

***PENSTEMON BLEAKLYI* (PLANTAGINACEAE),
A NEW HIGH-ELEVATION SPECIES FROM NORTH-CENTRAL NEW MEXICO**

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ABSTRACT

Penstemon bleaklyi O'Kane & K.D. Heil, **sp. nov.** (Plantaginaceae), from high elevations in the Culebra Range of north-central New Mexico is named, described, and illustrated. This beautiful new species is named in honor of David L. Bleakly, New Mexico specialist of *Penstemon*. It is at least superficially similar to *P. harbourii* A. Gray, a Colorado endemic.

A large portion of north-central New Mexico, especially in Taos County, has historically been little-botanized because large blocks of land are privately owned and are generally off-limits to the public. Recent botanical work on the privately held Vermejo Park Ranch uncovered several novelties and range extensions, including *Phlox vermejoensis* Legler (Legler 2010, 2011), which was found at high elevations in the Sangre de Cristo Range just south of the Colorado border. While botanizing on the Rio Costilla Land Grant near the habitat of *P. vermejoensis* in the Culebra Range (part of the Sangre de Cristo Mountains) in Taos County, one of us (Heil) discovered a striking new *Penstemon* that we here describe.

Penstemon bleaklyi O'Kane & K.D. Heil, **sp. nov.** Figures 1–3. **TYPE: USA. New Mexico.** Taos Co.: Culebra Range. Rio Costilla Park, 3.3 air mi SSW of State Line Peak, alpine scree slopes, 36.95247° N, 105.3226° W, 12,855 ft. elev, 25 Jul 2013, *K.D. Heil, D. Hyder, and A. Martinez* 35028 (holotype: MO; isotypes: ISTC, UNM, NMC, SJNM).

Herbaceous perennial, forming loose mats from numerous branched and tangled somewhat woody rhizomes, these often from a central caudex. **Stems** ascending-decumbent, single or in clumps, 2–8 cm tall, minutely puberulent. **Basal leaves** petiolate, glabrous, 15–35 mm long including the petiole, petioles narrowly winged, blades usually lanceolate to broadly elliptic, rarely oblanceolate, spreading, 4–15 mm wide, entire or serrulate (varying on the same plant), the apex broadly acute to obtuse, bases abruptly broad-cuneate. **Cauline leaves** opposite, sessile, glabrous or with a few trichomes at the base, entire to serrulate, narrowly lanceolate to linear-lanceolate, 1–2 cm long, 3–5 mm wide. **Inflorescence** terminal, secund, ± racemose, compact, not verticillate, (1–)2–6(–8) flowered; pedicels mostly 1–2 mm long, densely pubescent with gland tipped trichomes. **Sepals** herbaceous, lanceolate, 5–8 mm long, up to 1 mm wide, densely pubescent with flattened white trichomes with pale golden gland tips (becoming more golden with age and with drying), trichomes 0.4–0.6 mm long. **Corollas** 12–25 mm long, bilabiate, ampliate, narrowly funnelform, externally with scattered flattened white trichomes with pale golden gland tips (these becoming more golden with age and with drying), trichomes 0.25–0.35 mm long, the adaxial lip slightly shorter than the abaxial, both projecting-spreading, the adaxial recurving at the tips and the sinus between the lobes shallow, corolla adaxially light to violet, abaxially white with dark violet guide lines, abaxial lobes violet to light

violet (RHS 2005), glabrous, palette with crinkly flattened white trichomes 1.3–2.5 mm long. **Stamens** included, anthers 1.1–1.3 mm long, dark purple, finely puberulent with scattered longer trichomes, opening across the connective and tardily becoming peltate-subexplanate. **Staminode** 14–15 mm long, almost exceeding the adaxial lip of the corolla, bearded at the very tip (distal 0.8–1.0 mm) with flattened golden trichomes. **Style** 10–15 mm long, incurved at tip. **Capsule** glabrous, 4–7 mm long, 3–5 mm wide, dark brown. **Seeds** deep brown with tan borders, 0.6–1 mm long.

Paratypes. **USA. New Mexico.** Taos Co.: Vermejo Park, ca. 2 mi S of State Line Peak along boundary between Vermejo Park and Rio Costilla, 36.95681° N, 105.3209° W, 12,566 ft. elev, 18 Jul 2012, *Heil, Hyder, and Martinez 34213* (SJNM); Rio Costilla Land Grant, Culebra Range, crest of ridge on S side of an unnamed cirque, 2.2 air mi NNW of Big Costilla Peak and 3.3 air mi SSW of State Line Peak, 36.95158° N, 105.3183° W, 12,620 ft. elev, 19 Jul 2012, *Heil, Hyder, and Martinez 34276* (SJNM).



Figure 1. Habit of *Penstemon bleaklyi*.

Field recognition characters for *Penstemon bleaklyi* are its mat-forming habit, partially buried stems, lavender corollas, staminode bearded only the very tip, and high-altitude habitat. *Penstemon bleaklyi* is unlikely to be confused with any other species unless it is ultimately found to be growing with *P. harbourii* A. Gray, which is currently known only from high elevations in Colorado. *Penstemon harbourii* has its staminode bearded for much of its length (vs. at the very tip only), leaves that appear blue-green (vs. green), entire leaves (vs. many leaves totally or partially serrulate), and a corolla that is 2-ridged ventrally (vs. not ribbed).



Figure 2. Flower and inflorescence of *Penstemon bleaklyi*.

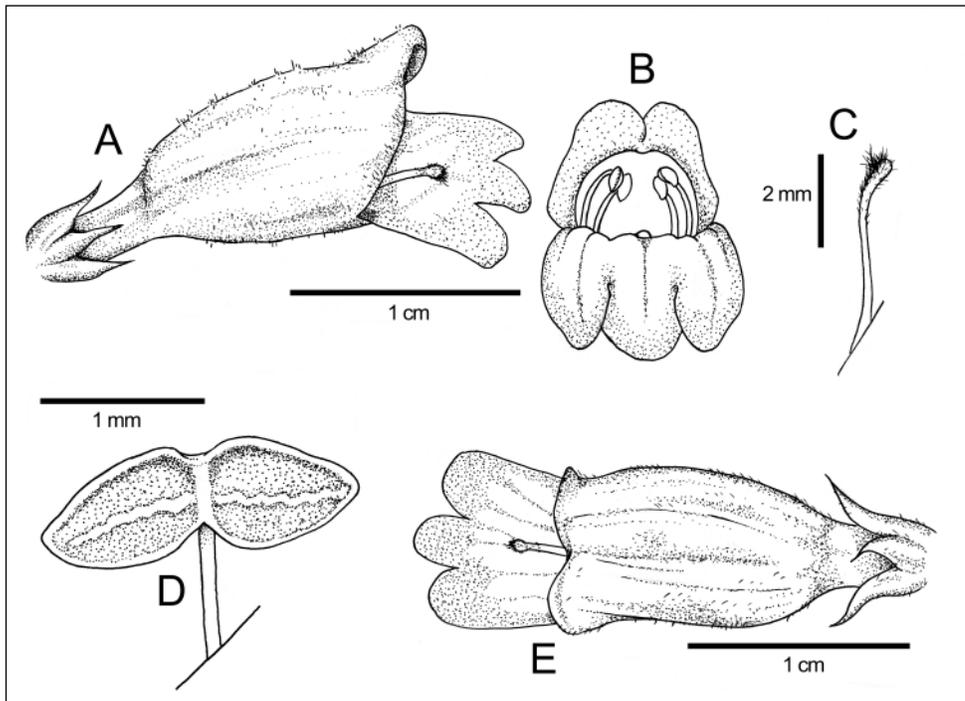


Figure 3. *Penstemon bleaklyi*. A. Lateral view of flower. B. Face view. C. Staminode. D. Mature anthers. E. Flower from above.

Bleakly penstemon grows on alpine scree slopes composed of steep, decomposing, reddish, gneissic granite of the 1.69 billion-year old Jaroso Creek formation (Fridrich et al. 2009) at known elevations of 12,500–12,900 feet in the Culebra Range of the Sangre de Cristo Mountains in north-central New Mexico. The total distributional extent of the species is unknown but is likely limited to northernmost New Mexico and southernmost Colorado in the Sangre de Cristo Mountains. Associates include *Antennaria media*, *Artemisia scopulorum*, *Castilleja miniata*, *Elymus scribneri*, *Erigeron melanocephalus*, *Festuca saximontana*, *Poa cusickii*, *Senecio holmii*, *Sibbaldia procumbens*, *Stellaria irrigua*, *Trifolium brandegeei*, *Trisetum spicatum*, and *Tonestus pygmaeus*.

Taxonomically, *Penstemon bleaklyi* clearly belongs to subg. *Penstemon*, but depending on which description or key is used, it is difficult to determine to which section the species belongs. According to the descriptions in Nold (1999) the species probably belongs to sect. *Penstemon* (subsect. *Humiles*), based especially on the presence of serrulate leaves. In the key of Crosswhite (1965) the species easily keys to series (subsect.) *Harbouriani*. Using the key provided by Holmgren (1984; revised 2008), however, the species easily keys to sect. *Penstemon*. It should be noted that Holmgren's key does not include subsect. *Harbouriani*. Subsect. *Harbouriani*, according to Nold (1999), has entire leaves, whereas *P. bleaklyi* has many leaves serrulate. The polyphyly of subgenera *Saccanthera*, *Habroanthus*, and *Penstemon*, however, leaves in doubt the subgeneric classification of the species (Wolfe et al. 2006).

The species is named for David L. Bleakly, a New Mexico specialist of the genus *Penstemon*, who wrote the treatment of the genus for the Flora of the San Juan Basin Region (Bleakly 2013) as well as a key to the species of the genus for the state of New Mexico (Bleakly 1998), and with Heil, who recognized this species as unique.

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LITERATURE CITED

- Bleakly, D.L. 1998. A Key to the *Penstemons* of New Mexico. *New Mexico Botanist* 9: 1–6.
- Bleakly, D.L. 2013. *Penstemon*. Pp. 715–724, in K.D. Heil, S.L. O'Kane, Jr., L.M. Reeves, and A. Clifford. *Flora of the Four Corners Region*. Missouri Botanical Garden Press, St. Louis.
- Crosswhite, F.S. 1965. Subdivisions of *Penstemon* Section *Penstemon*. *Sida* 2: 160–162.
- Fridrich, C.J., R.R. Shroba, C.L. Pillmore, and A.M. Hudson. 2009. Preliminary Geologic Map of the Vermejo Peak Area, Colfax and Taos Counties, New Mexico, and Las Animas and Costilla Counties, Colorado. U.S. Geological Survey, Denver, Colorado.
- Holmgren, N.H. 1984. Scrophulariaceae. Pp. 344–506, in A. Cronquist, A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren (eds.). *Intermountain Flora*, Vol. 4. New York Botanical Garden, Bronx.
- Holmgren, N.H. 2008. Untitled, updated key to the Intermountain Flora. <http://apsdev.org/library/references/revised_penstemon_keys.pdf> Accessed 4 Jun 2014.
- Legler, B.S. 2010. A floristic inventory of Vermejo Park Ranch, New Mexico and Colorado. M.S. Thesis, Univ. of Wyoming, Laramie.
- Legler, B.S. 2011. *Phlox vermejoensis* (Polemoniaceae), a new species from northern New Mexico, U.S.A. *J. Bot. Res. Inst. Texas* 5: 397–403.
- Nold, R. 1999. *Penstemons*. Timber Press, Portland Oregon.
- RHS. 2005. RHS mini colour chart. Royal Horticultural Society, London.
- Wolfe, A.D., C.P. Randle, S.L. Datwyler, J.J. Morawetz, N. Arguedas, and J. Diaz. 2006. Phylogeny, taxonomic affinities, and biogeography of *Penstemon* (Plantaginaceae) based on ITS and cpDNA sequence data. *Amer. J. Bot.* 93: 1699–1713.