

Columbia Phlox (*Phlox douglasii* Hook.)

James H. Locklear
7431 Briarhurst Circle, Lincoln, NE 68506



Phlox douglasii is a subshrub, branching from a woody base with herbaceous growth that dies back to the woody tissue at the end of each growing season. Flowers are borne at the top of the new growth. Photo by James Locklear.

“*Phlox douglasii* is a name covering...a multitude of botanical sins.” So wrote Ira Gabrielson in his 1932 classic, *Western American Alpines*, and so I discovered for myself some 70 years later. With grants from the Native Plant Society of Oregon and the North American Rock Garden Society, I waded into a study of the genus *Phlox* in general and *P. douglasii* in particular. While matters of nomenclature can be tedious to work through, the species in question is a prominent wildflower in a number of plant communities in central and eastern Oregon, and a clear picture of its taxonomic identity is important to understanding and describing the ecology of these communities.

The Discovery of Columbia Phlox

English botanist William Jackson Hooker established the name *Phlox douglasii* in his *Flora Boreali-Americana* (1838), in honor of David Douglas, who collected the specimens used to describe the new species. As David Douglas’ mentor, Hooker profoundly influenced botanical exploration of North America. Hooker was named Regius Professor of Botany at Glasgow University

in 1820, and helped develop the Glasgow Botanic Garden where his path crossed that of a newly hired gardener (David Douglas). Hooker was so impressed with the young Scot that he recommended Douglas to the Royal Horticultural Society of London as a botanical collector (Hooker 1836). Douglas made his first collecting trip under the auspices of the Society in 1823, traveling to the northeastern United States and Canada. In 1824 he set sail for the west coast of North America, arriving at the mouth of the Columbia River in April of 1825. In this vast watershed, Douglas collected seeds and plant specimens for the Society, and in the process, discovered scores of new species that today bear his name (McKelvey 1955).

Douglas collected the first specimens of Columbia phlox in 1826. The type specimen (holotype) of *P. douglasii*, held in the herbarium of the Royal Botanic Gardens, Kew, bears Douglas’ handwritten notation, “Limestone rocks of the Columbia and subalpine range of the Blue Mountains...1826.” A duplicate specimen at the Museum of Natural History, London, bears the exact same notation. A third Douglas specimen, held by the Gray Herbarium of Harvard University, bears the notation, “very common on the Blue Mountains on Limestone rocks.” The Blue

Mountains of northeastern Oregon and adjacent southeastern Washington comprise several ranges, including the Wallowa Mountains. Douglas' journal for the years 1823 through 1827, published by the Royal Horticultural Society in 1914, reveals he made two separate excursions into the Oregon portion of the Blue Mountains in June and July of 1826. Douglas most likely encountered Columbia phlox in flower on his first excursion, which commenced on 18 June 1826. Douglas was in the heart of the Blue Mountains on June 20th, when he hiked to the summit of "the highest peak of those untrodden regions," the height of which he estimated at least 9,000 feet above sea level (probably the Wallowas). Between the 20th and 25th of June, Douglas records, "I contented myself by botanizing over the eastern declivities of the mountains," where, at lower elevations, he encountered "several new species of *Phlox*."

Columbia phlox is relatively common at middle elevations in the Blue Mountains, as evidenced by a proposed common name, Blue Mountains phlox (Wherry 1955). In addition to the Blue Mountain collections of phlox, Douglas' list of plants collected in mid-April of 1826 near the mouth of the Spokane River on the Columbia River in present-day Lincoln County in eastern Washington included a small, shrubby *Phlox* "which comes near to *P. setacea* [= *P. subulata*]." Columbia phlox is a common and showy part of the local spring flora in this area, and is the only phlox in eastern Washington that fits Douglas' description.

Untangling Nomenclatural Knots

As one of the first of the cushion-forming phloxes described from western North America, the name *P. douglasii* initially served as catch-all for many later-discovered, superficially similar species, a number of which were treated as varieties or subspecies of *P. douglasii* at some point in their nomenclatural histories. Further confusion was caused by the emergence of the term "Douglasii Hybrids" in horticultural literature in the early 1900s, which was applied to a wide variety of cushion phlox cultivars of probable hybrid origin (see discussion under Horticulture).

Edgar Wherry brought much needed clarity to this situation through a series



Sir William Jackson Hooker recommended Douglas to the London Horticultural Society as a collector, and named the phlox for him. This portrait of Hooker at age 46 was painted by T. Phillips, engraved by H. Cook, and printed in London by Fisher Son & Co. in 1834. Image courtesy of the Hunt Institute for Botanical Documentation.



Artist Sir Daniel Macnee produced this portrait of David Douglas in the fall of 1828, while Douglas was visiting Professor Hooker in Glasgow. Image courtesy of the Hunt Institute for Botanical Documentation.

of taxonomic papers on the western phlox species (1938, 1941, 1942) and his 1955 monograph on the entire genus in which he recognized *P. douglasii* as a distinct species with a distribution centered on the Columbia Plateau in the Pacific Northwest.

The clarity was short-lived. In his treatment of *Phlox* in *Vascular Plants of the Pacific Northwest* (1959), Arthur Cronquist reduced *P. douglasii* to synonymy under *P. caespitosa*. Cronquist described the type of *P. caespitosa* as "a compact plant of the taxon usually known as *P. douglasii*." Since the name *P. caespitosa* was published by Thomas Nuttall (1834) four years prior to Hooker's (1838) publication of *P. douglasii*, Cronquist reasoned, "the latter name [*P. douglasii*]... must subside."

Wherry (1962, 1965) considered this "a serious misunderstanding," calling *P. douglasii* and *P. caespitosa* "about as distinct species as can exist among the Microphloxes." Indeed, Wherry (1955) had placed the two species in in-

dependent subsections of the genus – *Douglasianae* and *Caespitosae*. Despite Wherry's protests, Cronquist's view gained the day thanks to the wide circulation of *Vascular Plants of the Pacific Northwest*, and most botanists and ecologists have been using *P. caespitosa* for this species ever since.

I examined the type material (the original specimens used to describe the species) of *P. douglasii* and *P. caespitosa*, plus I studied both entities in the field (*P. douglasii* in Washington, Oregon, and California; *P. caespitosa* in Montana). This work led me to conclude that the two represent separate species (Locklear 2009). As noted by Wherry (1962, 1965, 1969), the leaves of *P. douglasii* are dark green, slender and needle-shaped (acicular or acrose), and covered by long gland-tipped hairs, while the leaves of *P. caespitosa* are pale green, relatively broad and flat (linear-oblong), thickish, and bear coarse glandless cilia along the margins. The distribution of *P. douglasii* is centered on the Columbia Plateau, while that of *P. caespitosa* is centered in the Northern Rocky Mountains. Accordingly, the name *P. douglasii* has been reinstated (Locklear 2009).

Wherry (1955) recognized *P. douglasii* subsp. *rigida*, which he considered a shorter, more compact expression of Columbia phlox that grows in exposed, xeric habitat. The subspecies is based on *P. rigida*, described by English botanist

George Bentham in 1845, also from material collected by David Douglas. As presently understood, the subspecies does not appear to warrant recognition and *P. rigida*, a name found in older floristic and ecological literature of Oregon and the Pacific Northwest, should be regarded as a later-published synonym of *P. douglasii*.

Description of Columbia Phlox

Columbia phlox is a subshrub, with herbaceous flowering growth that dies back to woody tissue at the end of each growing season. It is sparingly and diffusely branched, forming open tufts 10-20 cm tall from a woody base, the numerous erect-ascending annual flowering branches 5-15 cm long with about four leaf nodes apparent. The overall growth habit is more strongly condensed in exposed, xeric situations with flowering shoots only 2-4 cm long. The leaves of Columbia phlox are subulate, somewhat acerose, thinnish and dark green, sparsely ciliate and superficially pilose to glabrate with fine gland-tipped hairs, with a maximum length



Jeanne Russell Janish illustrated *Phlox douglasii* for Herbert Louis Mason's 1951 treatment in Abram's *Illustrated Flora of the Pacific States*.



David Douglas collected this specimen of phlox during his first expedition to northwestern North America in 1826 when he was 27; it became the type specimen when Hooker described *Phlox douglasii*. From the collection of the Royal Botanic Gardens, Kew, ©The Board of Trustees of the Royal Botanic Gardens, Kew, reproduced with permission.

7-12 mm and width 0.75-1.5 mm. The inflorescence is one- to three-flowered, its herbage copiously glandular-pubescent, with a maximum pedicel length 0.5-6 mm. The calyx is 7.5-11 mm long and united 1/2 to ca. 3/4 its length, the five spreading calyx-lobes linear-subulate with rather prominent midrib and cuspidate apex. The calyx membranes (thin, dry, translucent tissue occurring at the junction of the sepals in the calyx-tube) are flat. The tube of the corolla is 10-14 mm long, glabrous or exceptionally pubescent, and the five spreading corolla-lobes obovate (average dimensions 7.5 by 5 mm). The corolla hue is lavender, pink or white. The style is 4-8 mm long, united to its tip, which is free for about a mm. The flowering season of Columbia phlox is spring to early summer, April-May, into June.

Cushion-forming Look-a-likes

Columbia phlox is one of a number of cushion-forming phloxes occurring in Oregon that take careful observation to distinguish from each other. These species share a tufted growth habit, with numerous short flowering shoots arising from a woody caudex in discrete clusters to form loose to dense mats, cushions, or mounds. The leaves of these species are small, narrow, and often rigid, and the flowers are solitary or in groups of two to three (up to six) together at the stem-tip. Within its range in Oregon, Columbia phlox is most likely to be confused with *P. austromontana* or *P. diffusa*, two species that share its more open growing, subshrub growth habit. The key on page 8 separates the cushion-forming phlox species of Oregon.



Side view of *Phlox douglasii* showing stiff needle-shaped leaves, calyx lobes, and the glandular hairs. Photo by Robert Korfhage on May 14, 2010, at Haystack Reservoir in Jefferson County.

Distribution and Habitat

As reflected in the common name, the distribution of Columbia phlox is concentrated on the Columbia Plateau, including the Walla Walla and Blue Mountain sections (western Idaho/eastern Oregon/eastern Washington), and the Okanogan Highlands of north-central Washington, as well as the northern Great Basin (northeastern California/southern Oregon/northwest Nevada), including the Harney area of south-central Oregon. Within this region, Columbia phlox is associated with dissected plateaus, foothills, and mountains at elevations ranging from 1,000 to 7,000 feet.

Columbia phlox grows in dry habitats associated with escarpments, bluffs, scablands, ridges, and the upper slopes of rolling terrain. Soils are medium- to coarse-textured, often stony and shallow to bedrock. Parent material is primarily basalt, but Columbia phlox also occurs in association with glacial outwash, pumice and other volcanic substrates, and outwash derived from the volcanic deposits.

In certain parts of its range, Columbia phlox occurs in habitat where the soil profile has a moderately to strongly structured, clayey B-horizon near the surface. The clay impedes water drainage,

creating a perched water table with poor aeration in the rooting zone during the winter and spring. Columbia phlox is commonly associated with dwarf sagebrush (*Artemisia arbuscula*) in such habitat. The “*A. arbuscula* scab flats” of the Modoc Plateau of northeastern California, where Columbia phlox is a common species, are described as “virtually lakes in the spring when snow melts” due to the clayey soils (Young *et al.* 1977).

Plant Community Associations

Columbia phlox occurs in conifer woodland, shrubland, shrub-steppe, grassland, and rock outcrop communities. Throughout most of the northern portion of its range on the Columbia Plateau, Columbia phlox is associated with ponderosa pine (*Pinus ponderosa*) woodland and savanna. These open stands of ponderosa pine have an herbaceous layer typically dominated by a single species of xerophytic bunchgrass, either bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), or needle-and-thread (*Hesperostipa comata*), with a rich diversity of forbs. Along with Columbia phlox, typical forbs in these communities include arrowleaf balsamroot (*Balsamorhiza sagittata*), yellowbells (*Fritillaria pudica*), bulbous woodlandstar (*Lithophragma glabrum*), silky lupine (*Lupinus sericeus*), sagebrush buttercup (*Ranunculus glaberrimus*), and Douglas’ blue-eyed-grass (*Olymium douglasii* var. *inflatum*). These communities often border more densely forested areas of higher elevations, as in the Blue Mountains of northeastern Oregon.

In central Oregon and extending into extreme northeastern California, Columbia phlox occurs in western juniper (*Juniperus occidentalis* var. *occidentalis*) woodland. These open stands of western juniper, the most xeric forested community in the Pacific Northwest, occur with a shrub understory of Wyoming big sagebrush (*A. tridentata* subsp. *wyomingensis*), dwarf sagebrush, or antelope bitterbrush (*Purshia tridentata*), along with an herbaceous layer dominated by bluebunch wheatgrass or Idaho fescue. Columbia phlox is often a prominent forb in the herbaceous layer of juniper woodlands, notably in the Ochoco Mountains of central Oregon and the Warner Mountains of northeastern California.

Columbia phlox occurs in several types of shrubland and shrub-steppe on the Columbia Plateau and northern Great Basin. It is strongly associated with dwarf sagebrush in stony, shallow-soil habitat. These communities occur in open scabland, sometimes in a complex mosaic of openings within woodland, shrubland, and grassland communities. In the Hart Mountain National Antelope Refuge in southcentral Oregon, Columbia phlox is associated with extensive stands of dwarf sagebrush on upland flats. It also occurs in shrublands and shrub-steppe dominated by antelope bitterbrush and, less commonly, big sagebrush.

Columbia phlox is a component of grassland communities throughout its range on the Columbia Plateau. It is particularly common in the bunchgrass communities of the watershed of the Spokane River in eastern Washington and adjacent Idaho dominated by Idaho fescue or bluebunch wheatgrass. David Douglas appeared to be writing of Columbia phlox in his journal while in the vicinity of present-day Spokane, Washington, on 10 May 1826, when he noted a “small beautiful species of *Phlox* which I found some time since on the Columbia gave the whole open places a fine effect.”

Columbia phlox is often a dominant element in the flora of xeric rock outcrop and scabland and coulee habitat in the Pacific Northwest. It is very common along the rim-rock edges of the basalt plateaus that form the spectacular canyons of the Deschutes and Crooked Rivers in northcentral Oregon. It also is one of the showiest forbs growing on the comparatively recent volcanic substrates in Lava Beds National Monument on the Modoc Plateau in northeastern California. Columbia phlox is a dominant plant in the sparsely vegetated badland habitat derived from eroded volcanic ash and tuff deposits of the John Day and Clarno formations in central Oregon. In northeastern Washington, it occurs on rocky mounds and rock stripes in patterned ground habitat (biscuit and swale).

Interpreting ecological literature in relation to *P. douglasii* is made difficult by the confused nomenclature surrounding this species. Ecological literature pertaining to *P. douglasii* in Oregon includes the following references: Culver 1964 (as *P. diffusa*); Driscoll 1964a, 1964b; Eckert 1957 (as *P. diffusa*); Hall 1967. These names have been repeated where these studies are cited in the important ecological reference, *Natural Vegetation of Oregon and Washington* (Franklin and Dyrness 1988).

Horticulture: Mistaken Paternity

The name *P. douglasii* and the term “Douglasii Hybrids” have been used in European horticulture for decades in connection with the many cushion phlox cultivars that have been selected,

named, and introduced into commerce, particularly in England. The association of cultivars with the name *P. douglasii* occurred as early as 1931 in an article on “alpine phlox” in cultivation at the Royal Horticultural Society’s garden at Wisley. Some of these cultivars, such ‘Crackerjack’, are among the most popular and most easily grown cushion phlox in Europe, and several have received the Award of Garden Merit from the Royal Horticultural Society.

Whatever the original source of this material, it was not David Douglas himself, and most likely was not true *P. douglasii*. Careful review Douglas’ journal discloses that, while he collected herbarium specimens of a number of phloxes in the Pacific Northwest, the only species from which he actually collected seed was *P. longifolia*. This is in fact the only phlox included on the list of plants introduced by Douglas, as compiled and published by the Royal Horticultural Society in 1914.

Of the many cultivars circulating under the name “Douglasii Hybrids,” at least some are suspected to represent hybrids involving spontaneous garden crosses between *P. bifida*, *P. nivalis*, or *P. subulata*, or between one of these eastern mat-forming phloxes and one of the western cushion-forming phloxes. *Phlox diffusa* is the suspected westerner because, like the cultivars in question but unlike most of the western cushion-forming phloxes, it is relatively easy to propagate.

The only reliable report of the cultivation of Columbia phlox is found in Gabrielson’s *Western American Alpines* (1932) where it is apparent from his description of its attributes and ecology that he



Another important habitat of *Phlox douglasii* is Columbia plateau low sagebrush (*Artemisia arbuscula*) steppe. Photo by James Locklear at Hart Mountain National Antelope Refuge in Lake County.



Phlox douglasii in a Columbia plateau Western juniper (*Juniper occidentalis*) woodland at The Cove Palisades State Park in Jefferson County. Photo by James Locklear.

was referring to true *P. douglasii*. Gabrielson noted the plant was “in cultivation on the Pacific coast, both in Canada and the United States, and...available in a limited way commercially.” Columbia phlox is a showy species with potential not only as a subject for the rock garden but also as a drought-tolerant landscape plant for drier portions of the Pacific Northwest. It should be grown in full sun to light shade in dry, well-drained soil.

***Phlox pulvinata* in Oregon**

Like *P. douglasii*, the identity of another phlox in Oregon has been entangled with the name *P. caespitosa*. The species in question is *P. pulvinata*, the dominant alpine phlox of the northern and central Rocky Mountains. *Phlox pulvinata* occurs in alpine and subalpine communities in the Wallowa range of the Blue Mountains, sometimes in association with exposures of limestone of the Martin Bridge Formation (Cole 1982, Johnson 2004). This taxon was originally described by Wherry (1941) as *P. caespitosa* subsp. *pulvinata*. Subsequent regional treatments of *Phlox*, such as Peck (1941) in *A Manual of the Higher Plants of Oregon* and Mason (1951) in *Illustrated Flora of the Pacific States*, simply reduced this to *P. caespitosa*. Cronquist (1959) elevated it from *P. caespitosa* subsp. *pulvinata* to *P. pulvinata*. Locklear (2009) recently affirmed full species status for *P. pulvinata*.

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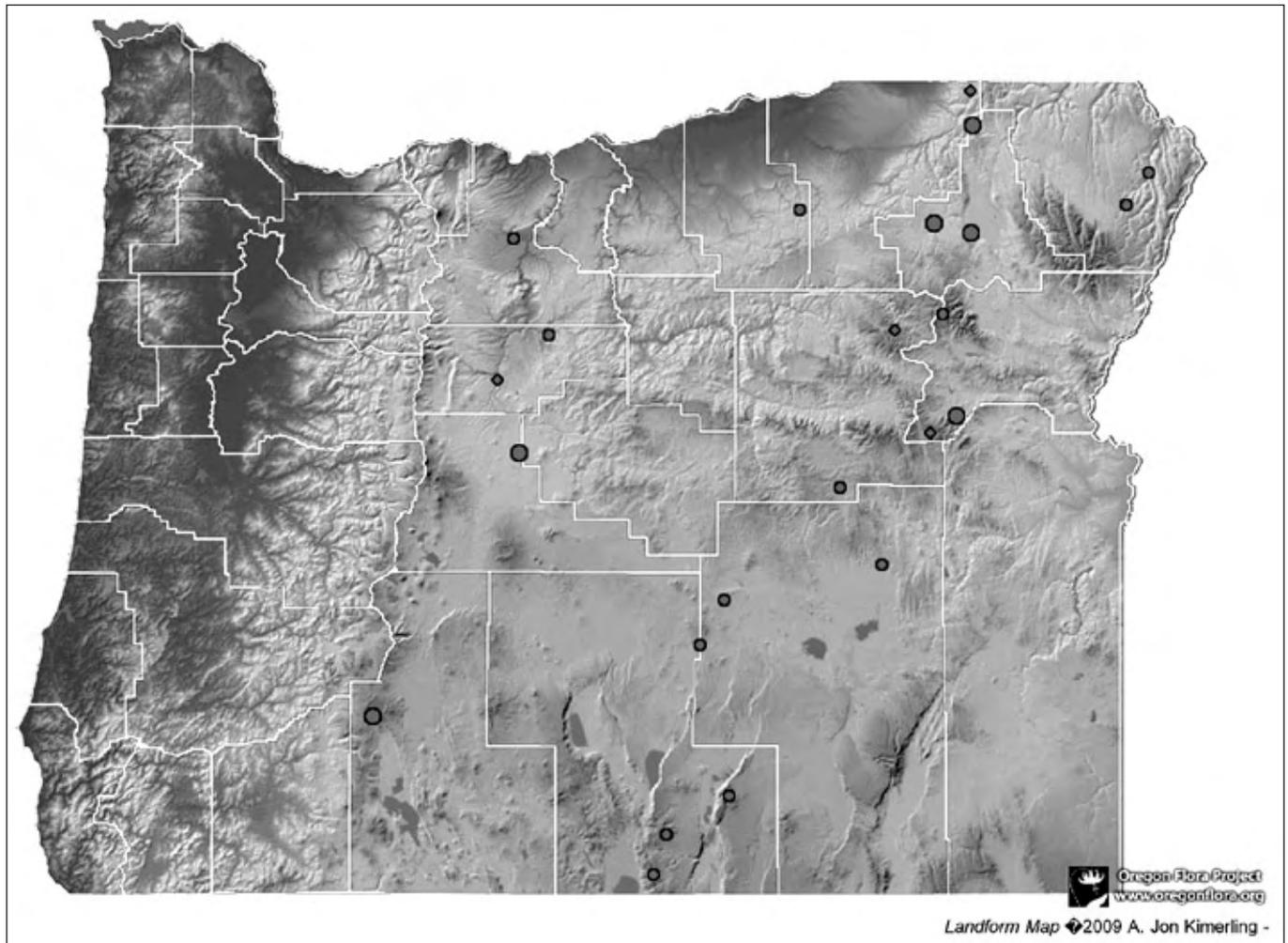
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Distribution of *Phlox douglasii* in Oregon; map courtesy of the Oregon Atlas Project. www.oregonflora.org/atlas.php

Key to the cushion-forming phlox species in Oregon

- 1a. Plant a subshrub, branched from the base like a shrub and annually producing herbaceous flowering growth that dies back to woody tissue at the end of the growing season; growth habit generally open with internodes typically apparent, but can be more condensed under harsh environmental conditions...2
- 2a. Calyx-membranes conspicuously carinate (raised lengthwise into a keel-like ridge)...**Phlox austromontana**
- 2b. Calyx-membranes flat to somewhat plicate (raised lengthwise into a flattened fold)...3
- 3a. Pubescent with glandular hairs throughout; leaves somewhat acicular (needle-shaped) and stiff, their surfaces pilose (beset with relatively sparse, soft, slender, more or less erect hairs) to glabrate (very sparsely hairy) with fine gland-tipped hairs; primarily dry to xeric habitat on the Columbia Plateau and in Blue Mountains region...**Phlox douglasii**
- 3b. Pubescence not glandular; leaves linear (narrow with sides parallel over most of length) to linear-subulate (narrowly triangular) and only moderately rigid; primarily moderate to high elevations in the Klamath and Cascade mountains...**Phlox diffusa**
- 1b. Plant a perennial herb (with no woody tissue in shoots) forming more or less compact mats, cushions, or mounds...4
- 4a. Calyx-membranes conspicuously carinate (raised lengthwise into a keel-like ridge) and strongly bulged toward the base...**Phlox aculeata**
- 4b. Calyx-membranes flat to weakly carinate...5
- 5a. Leaf margins bearing coarse, conspicuous cilia; in Oregon limited to alpine/subalpine habitat in Blue Mountain region...**Phlox pulvinata**
- 5b. Leaf-cilia fine or lacking altogether...6
- 6a. Inflorescence-herbage glandular-pubescent (with gland-tipped hairs) nearly throughout; calyx-membranes tending to be narrow; in Oregon limited to alpine habitat on Mount Hood...**Phlox hendersonii**
- 6b. Inflorescence-herbage pubescent but with glandular hairs sparse or lacking altogether; calyx-membranes tending to be broad...7
- 7a. Plant a diffuse mat; mostly glabrous (lacking hairs) to sparsely pilose (beset with relatively sparse, soft, slender, more or less erect hairs); leaves broadly linear (narrow with sides parallel over most of length); calyx-lobes with a conspicuous elevated midrib, joined by depressed, deep-seated calyx-membranes; in Oregon limited to montane forest in Blue Mountain region...**Phlox multiflora**
- 7b. Plant a compact mat or cushion; more or less canescent (beset with dense vesture of fine relatively short gray hairs) on portions of the leaf and calyx; leaves tending to be subulate (narrowly triangular); calyx-lobe midrib only moderately elevated and membranes not markedly depressed...8
- 8a. Leaves densely crowded and overlapping, closely appressed (lying flat against the stem) and often 4-ranked with stems quadrate (appearing square in cross-section); leaves 3-5 mm long, broad-subulate (broadly triangular) to narrowly lanceolate (lance-shaped), covered with dense wooly hairs at least at base; south-central Oregon...**Phlox muscoides**
- 8b. Leaves less crowded, stems appearing round in cross-section; leaves 6-12 mm long, often linear (narrow with sides parallel over most of length), usually stiff and pungent (very sharp), often loosely pubescent with somewhat cobwebby hairs; central and eastern Oregon...**Phlox hoodii**

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Jim Locklear is a botanist and horticulturist living in Lincoln, Nebraska, and is director of conservation for Lauritzen Gardens in Omaha, Nebraska. He received a BS in Biology from the University of Central Missouri and MS in Plant Science from Southern Illinois University. Locklear recently completed work on a book on the genus *Phlox* that will be available from Timber Press in 2011.