

KEY TO PHLOX OF COLORADO

PREPARED BY BILL JENNINGS

APRIL 29, 1999

The similarity of *Phlox* flowers from species to species does not offer much upon which to construct a key, except plant stature and habitat, the tack taken in most floras. However, taken together, the dimensions of the plant, leaves, and flowers; characteristics of the calyx; pubescence; habitat; blooming season; and elevation seem to separate the species of *Phlox*. Considering the similarity of the flowers, most species of *Phlox* are probably pollinated by the same or similar pollinators. It is probable that only by temporal, ecological, and elevational differences do the taxa maintain their distinctiveness as species. Where species share the same range and habitat, one should expect difficulty in separating species of *Phlox*.

1. Plants east of Continental Divide...2

1. Plants west of Continental Divide...11

2. Plants of the eastern plains (generally east of I-25)...3

2. Plants of the foothills, mountains, and tundra...6

3. cushionlike, densely caespitose plants, less than about 5 cm tall; leaves densely woolly, closely overlapping, scale-like, less than 5 mm long; flowers white to bluish, tube 5-10 mm, lobes 3-5 mm, style 2-5 mm; blooming mid-May to mid-June, peaking June 9; often in cracks in rock outcrops or on rocky sites, usually on calcareous substrates, in Logan, Weld, and Larimer Counties within about 30 miles of the Wyoming state line...*Phlox muscoides* (*Phlox bryoides*) (This can be difficult to distinguish from somewhat caespitose plants of *Phlox hoodii*, but *Phlox muscoides* is copiously woolly pubescent, is usually restricted to very rocky sites, and blooms later; see lead 5B for more characteristics of *Phlox hoodii*).

3. plants matted to loosely branched; may be low, but not cushionlike or densely caespitose; pubescent to somewhat cobwebby, but not so densely as above...4

4. Plants loosely branched, and usually over 10 cm tall; glandular pubescent, especially on the calyx; flowers distinctly pediceled, pink to white, tube 10-18 mm, lobes 7-15 mm, style about 15 mm; blooming late April to late May, peaking very early (May 9); plains or pinyon/juniper or oak thickets, mostly in the Arkansas River drainage of southeastern Colorado (Huerfano and Otero counties), but some specimens from the plains of suburban southeastern Denver (Arapahoe and Douglas counties) appear to be this species...*Phlox longifolia* (largest-flowered phlox on the plains and apparently the only phlox in southeastern Colorado).

4. low plants, intermediate in stature; neither cushion-like or caespitose, nor tall and loosely branched, between about 5 and 10 cm tall; mostly in northeastern Colorado...5
5. leaves 10-25 mm x 1-2 mm; calyx pubescent on margin of lobes; flowers white, tube 6-13 mm, lobes 6-8 mm, style 5-9 mm; blooming mid-May to mid-June, peaking June 4; sand hills of Yuma, Washington, Logan, Morgan, and Weld counties ...*Phlox andicola* (larger in all respects than the next, blooming later, and usually restricted to sand hills, although some specimens from Pawnee Buttes area are listed as collected on clay soils)
5. leaves 4-10 mm x 1 mm; calyx cobwebby pubescent to a greater or lesser degree, usually in leaf axils as well; flowers lavender, pink-purple, to white, tube 4-8 mm, lobes 4-5 mm, style 2-5 mm; blooms mid-April to mid-June, peaking May 18; prairies; the few specimens seen are from Pawnee National Grasslands (Weld County) and near Limon (Lincoln and Elbert counties), but probably more common on northeastern plains...*Phlox hoodii* (smaller than the last, blooming earlier, and growing mainly in grasslands; some specimens from Pawnee Buttes have been difficult to identify conclusively)
6. Plants occurring above timberline, OR if in subalpine situations, usually in rocky, windswept, or exposed sites mimicking the tundra environment, usually above 10,000 feet elevation...7
6. Plants of foothill, montane, and subalpine habitats, usually below 10,000 feet...8
7. tightly cushioned plants with numerous short, erect, subparallel shoots; flowers white to pink or lavender, tube 6-10 mm, lobes 3-5 mm, style 1.3-3.0 mm; blooming late June to early August, peaking July 14; tundra, mostly 11,500 to 13,000 feet (sometimes higher) elevations in Colorado; from James Peak southward along the Continental Divide and Sangre de Cristos...*Phlox condensata* (smaller, with a much denser mat than the next and with a generally more southerly distribution)
7. cushions loose, more spreading, some branches tending to spread out along or below the soil surface; flowers white to light bluish, tube 9-13 mm, lobes 5-7 mm, style 2-5 mm; blooms late June to early August, peaking July 11; mid- subalpine to low tundra habitats, 10,300 to 11,700 feet elevation in Colorado, one from as low as 9,400 feet; from James Peak northward along the Continental Divide, but with some scattered locations southward, particularly in the San Juans (Dolores, La Plata, Hinsdale, and Conejos [at only 9400 feet] counties)...*Phlox pulvinata* (*Phlox sibirica* ssp. *pulvinata*) (larger in all respects than the last and at lower elevation, but blooming at very nearly the same time and with the same pubescence; perhaps only an ecotype of *Phlox condensata*, the looser mat and larger flowers due to the more protected environment of the subalpine?)
8. plants loosely caespitose, forming closed or open mats or low mounds, plants generally between about 5 and 10 cm tall...9
8. plants densely caespitose, forming dense, closed mats, plants generally less than 5 cm tall...10

9. leaves 4-10 mm x 1 mm; calyx cobwebby pubescent to a greater or lesser degree, usually in leaf axils as well; flowers lavender, pink-purple, to white, tube 4-8 mm, lobes 4-5 mm, style 2-5 mm; blooms June; the few specimens seen from the Eastern Slope above the plains were collected in sagebrush at 8000 feet, from the floor of North Park, Jackson County...***Phlox hoodii*** (note also that *Phlox muscoides* and *Phlox multiflora* occur in the same habitat in North Park).
9. leaves 12-30 mm x 1-2 mm; calyx glabrous or sometimes inconspicuously puberulent, free calyx lobes conspicuously longer than the lower portions united by the intercostal membranes; flowers white to pink or bluish, tube 10-14 mm, lobes 6-11 mm, style 5-8 mm; blooming from mid-May to early July, following the advancing season up the mountains, peaking in mid-June; dry, gravelly openings in forests from 6,000 to 12,000 feet, but mostly 7,500 to 9,000; considered the common montane phlox of the Eastern Slope, but herbarium specimens seen only from Jackson, Larimer, and Boulder counties, and one location in Custer County and one location in Fremont County in the Sangre de Cristos...***Phlox multiflora***
10. cushionlike, densely caespitose plants, less than about 5 cm tall; leaves densely woolly, closely overlapping, scale-like, less than 5 mm long; flowers white to bluish, tube 5-10 mm, lobes 3-5 mm, style 2-5 mm; blooming mid-May to mid-June; often in cracks in rock outcrops or on rocky sites, usually on calcareous substrates; a few specimens from the lower foothills of Larimer County near Owl Canyon and one specimen from sagebrush at 8000 feet, on the floor of North Park, Jackson County, both localities within about 30 miles of the Wyoming state line...***Phlox muscoides*** (*Phlox bryoides*) (Also note that *Phlox hoodii* and *Phlox multiflora* occur in North Park in the same habitat).
10. cushions loose, more spreading; similar in most respects to *Phlox pulvinata* but with somewhat more succulent leaves; blooming from mid-May to mid-June; limited to two sites on the floor of South Park, Park County, in highly alkaline habitats (near Antero Reservoir and High Creek Fen) at 9,000 feet...***Phlox kelseyi*** (Whether the highly alkaline and moist habitat, earlier bloom, and lower elevation are significant is not clear. Weber & Wittmann, East Slope Flora consider these collections to be a low elevation occurrence of *Phlox pulvinata*; more work is necessary before this can be considered proven).
11. Plants of desert, shrub, oak, pinyon/juniper, and sagebrush habitats, below about 8,500 feet...12
11. Plants of montane and subalpine forest and tundra habitats, above about 8,500 feet...17
12. cushionlike, densely caespitose plants, less than about 5 cm tall; leaves densely woolly, closely overlapping, scale-like, less than 5 mm long; flowers white to bluish, tube 5-10 mm, lobes 3-5 mm, style 2-5 mm; usually on calcareous substrates; only two Western Slope specimens seen: from Moffat County at 6800 feet within 1 mile of the Wyoming state line, collected June 24, somewhat later than is usual for the species; and from a nebulous site ("Rocky Mountain Recreation Area" [was Arapahoe National Recreation Area meant?]) in Grand County at 8200 feet, highest elevation collection seen...***Phlox muscoides*** (*Phlox bryoides*) (This can be difficult to distinguish from somewhat caespitose plants of *Phlox hoodii*, but *Phlox muscoides* is copiously woolly pubescent, is usually restricted to very rocky sites, and

blooms later; see lead 5B for more characteristics of *Phlox hoodii*. The *Phlox muscoides* specimen from Moffat County may be *Phlox opalensis*).

12. plants matted to loosely branched; may be low, but not cushionlike or densely caespitose...13

13. plants loosely branched, 10-40 cm tall...14

13. low plants 5-10 cm tall, intermediate in stature between tall, loosely branched and low, cushionlike...15

14. Membrane between calyx lobes with a very prominent bulge, ridge, fold, or keel (strongly carinate), normally visible with naked eye, usually glandular pubescent; flowers pink to white, tube 10-18 mm, lobes 7-15 mm, style about 15 mm; blooming early May to Late June, peaking May 29; very common on the Western Slope, from 4800-9200 feet, but mostly from 5000-8200 feet, frequently in sagebrush or pinyon/juniper habitats; no records from the high mountain counties (Grand, Summit, Pitkin, San Juan, Hinsdale)...***Phlox longifolia*** (plants from Montezuma County have very long tubes and answer rather well to *Phlox longifolia* var. *stansburyi*; these plants were segregated by Aven Nelson as *Phlox cortezana*; see Intermountain Flora for details and drawings)

14. Membrane between calyx lobes flat, with no hint of a fold; otherwise, very similar to *Phlox longifolia* and blooming at the same time (May 6 to June 15, peak May 31); oak/ponderosa habitats, from 7,000 to 8,000 feet, apparently limited to the Pagosa Springs area of Archuleta County and adjacent Rio Arriba County, New Mexico, usually displacing *Phlox longifolia* in this area, but two *Phlox longifolia* specimens from within the range of *Phlox caryophylla* have been seen...***Phlox caryophylla*** (The differences between this and *Phlox longifolia* are minor and *Phlox caryophylla* probably should be considered only a local variety of the highly variable *Phlox longifolia*).

15. Membrane between calyx lobes with a low, inconspicuous, linear keel (hard to see, particularly on pressed specimens; look at multiple flowers on multiple plants); glabrous to hairy but not glandular; leaves 8-15 mm x 0.5-1.5 mm, sharply pointed; flowers white or less often bluish or pink, tube 8-15 mm, lobes 5-8 mm, style 2-5 mm; blooming mid-May to mid-June, peaking May 30; mostly in pinyon/juniper, but also ponderosa pine, oak, juniper, and Cercocarpus habitats; 6,000-8,000 feet (one specimen from 9,000 feet); best developed and most distinctive in western Moffat (Dinosaur National Monument) and Rio Blanco (Piceance Basin) counties, but also occurs in San Miguel, Montezuma, and La Plata counties where separation from *Phlox hoodii* is difficult...***Phlox austromontana*** (Convincing oneself of the presence or absence of the low keel on the calyx membrane is problematic; however, the looser stature and longer leaves of the Moffat and Rio Blanco county specimens of *Phlox austromontana* set them apart from *Phlox hoodii*; elevation and habitat generally set *Phlox austromontana* apart from *Phlox multiflora*).

15. Membrane between calyx lobes flat (not carinate); may be inconspicuously wrinkled in no particular pattern, but no longitudinal ridge is present...16

16. Pubescence of calyx thinly to densely arachnoid woolly, also in leaf axils; leaves 4-10 mm x 0.5-1.0 mm; flowers lavender to pink-purple, tube 4-8 mm, lobes 4-5 mm, style 2-5 mm; blooms mid-April to early June, peaking May 19 (about 10 days before *Phlox austromontana* and *Phlox longifolia* and nearly a month before *Phlox multiflora*); mostly in sagebrush or pinyon/juniper; 5000-8000 feet, in most Western Slope counties, but no records from high mountain counties (Summit, Pitkin, San Juan, Hinsdale)...***Phlox hoodii*** (separation of *Phlox hoodii* from *Phlox austromontana* is difficult in Montezuma County.)
16. Calyx glabrous to pubescent, but usually not densely and not arachnoid woolly, pedicels and upper stems lightly pubescent with short crinkled hairs; leaves 12-30 mm x 1-2 mm; free calyx lobes conspicuously longer than the lower portions united by the intercostal membranes; flowers white to pink or bluish, tube 10-14 mm, lobes 6-11 mm, style 5-8 mm; blooming from late May to mid-July, following the advancing season up the mountains, peaking in mid-June; dry, gravelly openings in forests from 6,000 to 12,000 feet, but mostly 7,000 to 10,000; mostly from the higher elevation counties and missing from the lower elevations, most common in Routt and Grand counties; the Flattops Area; Grand Mesa; and the Gunnison Basin; no Western Slope collections from south of US 50 (missing from the San Juans)...***Phlox multiflora***
17. Plants of 8,500 to 10,000 elevation; leaves 12-30 mm x 1-2 mm; free calyx lobes conspicuously longer than the lower portions united by the intercostal membranes; flowers white to pink or bluish, tube 10-14 mm, lobes 6-11 mm, style 5-8 mm; blooming from late May to mid-July, following the advancing season up the mountains, peaking in mid-June; dry, gravelly openings in forests from 6,000 to 12,000 feet, but mostly 7,000 to 10,000; mostly from the higher elevation counties and missing from the lower elevations, most common in Routt and Grand counties; the Flattops Area; Grand Mesa; and the Gunnison Basin; no collections from south of US 50 (missing from the San Juans)...***Phlox multiflora***
17. Plants occurring above timberline, OR if in subalpine situations, usually in rocky, windswept, or exposed sites mimicking the tundra environment, usually above 10,000 feet elevation...18
18. tightly cushioned plants with numerous short, erect, subparallel shoots; flowers white to pink or lavender, tube 6-10 mm, lobes 3-5 mm, style 1.3-3.0 mm; blooming late June to early August, peaking July 14; tundra, mostly 11,500 to 13,000 feet (sometimes higher) elevations in Colorado; from James Peak southward along the Continental Divide and Sangre de Cristos...***Phlox condensata*** (smaller, with a much denser mat than the next and with a generally more southerly distribution)
18. cushions loose, more spreading, some branches tending to spread out along or below the soil surface; flowers white to light bluish, tube 9-13 mm, lobes 5-7 mm, style 2-5 mm; blooms late June to early August, peaking July 11; mid-subalpine to low tundra habitats, 10,300 to 11,700 feet elevation in Colorado, one from as low as 9,400 feet; from James Peak northward along the Continental Divide, but with some scattered locations southward, particularly in the San Juans (Dolores, La Plata, Hinsdale, and Conejos [at only 9400 feet] counties)...***Phlox pulvinata*** (*Phlox sibirica* ssp. *pulvinata*) (larger in all respects than the last and at lower elevation, but blooming at very nearly the same time and with the same pubescence. Perhaps

this is only an ecotype of *Phlox condensata*; the looser mat and larger flowers due to the more protected environment of the subalpine?)

SPECIMENS OF GENUS PHLOX

IN REGIONAL HERBARIA

Herbaria checked: COLO (University of Colorado - Boulder); KHD (Kalmbach Herbarium at Denver Botanic Gardens); RM (Rocky Mountain Herbarium at University of Wyoming). Not all species checked at all herbaria. Abridged label data taken for some very common species.

PHLOX ANDICOLA

Weld County

Vicinity of Pawnee Buttes, dirt road, frequent on rotten sandstone outcrop, T10N R59W secs 29, 28, 22, May 24, 1981, Wittmann 1653 (COLO) [in flower]

Pawnee Buttes, July 1, 1906, Dodds 2129 (COLO) [late flower]

Along main trail to Pawnee Buttes, May 18, 1997, Smookler 128 (KHD)

Pawnee Grasslands, 5000 feet, June 4, 1980, B. Anderson 1733 (KHD)

Roadside, 5 miles north of New Raymer, 4700 feet, June 6, 1946, Hartwell & Penland 2081 (KHD)

Near Hudson, sandy soil, May 30, 1918, Ramaley 11350 (COLO) [late flower, probably between Hudson and Roggen]

Roggen, sandy soil, June 20, 1920, Ramaley 11831 (COLO) [in flower; probably all these Roggen specimens were taken in the Sand Hills north of Roggen]

Roggen, sandy soil, June 10, 1930, Ramaley 12337 (COLO) [late flower]

Roggen, sandy soil, July 26, 1930, Ramaley 12406 (COLO) [vegetative]

Roggen, sandy soil, May 27, 1936, Ramaley 15291 (COLO) [in flower]

Roggen, sandy soil, June 17, 1936, Ramaley 15365 (COLO) [in flower]

Logan County

Northeast of Julesburg (Jumbo) Reservoir at top of grade crossed by road 93, north of South Platte River, clay ridges, May 21, 1983, Weber & Wittmann 16636 (COLO) [late flower; site is northwest of Julesburg Reservoir if location description is correct]

Northeast of Sterling along US 6, sand hills, 3900 feet, May 30, 1997, Lederer 97-08 (COLO)

Morgan County

Brush, scattered in more stabilized soil of sand hills, June 6, 1938, Ramaley 16357 (COLO) [in flower]

Washington County

Wagner, sand hills, June 12, 1937, Ramaley 16015 (COLO) [late flower; I am unable to locate Wagner on any map in my possession. Ramaley's field books indicate that on June 11, he was in Brush; on June 12, he was at Wagner and then at Joes; on June 13, he was at Grenada. Ramaley 16018 is *Penstemon ambiguus* collected at Joes. It appears from this that Wagner was somewhere between Brush and Joes on Colorado 71 or US 36. This may be the same site as Ramaley 16357, above, and would be in Morgan County. Ramaley frequently collected the same site again and again.]

Two miles west of Cope on US 36, roadside, 4950 feet, May 16, 1954, Douglass 5423 (COLO) [in flower]

Yuma County

Sand hills, 12 miles north of Wray on east-trending side road that ends just west of Laird, June 2, 1984, Weber & Wittmann 17281 (COLO) [in flower, very nice]

J. Conrad property north of Wray, 5.5 miles north of US 34 and 1 mile east of county road BB, T2N R44W sec 7, 3800 feet, sand hills, June 8, 1988, Neely 5057 (COLO)

Sandy hillside, just north of Wray on US 385, 3600 feet, June 4, 1975, B. Anderson 747 (KHD)

Wray, May 20, 1904, Ferril s.n. (COLO) [in flower, nice]

PHLOX AUSTROMONTANA

Moffat County

Blue Mountain Plateau, near county road 14, P/J, 7000 feet, June 10, 1967, Denham 1431 (COLO)

Dinosaur National Monument, P/J, T6N R100W sec 28, 7000 feet, May 15, 1987, Neely 3957 (COLO)

Dinosaur National Monument, P/J, T6N R100W sec 26, 6800 feet, May 18, 1987, O'Kane 2793 (COLO) [late flower]

Dinosaur National Monument, P/J, T6N R100W sec 32, 7250 feet, May 27, 1987, O'Kane 2937

(COLO)

Dinosaur National Monument, *Cercocarpus* & pinyon, T8N R102W sec 33, 9000 feet, June 12, 1987, Neely 4293 (COLO) [collected at summit of Zenobia Peak; elevation correct for summit; highest elevation specimen seen]

Dinosaur National Monument, *Artemisia* & *Agropyron smithii*, T7N R102W sec 7, 7480 feet, June 13, 1987, O'Kane 3053 (COLO)

Dinosaur National Monument, Douglas-fir, pinyon, *Petrophyton*, T8N R103W sec 35, 8000 feet, June 15, 1987, Neely 4387 (COLO, RM) [originally identified as *P. multiflora*, COLO specimen has been annotated; RM specimen has not been annotated]

Dinosaur National Monument, T6N R99W sec 18, 6000 feet, May 18, 1988, Naumann 133 (COLO)

Rio Blanco County

2.3 miles east of Gillam Draw and 1.8 miles southeast of County road 64, P/J, T1N R97W sec 2, 2000m, May 20, 1982, O'Kane & Waters 82-99 (COLO) [in flower; mats not as tight as specimens from Montezuma County, glabrous]

Southwest of Rangely, P/J, T2S R104W sec 22, 6000 feet, June 14, 1985, Western Res. Dvlpt. Co. 11 (COLO)

Northeast-facing sandstone slope overlooking West Evacuation Creek, about 55 km north of Mack, P/J, T4S R103W sec 19, 1900m, May 27, 1976, Cronquist 11453 (COLO) [in flower; very loose mat; nearly glabrous]

San Miguel County

Lone Cone, no date, Brewster (COLO) [incorrectly attributed to Dolores County]

Uncompahgre National Forest south of Norwood, open Ponderosa pine forest with oak and juniper, T44N R13W sec 8, 7800 feet, June 4, 1982, Beck & Siplivinsky 3557 (COLO) [in flower; incorrectly attributed to Dolores County]

Montezuma County

Mesa Verde National Park, July 1, 1935, Zobel s.n. (KHD)

Mesa Verde National Park, Spruce Canyon, May 5, 1929, Bader 15 (COLO) [this may be *P. hoodii*; not annotated]

Mesa Verde National Park, Wetherill Mesa, P/J, 6000 to 8000 feet, May 18, 1960, Erdman 25
(COLO) [in flower]

McElmo Canyon about 11 miles west of Cortez, George Kelly Property, P/J, May 15, 1984, Weber &
Wittmann 17261 and 17262 (COLO) [these may be *P. hoodii*; not annotated]

Mancos, May, 1891, Eastwood (COLO)

La Plata County

Clay/gumbo soil, Durango, May 13, 1925, A. Nelson s.n. (COLO)

PHLOX CARYOPHYLLA

Archuleta County

0.9 mile east of Historical Marker at Nutria, T35N R2W sec 30, SW 1/4 SW 1/4 NE 1/4, June 3,
1985, O'Kane 2056 (RM)

South side of US 160, 0.9 mile east of the Nutria Historical Marker, opposite entrance to Pagosa
Trails Subdivision, roadside, under an oak, flowers bright pink when fresh, fading
dramatically when pressed, May 31, 1994, Jennings 94-16 (KHD)

North of Pagosa Springs, 7905 feet, June 15, 1924, Schmoll 1093a (COLO)

1 mile east of Pagosa Springs, US 160, roadside, 7100 feet, June 11, 1948, Penland 3658 (COLO)

1 mile south of junction of US 160 and US 84 on US 84, 7100 feet, May 6, 1982, Johnston 2538
(COLO) [2 sheets; one sheet annotated as *P. longifolia*; annotated back to *P. caryophylla*
4/22/99]

North of Stinking Springs, T35N R2W sec 26, 2200m, June 4, 1985, O'Kane 2067 (COLO)

Echo Lake Wildlife Area, on ridge west of Echo Reservoir, south of Pagosa Springs, T34N R2W sec
1, May 23, 1985, Wilken 14425 (RM)

A few miles north of Chromo, 7600 feet, May 30, 1947, Penland & Hartwell 3477 (COLO)

Gravel roadside [?, illegible], 2 miles north of Chromo, 7600 feet, May 30, 1947, Hartwell & Penland
1883 (KHD)

PHLOX CONDENSATA

Location uncertain

Baldy, Colorado, July 12, 1912, Huestis s.n. (COLO) [leaves very ciliate, glandular; flowers well above leaves, tube 10-12mm, lobes 5-6mm, leaves 7-8mm, tight mats. There are lots of peaks or mountains in Colorado formally or informally named Baldy and Huestis' whereabouts in 1912 cannot be established at present, however the Bald Mountain near Ward is a very real possibility. These flowers are big for *P. condensata* and this may be a densely matted *P. pulvinata*, which would make sense if collected near Ward, which is near the type locality of *Phlox pulvinata*.]

James Peak Region, June 29, 1913, L. Overholts 10061 (COLO) [Gilpin, Clear Creek, or Grand counties apparently; Gilpin most likely; tight dense mats, tube 7-8mm, lobes 3-4mm, leaf margin lightly ciliate]

Clear Creek County

Arapahoe National Forest, saddle between Bard and Robeson Peaks, 2 miles north of Bakerville, T4S R75W sec 5, 13000 feet, July 28, 1994, Lederer 4437 (COLO) [tube 7mm, lobes 3mm, very small dense mat; effectively a topotype: "Headwaters of Clear Creek"]

Grays Peak, 12000 feet, June 19, 1873, Coulter (COLO) [densely ciliate, no flowers; effectively a topotype]

Grays Peak, July, 1888, Eastwood (COLO) [densely ciliate, tube 10mm, lobe 6mm; effectively a topotype]

Pendleton Mountain above Leavenworth Gulch, Silver Plume, 11500 feet, August 1, 1942, Ewan 14485 (COLO) [very tight, short-leaved mats, densely ciliate, tube 6mm, lobes 3mm; effectively a topotype]

Below summit, Mount Evans, about 14000 feet, July 13, 1963, Jones 35951 (COLO) [tight dense mats, very ciliate, tube 5-6mm, lobes 4mm]

Mount Evans, 14000 feet plus, August 26, 1961, Brunquist s.n. (KHD)

Mount Rosalie, alpine meadow, July 15, 1948, Perrigo s.n. (KHD)

Mount Goliath, 12100 feet, July 15, 1961, Brunquist s.n. (KHD)

Mount Goliath, June 5, 1977, J. Hartman s.n. (KHD)

Mount Goliath, June 26, 1932, no collector (KHD)
Park/Summit County

Hoosier Ridge, open grassland, 12000 feet, July 14, 1934, Hartwell 281 (KHD)

Hoosier Ridge, 12700 feet, August 1, 1937, Hartwell 1043 (KHD)

Tundra ridge just west of Hoosier Pass toward North Star Mountain, T8S R78W, 12500 feet, July 7, 1951, Weber 6511 (COLO) [short leaves, dense mat, leaves ciliate, tube 6-7mm, lobes 3-4mm]

Park County

Mount Lincoln, July, 1905, Huestis (COLO)

Mount Lincoln, August 14, 1905, Huestis (COLO) [tube 5mm, lobe 3mm, dense mat, ciliate]

Mosquito Range, Pennsylvania Mountain summit, T9S R78W sec 17, 13000 feet, July 5, 1985, Neely 3096 (COLO)

Mosquito Range, 0.5 mile west of West Buffalo Peak, above timberline, T12S R78W sec 20 N 1/2, 12800 feet, July 22, 1995, Hogan & Yeatts 2693 (COLO, KHD)

Lake County

Vicinity Weston Pass, alpine, T11S R75W sec 2, 12100 feet, July 1, 1964, Gierisch 2956 (COLO)

Chaffee County

1 mile south of Cottonwood Pass, rocky saddle, T14S R81W, 12300 feet, June 26, 1989, Kelso, et al., 3 (COLO)

0.3 mile south-southeast of Spout Lake, about 3 miles south of Cottonwood Pass, dark limestone scree, T14S R81W, 12200 feet, July 19, 1985, Neely 3172 (COLO)

South slope of Mount Yale, 13200 feet, July 3, 1976, Brett 122 (KHD)

Sawatch Range, Mount Princeton, east face of Miriam Peak, tundra, 11500 feet, August 8, 1967, Johnson 100 (COLO)

Custer County

Sangre de Cristo Range, road to Music Pass, 11000 feet, June 28, 1971, Howard 2364 (COLO)
Saguache County

Sangre de Cristo Range, Willow Creek drainage north of Kit Carson Mountain, alpine meadow, 12000 feet, June 25, 1994, Hogan 2432 (COLO)

Sangre de Cristo Range, North Fork of North Crestone Creek, Venable Pass, dry tundra, 12750 feet, July 13, 1991, Hogan 1343 (COLO)

La Garita Wild Area, Cochetopa Creek at and below tree limit, August 11-13, 1968, Willard 68-74 (COLO)

La Garita Wild Area, Spring Creek to Cochetopa Pass, August 11-13, 1968, Willard 68-52 (COLO)

La Garita Wild Area, divide between Lake Creek and Saguache Creek, open flat rocky ridge, 12500 feet, August 11-13, 1968, Willard 68-153 (COLO)

Gunnison County

Upper slopes of Cottonwood Pass, 1 mile below summit, 3400m, July 9, 1994, Weber & Wittmann 19045 (COLO)

Ridge east of Cumberland Pass, rocky alpine tundra, 12000-12500 feet, July 7, 1957, Beaman & Erbish 1268 (COLO)

Cumberland Pass, 12015 feet, July 8, 1948, Kelly 1321 (KHD)

Cumberland Pass, sandy soil, alpine zone, 12000 feet, July 9, 1969, Higgins 2108 (COLO)

Head of Comanche Creek, Fossil Ridge, 12250 feet, June 24, 1951, Langenheim 1279 (COLO)

Trail to Copper Lake, above Gothic, 12400 feet, July 5, 1948, Kelly 1263 (KHD)

Hinsdale County

Alpine plateau north of Slumgullion Gulch at west end of Mesa Seco, 3660-3780m, June 13, 1966, Denham 1033 (COLO)

San Juan National Forest, Williams Fork Lake, windswept tundra, T39N R3W, 12000 feet, July 14, 1970, INSTAAR (COLO)

San Juan National Forest, Williams Fork Lake, windswept tundra, T39N R3W, 11600 feet, July 28, 1971, INSTAAR (COLO) [tight mats, flowers stand clear, tube 8mm, lobes 4mm, lightly ciliate, many leaves glabrous]

San Juan County

On mountain just west of summit of Red Mountain Pass, rocky alpine tundra, about 12500 feet, June 29, 1957, Beaman & Erbish 1152 (COLO)

La Plata County

La Plata Mountains, Tomahawk Basin, T37N R11W sec 26, July 24, 1995, Holmes 554 (COLO)

PHLOX HOODII

Location uncertain

1862, E. Hall [According to Weber, King of Colorado Botany, Hall & Harbour 453, originally identified as *P. douglasii* is *P. multiflora*; Hall & Harbour 454, originally identified as *P. humilis* is *P. pulvinata*; and Hall & Harbour 455, originally identified as *P. hoodii* is *P. condensata*. This specimen was hand-annotated by Weber as Hall & Harbour 453, since it was identified as *P. douglasii* on Hall's label. However, the specimen is densely arachnoid woolly and is *P. hoodii*, annotated 4/28/99. Probably collected in western Nebraska or northeastern Colorado on the way to Denver, in late May or early June, 1862. Parry, Hall & Harbour mostly followed the South Platte into Colorado and the Pawnee Buttes specimens collected in recent years are not all that far from the route they took.]

Weld County

6.5 miles east of Grover, common on mesa, west slope, chalky soil mixed with conglomerate, 5400 feet, April 16, 1954, Douglas 54-11 (COLO) [misidentified as *P. muscoides*, annotated 4/22/99]

Pawnee National Grassland, rolling to flat short-grass prairie cut by shallow gullies, White River Formation, occasional on south-facing lower clay slope of East Pawnee Butte, mat plant with white corolla, 5200 feet, June 1, 1985, Yeatts 2008 (KHD)

Sandy soil north of New Raymer, within sight of Pawnee Buttes, 4900 feet, May 26, 1977, B. Anderson 1538 (KHD)

Pawnee National Grassland, north of Keota on the level, T10N R59W sec 32-33, 5500 feet, June 2, 1981, B. Anderson 1807 (KHD)

Pawnee National Grassland, June 2, 1989, Borland s.n. (KHD)

Igo Creek Drainage, vicinity of Pawnee Buttes, disturbed short-grass prairie, 1600m, May 25, 1975, Denham 3465 (COLO)

Elbert County

Cedar Point exit off US 287 [sic, I-70], northwest of Limon, rolling short-grass hills, May 22, 1993, Weber & Wittmann 18516 (COLO) [about 5750 feet]

Lincoln County

1 mile west of Limon on US 24, dry ground, April 10, 1948, Pesman 1096 (COLO)

Jackson County

Cowdrey, frequent among sage in sterile rocky soil, June 19, 1920, Ramaley 11781 (COLO)

Walden, ridge, rocky soil, common, dry gray plants, among rocks, August 12, 1938, Ramaley & Ewan 16759 (COLO) [vegetative]

Moffat County

Douglas Mountain, 4 miles southwest of Greystone, with sagebrush, 7250 feet, May 2, 1961, MacLeod 101b (COLO)

Dinosaur National Monument, Roundtop Mountain, 2800m, June 27, 1948, Wolf & Dever 5163 (COLO) [elevation of 2800m is 9180 feet; peak of mountain is 8540 feet, thus elevation should be no higher than 2600m; in fruit; this may be *P. multiflora*, not annotated]

Dinosaur National Monument, T6N R100W sec 20, 6380 feet, May 14, 1987, Neely 3936 (COLO)

Dinosaur National Monument, T6N R100W sec 19, 6400 feet, May 14, 1987, O'Kane 2669 (COLO)

Dinosaur National Monument, T6N R101W sec 28, 7760 feet, May 16, 1987, O'Kane 2745 (COLO)

Dinosaur National Monument, T6N R101W sec 27, 7900 feet, May 27, 1987, Neely 4097 (COLO)

Dinosaur National Monument, T6N R102W sec 25, 8500 feet, May 31, 1987, O'Kane 2979
[elevations are not this high in this section; 6500 feet is probably meant]

Dinosaur National Monument, T6N R103W sec 25, 7700 feet, May 31, 1987, Neely 4158 (COLO)

28 miles southeast of Greystone on Colorado 318, 1790m, June 16, 1978, Weber & Wingate 15404 (COLO)

Road to Roundtop Mountain, 1 mile east of junction with Echo Park Road, sagebrush summits, May 17, 1952, Weber 7399 (COLO) [about 8000 feet]

On mesa, 9 miles north of US 40, just inside Utah state line, dry gravelly slopes, 7400 feet, May 27, 1950, Kelly 50-12 (KHD)

Routt County

Flattops/White River Plateau, about 1 mile northwest of McCoy, P/J, sandstone hills and limestone outcrops, T1S R83W sec 31, 7000 feet, May 12, 1991, Vanderhorst 2027 (COLO)

Rio Blanco County

about 2 miles southwest of the junction of Stake Springs Draw and Corral Gulch, T2S R98W sec 6, 2015m, May 27, 1982, Baker & Riefler 82-104 (COLO)

Grand County

21 miles northwest of Kremmling, sagebrush hills, June 4, 1951, Weber 6114 (COLO) [assumed to be collected along US 40, about 7900 feet]

Eagle County

Shale outcrop near Radium, June 4, 1986, Weber & Hogan 17772 (COLO) [in fruit; about 7100 feet]

Wolcott, May 25, 1910, Osterhout 4238 (COLO) [about 7100 feet]

Garfield County

5 miles north of Rifle, clay knolls along Government Creek, May 17, 1947, Weber 3340 (COLO) [about 6000 feet]

5 miles north of Rifle, clay knolls along Government Creek, May 20, 1948, Weber 3742 (COLO)

Battlement Mesa Community, sagebrush, T7S R95W sec 18, 5300 feet, April 22, 1996, Austin 21 (KHD)

Mesa County

Top of Mount Garfield, sandy to rocky soil, May30, 1982, Borland s.n. (KHD)

Colorado National Monument, Monument Canyon Trail, P/J, T11S R2W sec 17-18, May 18, 1982, Siplivinsky 3281 (COLO) [Range/Township combination incorrect, apparently T11S R101W]

was meant; about 5200 feet]

Colorado National Monument, south of Highland View, rimrock, slopes of Summerville Formation, P/J, T11S R2W sec 25, May 24-25, 1982, Siplivinsky 3352 (COLO) [Range/Township combination incorrect, apparently T11S R102W was meant; about 6550 feet]

1 mile north of Glade Park, sagebrush, May 21, 1948, Weber 3826 (COLO) [about 6900 feet]

Grand Mesa National Forest, P/J, sandy, T12S R97W sec 19, 6500 feet, May 23-24, 1981, Siplivinsky 986 (COLO) [in fruit]

Colorado River Valley southwest of Mack, May 5, 1982, Wingate 1393 (KHD)

Gunnison County

Sapinero, April 21, 1898, Wheeler 404 (COLO) [about 7200 feet]

1 1/2 mile west of Gunnison, 8000 feet, May 29, 1949, Kelly 1502 (COLO, KHD) [elevation should be 7600 feet for location cited]

Montrose County

Black Canyon of the Gunnison National Monument, among rocks, walls, 7900 feet, May 31, 1942, Penland 1804 (COLO)

Black Canyon of the Gunnison, among rocks, 7900 feet, May 31, 1942, Hartwell & Penland 1264 (KHD)

Naturita, 5500 feet, April 20, 1914, Payson 238 (COLO)

San Miguel County

Lone Cone, no date, Brewster s.n. (COLO) [incorrectly attributed to Dolores County]
Montezuma County

Mesa Verde National Park, Chapin Mesa, P/J & *Purshia*, 6650 feet, April 9, 1963, Erdman 259 (COLO)

North side of Cortez, 1.3 miles north of junction of highways [US] 160 and [Colorado] 145, then 0.4 miles west on Alamosa Street, T36N R16W sec 24, 6160 feet, April 27, 1989, Anderson 89-22 (COLO)

La Plata County

9 miles south of Ignacio, 0.7 miles southeast of La Boca, T32N R7W sec 22, 2828m [*sic*, 1828m],
April 30, 1985, O'Kane 85-30 (COLO)

PHLOX KELSEYI

Park County

High Creek Fen, east edge, glabrous form, June 21, 1991, Cooper 2009 (COLO) [in *Phlox pulvinata*
file at COLO; calyx glabrous, leaves long ciliate]

High Creek Fen, east edge, glandular form, June 21, 1991, Cooper 2010 (COLO) [in *Phlox pulvinata*
file at COLO; calyx hairy like Weber 17766]

South Park, 3.5 miles north of Antero Junction, May 28, 1986, Weber & Hogan 17766 (COLO) [in
Phlox pulvinata file at COLO; tube 8-10mm, lobes 8mm, leaves with long intermittent non-
glandular cilia; calyx quite hairy; anthers slightly exerted; very loose clumps]

Margin of Antero Reservoir, 3 1/2 miles north of Antero Junction, 9000 feet, June 8, 1949, Hartwell
& Penland 2137 (KHD)

PHLOX LONGIFOLIA

[only minimal data collected on most COLO specimens]

Arapahoe County

University Blvd., May 6, 1941, Brunquist s.n. (KHD)

Englewood, field southwest of junction of Arapahoe Road and Quebec Street, common in sandy soil
along draw, undisturbed prairie near housing development, 5300 feet, June 27, 1975,
Hammel 9 (RM)

Plains Conservation Center, 5800 feet, May 5, 1970, B. Anderson 14 (KHD)

Location unknown, May 29, 1970, B. Anderson 1549 (KHD) [attributed to the road between
Longmont and Estes Park, an impossible location; most probably a duplicate of the above or
following specimen, despite different date and collection number. Berta Anderson's numbers
do not reflect collection sequence.]

Douglas County

On roadside bank at junction of West Parker Road and I-25, 5500 feet, May 9, 1976, B. Anderson 1542 (KHD)

Huerfano County

Open prairie 20 miles north of Walsenburg, May 5, 1947, Weber 3305 (COLO, RM)

Roadside just south of Pueblo County line, 6100 feet, [date ?], Hartwell & Penland 1741 (KHD)

Otero County

Comanche National Grassland, 0.8 miles north of David Canyon Road on Rourke Road, T26S R56W sec 25, 4600 feet, April 30, 1997, Roussos & Smith 64 (COLO)

Comanche National Grassland, T26S R55W sec 30, 4680 feet, May 6, 1997, Pickelner & Keilty 37 (COLO)

5-10 miles west of Higbee on road to Timpas, shaly outcrop, May 5, 1948, Kelly 818, Kelly 825 (KHD)

Comanche National Grassland, east of highway 350 near Bloom, T27S R59W, 4900 feet, May 24, 1997, Hazlett 9728 (COLO)

Shale buttes 4 miles southwest of Timpas, April 28, 1951, Maslin s.n. (COLO) [probably on US 350]

Cedar mesas 25 miles southwest of La Junta, May 12, 1936, Paull 6 (COLO) [probably between Timpas and Delhi on US 350]

Moffat County

At Whisky Springs Ranch, near Greystone, 7200 feet, June 17, 1971, B. Anderson 514 (KHD)

Open red sandstone flats near cabin at Whisky Springs Ranch, June 17, 1971, B. Anderson 1540 (KHD)

Summit of Roundtop Mountain, 2800m, June 27 - July 1, 1948 (COLO) [*sic*, 2600m]

Moffat County, 7100 feet, June 22 (COLO)

Moffat County, 6600 feet, May 15 (COLO)

Moffat County, 7500 feet, June 30 (COLO)

Moffat County, 7480 feet, June 13, 1987 (COLO)

Moffat County, 6490 feet, May 15, 1987 (COLO)

Moffat County, 5600 feet, May 18, 1988 (COLO)

Moffat County, May 11, 1953 (COLO)

Routt County

Route 13, south of Yampa, 7700 feet, June 26, 1950, Hartwell & Penland 2369 (KHD) [*sic*, Colorado State Highway 131 was meant; Colorado 13 is the road from Rifle to Craig and it never went through Yampa]

Routt County, June 21, 1965 (COLO)

Routt County, June 10, 1967 (COLO)

Rio Blanco County

Rio Blanco County, 6750 feet, June 28, 1933 (COLO)

Rio Blanco County, 2010m, June 9, 1982 (COLO)

Rio Blanco County, May 17, 1947 (COLO)

Rio Blanco County, 1770m, May 27, 1979 (COLO)

Eagle County

I-70 at MP 152, east of Wolcott in median strip, May 26, 1982, Borland s.n. (KHD)

1/2 mile north of Wolcott, May 26, 1951 (COLO)

Garfield County

Glenwood Springs, on sandy slope, May 2, 1905, no collector (KHD)

6 miles north-northwest of Rifle, 6100-7100 feet, May 22, 1990 (COLO)

5 miles north of Rifle, May 17, 1947 (COLO)

Garfield County, 6640 feet, June 12, 1993 (COLO)

Mesa County

Along County Road 21, 14 miles north of US 6 & 50, T9S R100W sec 18/T9S R101W sec 13, 5430 feet, May 1, 1996, Austin 27 (KHD) [north of Grand Junction]

1 mile south of junction of US 6 and County Road 38, sparse, loose, gravelly soil, northeast-facing slope, 4800 feet, May 23, 1982, Borland s.n. (KHD)

Colorado River Valley southwest of Mack, May 5, 1982, Wingate 1394 (KHD)

Colorado National Monument above Grand View, moist and shaded, 5700 feet, May 30, 1942, Hartwell & Penland 1154 (KHD)

In sandy soil on north-facing bank on top of Colorado National Monument, 5700 feet, May 27, 1978, B. Anderson 986 (KHD)

20 miles east of Gateway, open south slope, 6600 feet, June 1, 1949, Kelly 1615 (COLO, KHD)

Mesa County, 8000-8400 feet, May 25-26, 1981 (COLO)

Mesa County, 6500 feet, May 23-24, 1981 (COLO)

Mesa County, 5040 feet, May 6, 1982 (COLO)

Fruita Ranger Station, 10-12 miles southwest of Glade Park, 6800-7100 feet, June 24, 1938 (COLO)

Debeque, 5000 feet, May 15, 1965 (COLO)

Mesa County, 8150 feet, June 8, 1981 (COLO)

Mesa County, 1486m, May 1, 1978 COLO)

Colorado National Monument, Coke Ovens Trailhead, May 21, 1948 (COLO)

1 mile north of Glade Park, May 21, 1948 (COLO)

Delta County

Delta County, May 12, 1975, Armstrong 3588 (KHD) [no other location information on label]

5 miles north of Eckert, May 31, 1952 (COLO)

Austin, June, 1920 (COLO)

Montrose County

Montrose County, 7900 feet, May 31, 1942 (COLO)

3.5 miles east of Montrose, May 18, 1965 (COLO)

7.0 miles east of Montrose, 6000 feet, May 30, 1952 (COLO)

Montrose County, T49N R13W, 8500 feet, August 30, 1947 (COLO) [some flowers and buds; despite date, probably collected on May 30 and labelmaker mistook a "5" for an "8"]

Gunnison County

12 miles west of Iola, 7800 feet, May 29, 1949, Kelly 1510 (COLO, KHD) [elevation actually about 7500 feet]

Blue Mesa above reservoir, May 28, 1978, Yeatts s.n. (KHD)

1 mile west of Gunnison, 7600 feet, Hartwell & Penland 2486, Hartwell & Penland 2666 (KHD)

Sapinero, May 25, 1898, Wheeler (COLO)

Montrose County

Black Canyon of the Gunnison, sunny slope, 7900 feet, May 31, 1942, Hartwell & Penland 1265 (KHD)

Naturita, 5400 feet, April 18, 1914, Payson (COLO)

Montrose County, June 13, 1991, 5020 feet (COLO)

San Miguel County

15 miles west of Placerville, 7300 feet, May 30, 1949, Kelly 1540 (COLO, KHD)

About half way down the hill on Colorado 141 between Egnar and Slick Rock, in red soil and red sandstone in P/J forest, 6500 feet, June 1, 1976, B. Anderson 1543 (KHD)

San Miguel County, 7045 feet, June 1, 1982 (COLO)

San Miguel County, 2000m, May 29, 1982 (COLO)

San Miguel County, 6300 feet, June 1, 1982 (COLO)

San Miguel County, 7800 feet, June 4, 1982 (COLO)

Lone Cone, no date, Brewster (COLO) [erroneously ascribed to Dolores County]

Dolores County

Dolores County, 8200 - 8300 feet, June 7, 1994 (COLO)

Montezuma County

Black Mountain, May 30, 1938, Zobel s.n. (KHD) [There are numerous Black Mountains in Colorado and the county was not identified on label, but the Black Mountain that is a subsidiary peak of Ute Mountain seems most likely, considering the long-tubed flowers typical of Montezuma County specimens. Zobel collected *Phlox austromontana* on Mesa Verde 3 years earlier.]

Between Four Corners and Cortez, 6600 feet, May 22, 1970, B. Anderson 41 (KHD) [*P. longifolia* cf. *var. stansburyi*]

Four Corners, 5000 feet, May 16, 1964 (COLO) [very long-tubed flowers, annotated *var. longipes* by Peabody]

Mesa Verde, May 12, 1929 (COLO)

Mesa Verde, 1792m, May 7, 1985 (COLO)

Mesa Verde, 6650 feet, May 9, 1963 (COLO)

Mesa Verde June 8, 1927 (COLO)

Montezuma Forest Preserve, no date (COLO)
La Plata County

Durango, June 1890, Eastwood (COLO)

Durango, May 10, 1906 (COLO)

Oxford, 1916 (COLO)

Gem Village, July 11, 1950 (COLO)

Archuleta County

Arboles, May 31, 1906, Ferril s.n. (COLO)

East Fork of San Juan River near Pagosa Springs, June 5, 1947, Kelly 210 (KHD)

Adobe bank, highway 84 between Chromo and Pagosa Springs, 7700 feet, May 31, 1947, Hartwell & Penland 1780 (KHD)

2 miles north of New Mexico state line on Colorado 17, 7600 feet, May 30, 1947, Penland & Hartwell 3476 (COLO) [location and elevation do not correlate; elevation is about 9000 feet at 2 miles north of Colorado state line and site is in Conejos County (only the first mile of Colorado 17 north of the state line is in Archuleta County). Suggest this specimen was taken nearer Chama, in Rio Arriba County, New Mexico or even more likely, along US 84 near Chromo, Archuleta County, Colorado. See *Phlox caryophylla* collections; Penland & Hartwell 3477 is attributed to "a few miles north of Chromo." Also, when Penland collected, Hartwell usually did too. See *Phlox longifolia* (Hartwell & Penland 1780) and *Phlox caryophylla* (Hartwell & Penland 1883)]

PHLOX MULTIFLORA

Jackson County

Kings Canyon, 9000 feet, June 25, 1925, Payson 4270 (RM)

Cowdrey, frequent among sage in sterile rocky soil, June 19, 1920, Ramaley 11782 (COLO)

Northwest of Cowdrey, edge of aspen stand in full sun, 8500 feet, June 28, 1968, Denham 2274 (COLO)

19 air miles north-northwest of Walden, T11N R81W sec 5, 8750 feet, June 14, 1989, Kastning & Culp 1703 (COLO)

Beaver Creek, July 4, 1903, Goodding 1440 (COLO, RM) [attributed to Larimer County, and correct at the time, but more likely in today's Jackson County, since Goodding was in Jackson County July 7, 1903]

5 miles west of Delany Butte Lake, near confluence of Roaring Fork and Sunday Creek Ditch, T8N R82W sec 12, 2530m, April 25, 1976, Wilken 12522 (RM) [if collection date is correct, this is certainly *Phlox hoodii*; needs to be re-examined]

Bundy Park Road 3.7 miles south of junction of County Road 11 and Colorado 14, T6N R80W sec 21, 8200 feet, June 6, 1977, Wilken 13105 (RM)

Routt National Forest, lower part of Chedsey Creek, sagebrush, 8000 feet, June 15, 1929, Katzleb 90 (RM)

Larimer County

Northeast slope of Fall Mountain, Mummy Range, T7N R74W sec 36, 11,300 feet, June 23, 1977, Wilken & Painter 13155 (RM) [low-growing caespitose plant; at this elevation almost certainly *Phlox pulvinata*; needs to be re-examined]

Sheep Creek, a tributary of the North Fork of the Cache la Poudre, August 9, 1894, Osterhout 323 (RM)

Rist Canyon, May 29, 1891, Crandall 13419 (RM)

Rist Canyon, T8N R70W sec 27, 5500 feet, May 31, 1941, Ginter 414 (RM)

Rist Canyon, dry disturbed soils, T8N R70W sec 29, 6200 feet, June 12, 1951, Gierisch 1632 (RM)

Old road from Longmont to Estes Park, 6500 feet, May 15, 1971, B. Anderson 1539 (KHD)
[probably along Apple Valley Road]

Boulder County

Rocky foothills, infrequent, June 4, 1937, Ramaley 15988 (RM)

Near Boulder, June, 1899, Ramaley a58 (COLO, RM)

Near Boulder, June 20, 1900, Ramaley a81 (COLO, RM)

Boulder Canyon, June 8, 1903, Ferril s.n. (COLO)
1 mile west of Boulder, rocky soil, 5500 feet, April 30, 1939, Gierisch 878 (RM)

Gregory Canyon, 6000 feet, 1928-1929, McHenry 160 (COLO)

Gregory Canyon, May 19, 1933, Campbell 256 (COLO)

Mouth of Sunshine Canyon, May 1, 1939, "D.M.H." (RM)

Sunshine Canyon, May 6, 1948, Weber 3716 (COLO)

West Ridge, Green Mountain, along trail, about 7600 feet, May 28, 1991, Hogan 1036 (COLO)

Boulder, Hogan 1664 (RM) [no other data recorded; re-examine]

Lake County

Tennessee Pass, July 2, 1895, Osterhout 4422 (RM)

Fremont County

San Isabel National Forest, 20%-north slope, gravelly, T48N R10E sec 20, 8000 feet, [date?],
Gierisch 1492 (RM)

Custer County

12 miles southwest of Westcliffe on Hermit Road, dry gulch, June 22, 1970, Baltzell 79 (COLO)

Sangre de Cristo Mountains, Hermit Pass, on granitic soil with *Pinus flexilis*, 12,000 feet, July 29, 1970, Bujakiewicz s.n. (COLO) [originally identified as *Phlox pulvinata*; loose; no ciliate hairs on calyx; long calyx lobes - *Phlox multiflora*; soil probably Sangre de Cristo arkose rather than granite; too high for *Pinus flexilis*, probably collected below 11,000 feet; pass elevation about 12,900 feet]

Moffat County

Dinosaur National Monument, slopes of Roundtop Mountain below summit, 8000 feet, June 1, 1956, Weber & Welsh 9619 (COLO) [very loose; originally identified as *Phlox multiflora*; annotated as *Phlox austromontana*; annotated back to *Phlox multiflora* 4/28/99]

Routt County

Hinman Park, east of Clark, sagebrush, 7600 feet, June 1, 1986, Flock 1015 (COLO)

Hinman Park near Hinman Campground, sagebrush, lodgepole pine forest, 7640 feet, June 3, 1989, Flock 2023 (RM)

Hinman Park Campground, 8 miles east of Clark, sagebrush meadows, June 1, 1951, Weber 6105 (COLO)

Beside Routt County 64 to Seedhouse Campground, along South Fork Elk River, 8000 feet, July 11, 1982, B. Anderson 1870 (KHD)

Along Colorado 131, 1 mile south of Toponas, T1N R84W sec 14, 8200 feet, May 27, 1977, Wilken 12935 (RM)

Rio Blanco County

Rocky ground beside road, just below Marvine Lakes Campground, White River Valley east of Meeker, June 18, 1988, Weber 17915 (COLO)

2 miles east of Yellow Jacket Pass, T2N R92W sec 15, 8000 feet, June 4, 1977, Wilken & Painter 13067 (RM)

Along Colorado 13/789, 6.6 miles north of Rio Blanco, T2S R94W sec 33, 7200 feet, June 4, 1977, Wilken & Schwab 13059 (RM)

About 2/3 mile northeast of junction of King Gulch and Piceance Creek, P/J, T3S R96W sec 12, 2135m, June 24, 1982, Baker & Naumann 82-222 (COLO) [originally identified as *Phlox multiflora*; annotated *Phlox austromontana*; annotated back to *Phlox multiflora* 4/28/99]

Garfield County

White River National Forest, with *Delphinium*, *Erythronium*, and *Carex*, T3S R92W sec 3, 9500 feet, July 3, 1932, Ware 62 (RM)

Limestone outcrop south of Willow Peak, 10,000 feet, June 14, 1963, Miller 176 (COLO)

Grand County

Openings, lodgepole pine forest, Denver Creek, Denver Creek Campground, Willow Creek Pass, June 21, 1965, Weber & Salamun 12414 (COLO)

2 miles north of intersection of Willow Creek Road and US 40, 8200 feet, June 25, 1950, Hartwell & Penland 2322 (KHD)

1/2 to 1 mile below Onahu Ranch buildings on east side of Colorado River valley, foot of moraine, 3.5 miles north-northwest of Grand Lake, dry bank, June 13, 1961, Douglass 61-37 (COLO)

Grand Lake, dry forest hillside, but especially forest margins around sage flats, July 10, 1915, Ramaley 10504 (COLO, RM)

Grand Lake, June 29, 1929, Ramaley s.n. (COLO)

Near Grand Lake, July 17, A. Nelson 127 (RM)

Grand Lake, 8369 feet, June 21, 1933, Johnson 32 (COLO) [two sheets]

Grand Lake, lakeside shrub zone, sage plain, sandy soil, June 23, 1933, Johnson 47 (COLO)

Sulphur Springs, June 28, 1905, Osterhout 2997 (RM) [Hot Sulphur Springs was called Sulphur Springs 1894-1912; was the railhead August 20, 1905]

Sulphur Springs, June 8, 1906, Osterhout 3245 (RM)

Kremmling, May 26, 1915, Osterhout 5219 (RM)

Arapahoe National Forest, Cottonwood Pass, sagebrush habitat, May 25, 1935, Kutzleb 277 (RM) [two sheets]

Open pine forest near Tabernash, 8000 feet, July 21, 1924, Penfound s.n. (COLO)

Arrowhead, July 12, 1905, Huestis 2651 (COLO) [on Rollins Pass Road, old railroad grade; was the end of track, winter 1904-1905]

Sagebrush opening in lodgepole forest, just north of the intersection of Fool Creek and St. Louis Creek roads, T1S R76W sec 34, 9000 feet, June 17, 1992, Sheppard s.n. (COLO)

Summit County

10 miles north of Dillon, above Blue River, June 26, 1949, Kelly 1669 (KHD)

Frisco, gravelly ground, openings in lodgepole pine stands, 2670m, June 13, 1978, Weber & Wingate 15360, 15361 (COLO, RM)

Eagle County

White River National Forest, Derby Mesa, stonecrop/creeping daisy association, June 6, 1930, Read 245 (RM)

Derby Mesa, about 18 miles north-northwest of Eagle, ponderosa pine, Douglasfir, sagebrush and aspen, T2S R86W sec 13, 8200 feet, June 11, 1990, Vanderhorst 397 (COLO)

Minturn, June 5, 1902, Osterhout 2547 (RM)

Pitkin County

Norrie, *Vaccinium/Polemonium/Stachys* association, T8S R82W sec 18, 8900 feet, June 17, 1932,

Ware 80 (RM)

Mesa County

Grand Mesa National Forest, south of Land's End, sagebrush near lava cliff edge, T12S R97W sec 13/14, 9960 feet, June 22, 1981, Weber & Siplivinsky 1300 (COLO)

Along J-6.5 Road about 7 miles southwest of Haypress Campground, on gravelly soil with *Artemisia*, T14S R102W sec 6, 9000 feet, June 1, 1977, Wilken & Tabar 12995 (RM)

Gunnison County

East approach to Kebler Pass, 10,000 feet, open meadows, June 29, 1947, Kelly 540 (KHD)

3 miles south of Crested Butte, along highway, in sagebrush, 9000 feet, June 29, 1949, Langenheim 116 (COLO)

Brush Creek Road, about 2 miles south of Crested Butte, sagebrush meadow, alluvial substrate, 8850 feet, July 14, 1995, Yeatts 3733 (COLO, KHD)

Jacks Cabin, 8280 feet, July 26, 1901, C.F. Baker 620 (RM)

Jacks Cabin Cutoff Road, 2.2 miles southeast of junction with Colorado 135, T15S R84W sec 19, 8600 feet, June 17, 1984, Wilken 14010 (RM)

Roadside between Gunnison and Crested Butte, Colorado 135, June 18, 1955, Barrell 9-55 (COLO)

Taylor Reservoir near Tincup, open evergreen forest, 10500 feet, June 8, 1948, Kelly 1318 (KHD)

Taylor Park, T14S R82W sec 25, 9300 feet, June 22, 1962, Gierisch 2564 (RM)

1-2 miles north of Almont, 8000 feet, June 11, 1960, Barrell 16-60 (COLO)

West slope of Monarch Pass near Saguache County Line, gravel in turnout, margin of sagebrush community, 8700 feet, June 5, 1951, Hartwell & Penland 2481 (KHD) [just above Sargents]

Dry hillside 3 miles northeast of Sargents, July 12, 1951, Rollins 5178 (RM)

US 50, 3 km south of Mammoth [*sic*, Monarch] Pass at Gunnison [*sic*, Saguache] County Line, sagebrush community, sandy soil with *Artemisia*, about 9600 feet, June 23, 1984, Stein, Neill & Hamilton 1778 (RM) [Saguache County on label, but 3 km south of Monarch Pass is still in Gunnison County; almost certainly collected at Hartwell & Penland's or Rollins' sites]

Black Sage Pass Road on Waunita Hot Springs side of Pass, rolling hills, no trees, 9400 feet, June 15,

1973, B. Anderson 1541 (KHD)

Parlin, June, 1888, Eastwood (COLO)

Sapinero, May 5, 1898 [one sheet], May 6, 1898 [one sheet], Wheeler 512 (COLO)

River crossing west of Sapinero, north slope of river bank, 7800 feet, May 29, 1949, Kelly 1512 (COLO, KHD) [elevation too high, about 7400 feet]

Black Mesa, 7000 feet, May 28, 1978, Yeatts s.n. (KHD) [north side of Black Canyon of Gunnison, off Colorado 92]

Montrose County

Grassy slope above US 50 near Cimarron, 7300 feet, June 15, 1967, Denham 1101 (COLO)

PHLOX MUSCOIDES

Jackson County

West edge of Walden, open sagebrush knoll, 8100 feet, May 14, 1986, Weber & Dahnke 17758, 17759 (COLO)

Larimer County

Tenmile Creek, June 13, 1907, Ramaley & Robbins 2899 (COLO)

Owl Canyon, June 8, 1907, Ramaley & Robbins 2859 (COLO)

Owl Canyon, limestone outcrop, pinyon colony, June 25, 1949, Weber 4874 (COLO)

Top of pinyon ridge, highway 14, 20 miles west of Fort Collins, cracks in sandstone, 6300 feet, June 7, 1949, Hartwell & Penland 2140 (KHD) [Probably the well-known pinyon grove at Owl Canyon on US 287. I know of no pinyon groves along Colorado 14 (Poudre Canyon).]

Weld County

1/2 mile south of Nebraska state line on Colorado 71, west-facing road cut, T12N R56W sec 19, May 15, 1994, Von Barga 3 (KHD)

Logan County

Along County Road 74, 2.5 miles south of Nebraska State Line, T11N R54W sec 1, June 21, 1997,
Lederer 97-65 (COLO)

Logan County Road 74 north of Sterling, limestone ridge, June 21, 1997, Smookler 143 (KHD) [same
site as above specimen; probably a caliche-cemented sandstone rather than a limestone]

Grand County

Rocky Mountain Recreation Area, 8200 feet, June 9, 1970, B. Anderson 97 (KHD) [Possibly
Arapahoe National Recreation Area is meant, vicinity of Grand Lake, Shadow Mountain
Lake, or Lake Granby? Outlet of Colorado River at Lake Granby is 8200 feet and outcrops
of Troublesome Formation, sandstone and siltstone, are in the area]

Moffat County

East side Shell Creek, about 1 mile south of Wyoming State Line, 6800 feet, June 24, 1983, Denham
83-048 (COLO) [this could be *Phlox opalensis*]

PHLOX PULVINATA

Larimer County

Range beyond Windy Gulch, August 4, 1922, Osterhout s.n. (COLO) [very late bloom; tube 10mm,
lobes 5-6mm; this site is on Trail Ridge in Rocky Mountain National Park]

Trail Ridge, in bowl north of rock cabins in dry exposed tundra, 11500-12465 feet, June 26, 1958,
Willard 58-10 (COLO) [tube 12mm, lobes 6mm, leaves 11mm]

Ute trail above Trail Ridge Road, 12000 feet, August 14, 1970, B. Anderson 337 (KHD)

Twin Sisters, in islands of tundra below timberline, 11600 feet, June 24, 1961, Willard 61-21 (COLO)
[tube 12mm, lobes 6-7mm, leaves 6mm]

Rocky Mountain National Park, 11400 feet, June 16, 1963, McNeal 16 (COLO) [tube 10-11mm,
lobes 5-6mm]

Boulder County

Mount Audubon, July 19, 1908, Robbins 5831 (COLO) [tube 11mm, lobes 7mm; effectively a
topotype, about 3 miles northwest of type locality at Brainard Lake]

Brainard Lake, open rocky exposed windswept area east of the lake, 10300 feet, June 24, 1922, Schmoll 557a (COLO) [tube 10mm, lobes 5-6mm, topotype, probably collected within a few feet of Wherry's type plant]

Brainard Lake, June 6, 1948, Kalmbach 1077 (KHD) [topotype]

West Long Lake, subalpine, open places at side of rocks, June 27, 1908, Robbins 5499 (COLO) [tube 10mm, lobes 7mm; probably the west end of Long Lake was meant; effectively a topotype, about 1 mile due west of type locality at Brainard Lake]

South side of Bald Mountain, Ward, July 12, 1920, Gibbon (COLO) [tube 10mm, lobes 7mm; Niwot Mountain, east end of Niwot Ridge; effectively a topotype, about 2 miles southeast of type locality]

Bald Mountain, at or above timberline, 11500 feet, July 18-22, 1907, Ramaley 3243 (COLO) [tube 10-11mm, lobe 6mm, this site is now Niwot Mountain, the east end of Niwot Ridge; effectively a topotype, about 2 miles southeast of type locality]

Science Lodge, June 28, 1965, Arp 30 (KHD) [Niwot Ridge area]

Tundra, Science Lodge, July 1, 1965, Arp 85 (KHD) [Niwot Ridge area]

Road to [Mount] Albion, subalpine, July 25, 1935, Wolcott (COLO) [tube 10mm, lobes 6mm; probably in the vicinity of Silver Lake]

Gilpin/Clear Creek/Grand Counties

James Peak, June 28, 1913, Robbins A128 (COLO) [tube 10mm lobes 5mm; compare *Phlox condensata* from same site (Overholts 10061)]

Park/Summit Counties

Boreas, July 11, 1904, Huestis s.n. (COLO) [tube 9-10mm, lobes 4-5mm, fairly dense, glandular, ciliate; summit of Boreas Pass]

Huerfano County

Trinchera Peak, Culebra Range, subalpine rocky slopes, 11700 feet, July 26, 1963, Gillett & Mosquin 12202 (COLO) [ciliate, glandular, dense mat; flowers hard to see, some tube 7mm, lobes 6mm; others tube 10mm and twice length of calyx; not quite dense enough for *Phlox condensata*]

Conejos County

Rhyolite cliff along Conejos River, 4 miles south of Platoro, 9400 feet, July 14, 1965, Weber & Salamun s.n. (COLO) [originally identified as *Phlox condensata*; then *Phlox austromontana*; annotated to *Phlox pulvinata* 4/22/99]

Saguache County

La Garita wild area, head of Saguache Creek to Half Moon Pass, 11500-12300 feet, August 11-13, 1968, Willard 68-192 (COLO) [all the other *Phlox* specimens Willard collected in this area are *Phlox condensata*]

Hinsdale County

Spring Creek Pass, July 22, 1938, Ramaley 16494 (COLO) [tube 11mm, lobes 5-6mm; but not densely matted]

Dolores County

Upper Dolores River drainage, 8 air miles northwest of Rico, upper Fish Creek, drainage south of Dolores Peak, subalpine spruce-fir forest grading into subalpine talus, T41N R11W sec 7, 8, 5, 10200-11800 feet, July 27, 1995, Moore 7512 (COLO) [annotated 4/22/99]

La Plata County

La Plata Mountains, Cumberland Peak, July 1890, Eastwood (COLO) [leaves almost entirely glabrous and rather white margined; some hairs on calyx and at base of leaves; tube 12-13mm, lobes 6mm; loose clump]