

***Penstemon ambiguus* Torr.**
SCROPHULARIACEAE

sand penstemon

Synonym: *Leiostemon ambiguus* (Torr.) Greene



General Description.—Sand penstemon is also known by the names bush penstemon, prairie or pink plains penstemon, moth penstemon, gilia penstemon, phlox penstemon, and cow-tobacco. This species occurs in sandy soils of plains, and mesas, and somewhat hilly terrain. The plant generally ranges from 20 to 60 cm in height, sometimes to 1 m, is highly branched, the stems are slightly hairy, and become distinctly woody well above the bases. Leaves are simple, linear, opposite, 6 to 30 mm long, enrolled, smooth to slightly hairy, with slightly rough edges (Carter 1997, Epple 1995, Great Plains Flora Association 1986, Kearney and others 1951, Martin and Hutchins 1981). There are two recognized varieties: *P. ambiguus* var. *ambiguus* and *P. ambiguus* var. *laevissimus* (Keck) N. Holmgren (Kartesz 1994, Allred 2002). Both varieties have also been classified as subspecies. Variety *laevissimus* differs from the typical in that it has smooth stems, with the leaf edges smooth or very slightly rough. The chromosome number is reported as $n = 8$, which is common to many members of this genus (Nisbet and Jackson 1960).

Range.—This species occurs from eastern Colorado, western Kansas, Oklahoma, and Texas, through eastern and central New Mexico, then west into Arizona, Utah, and Nevada, at elevations from about 850 m to 2,000 m. Variety *ambiguus* occurs in the northern and eastern portions of this range while variety *laevissimus* occurs in the southern and western portions of this range.

Ecology.—Sand penstemon occurs on alluvial plains, valleys, and in sandy hill country. It is

considered one of the major shrub species comprising Plains-Mesa Sand Scrub vegetation that occurs along drainages of the Rio Grande, Pecos River, San Juan River, and areas within the Llano Estacado ("staked" plains) of western Texas and eastern New Mexico (Dick-Peddie 1993). It is common in the Painted Desert of Arizona (Kearney and others 1951). A couple of hybrid swarms between *P. ambiguus* and *P. thurberi* Torr. (*P. ambiguus* x *thurberi* Nisbet and Jackson) are known from: 1) an area near Magdalena, Socorro County, and 2) another near Carrizozo, Lincoln County, both in New Mexico (Nisbet and Jackson 1960). *P. thurberi* has a similar shrubby habit and occurs in sandy soils. Hybrids have shown a wide range of characteristics between the two species. Although generally considered a separate species, *P. thurberi* has also been classified as a variety of *P. ambiguus* (*P. ambiguus* Torr. var. *thurberi* Gray).

Biochemical Ecology.—Several iridoid glucosides have been isolated and identified from sand penstemon: catalpol, speciocide, nemoroside, ambiguoside; as well as two phenylpropanoid glycosides: verbascoside and martynoside (Arslanian and others 1990). Iridoids are a group of bitter tasting terpenoid toxins also referred to as monoterpenes lactones (Harborne 1988). These compounds may be toxic to birds and insects, hence functioning as a chemical defense against herbivory.

Reproduction.—Each plant has numerous many-flowered inflorescences, and each inflorescence is narrow, with one to two flowers per peduncle, the flowers spreading. The calyx is 2 to 3 mm long, the corolla 15 to 25 mm long, pale to deep pink, the five corolla lobes whitish, the upper ones reflexed at an oblique angle to the tube, the lower one projecting forward, making it distinctive from most other penstemons. The opening of the tube is bearded with short hairs, in two prominent guidelines at the base of the throat (Nisbet and Jackson 1960, Martin and Hutchins 1981, Carter 1997). The sterile stamen (staminode) is beardless (hairless), a feature different from most penstemons (beardtongues), hence the alternate genus name *Leiostemon*, leio meaning smooth and

stemon for stamen (Kirkpatrick 1992, Weber and Wittman 2001). It blooms from May to as late as October, depending on local environmental conditions, although mass blooming generally occurs from June through July. The hybrid, *P. ambiguus* x *thurberi* has smaller corollas, 12 to 15 mm long, corolla lobes white to blue-purple, the throat and tube pale pink to deep reddish purple. The fruit is a capsule from 5 to 10 mm long that contains many very small (1.2 to 2 mm) seeds. Seed germination characteristics (for example, the amount of cold stratification) vary as a function of the elevation of the source population (Meyer and others 1995). Sand penstemon seeds have a physiological dormancy requiring 8 to 15 weeks of cold stratification before germination will occur (Kitchen and Meyer 1991, Baskin and Baskin 2001).

Growth and Management.—Seedlings take a few years becoming established before this long-lived plant becomes larger and more conspicuous in the landscape. Only a few flowers may be produced the first year of blooming, before the plant gains enough mass and root reserves for the large floral displays that make this plant so characteristic.

Benefits.—Since this species' typical habitat is in sandy, unstable type soils, it acts as a soil stabilizer. Because of its conspicuous and colorful floral displays, it is a welcome addition to habitats that might otherwise appear drab. This is an attractive plant for native plant landscaping (Morrow 1995, Warnock 1974), and in full bloom with the numerous stems and flowers per stem, it makes for an attractive display of pink bouquets.

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