybrid between *P. platyphyllus* and *P. sepalulus*. In all characteristics studied the Jones collection conforms with other specimens from the Deep Creek Range.

It was my early impressions of the fascination that the Intermountain flora held for my father, Arthur H. Holmgren, that first attracted me to plant taxonomy. Because I now share that fascination, it gives me particular pleasure to honor him in naming this *Penstemon*, first collected in good condition by him and Bassett Maguire in July of 1943. Arthur Holmgren was appointed curator of the Intermountain Herbarium in 1942 and he continues to administer the collections to the present time, a year following his formal retirement. His knowledge of the flora from his 40 years of exploration is unexcelled. His carefully composed and enthusiastically delivered lectures and his youthful rapport with students have left a legacy of botanical appreciation and respect for the environment and have gained him many friends.

Specimens examined: All from the Deep Creek Range: UTAH: Unspecified locality: 11 Oct 1901, *Jones s.n.* (POM). TOOELE Co.: head of Bagley Gulch, just E of Ibapah Peak, *N. Holmgren et al.* 2151 (BRY, GH, NY, UC, UTC). JUAB Co.: ridge at head of Goshute Canyon, *N. Holmgren & Reveal* 2840 (BRY, NY, PH, RSA, UC, UTC); Indian Farm Creek drainage, *A. Holmgren et al.* 16480 (NY, UTC); Mount Ibapah, *Jones s.n.* (POM); Granite Creek Canyon, *Kelson* 648 (UT), 720 (UT); Granite Creek, *Maguire & A. Holmgren* 21919 (GH, PH, UC, UTC); pass between Tom Creek and Indian Farm Creek, *Maguire & A. Holmgren* 21935 (GH, NY, PH, UC, UTC); Indian Farm Creek, *Maguire & A. Holmgren* 22001 (GH, PH, UT, UTC); Granite Creek Canyon, *McMillan* 648 (POM, UT), 720 (UT); S end of Mount Ibapah, *Stanton* 1004 (PH); Cedar Canyon head, 8 mi due WSW of Callao, *Welsh et al.* 17628 (BRY); Art Canyon, ca 7 mi SE of Ibapah, *Welsh et al.* 17672 (BRY). NEVADA: WHITE PINE Co.: Spring Creek, 23 Jun 1891, *Jones s.n.* (POM).

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