Aliso: A Journal of Systematic and Evolutionary Botany

Volume 4 | Issue 1 Article 8

1958

A New Species of Luzula and of Phlox from the High Sierra Nevada of California

Carl W. Sharsmith
San Jose State College

ALISO

VOL. 4, NO. 1, pp. 125-129 APRIL 25, 1958

A NEW SPECIES OF LUZULA AND OF PHLOX FROM THE HIGH SIERRA NEVADA OF CALIFORNIA

CARL W. SHARSMITH

San Jose State College, San Jose, California

As a result of studies on the high alpine flora of the Sierra Nevada, the following are proposed as new species:

Luzula orestera C. W. Sharsmith, sp. nov.

L. campestris var. *sudetica* of references to California plant, not Celak., 1881. *L. campestris* var. *congesta* of Smiley, Univ. Calif. Publ. Bot. 9: 129. 1921, not Meyer, 1823. Not *Juncoides congestus* Thuill., 1799.

Herba perennis dense caespitosa. Culmis numerosis rigidis erectis 5-18 (rare ad 25) cm. altis; foliis radicalibus (2.5-) 4-7 cm. longis; foliorum laminis firmis viridissimis vel praesertim apud ea caulina ad apicem versus rubescentibus basi oreque vaginae glabris vel plerumque sparse piloso-ciliatis apice calloso-obtusis; bracteis infimis inflorescentia brevioribus vel ea superantibus, erectis vel divaricatis, plerumque rubescentibus; inflorescentia in capitulam late ovoideum vel suborbiculatum congesta, ca. 1 cm. longa; tepalis (2.0-) 2.5-3.0 mm. longis anguste lanceolato-attenuatis, atrobrunneis, atrobadiis vel fere nigris, aequalibus vel subaequalibus, plerumque capsulas valde superantibus; seminibus carunculo incluso 0.9-1.2 mm. longis, carunculis (siccis) 0.1-0.3 mm. longis.

Densely cespitose perennial. Culms numerous, stiffly erect, 5-18 (rarely 25) cm. high; basal leaves numerous, crowded, short (2.5-) 4-7 cm. long; leaf-blades firm, bright green or distal portion of especially the cauline commonly reddish-tinged, mostly glabrous or sometimes sparsely pilose-ciliate at base and at mouth of sheath, apices callose-obtuse, cauline blades 2-3, appressed to culm or slightly spreading; lowest bract shorter than or exceeding the inflorescence, usually stiffly erect or divaricate, mostly reddish-tinged; glomerules 1-5, small, ovoid, sessile, congested into a single terminal broadly ovoid or suborbicular head about 1 cm. long, or head rarely with 1 or 2 small (4 mm. wide) and more or less approximate glomerules below, these sessile or if pedunculate then very shortly so and not overtopping the terminal head; tepals (2.0-) 2.5-3.0 mm. long, narrowly lanceolate-attenuate, equal to subequal in length, usually exceeding the capsule strongly, and mostly dark brown or intensely castaneous to almost black; anthers equalling or generally much shorter than filaments; stylar column short (ca. 0.3 mm. long); upper portion of ripe capsule dark brown to almost black; seeds oval, 0.9-1.2 mm. long (including caruncle), caruncle (dry) 0.1-0.3 mm. long.

According to Hedda Nordenskiöld (Hereditas 37: 352. 1951, wherein *L. orestera* [then *ined.*] is erroneously written as *"L. orestra,"*), the $2n$ chromosome number of *Luzula orestera* is 20, 22.

Distribution.—California in the Sierra Nevada from Tuolumne and Mono counties southward to Tulare and Inyo counties. (?)Oregon in Wallowa Mountains. In Sierra Nevada largely restricted to subalpine and alpine situations; occasional, often forming colonies, in moist sites in meadows, the soils derived from granitics or metamorphics.

Specimens examined.—TUOLUMNE COUNTY: small meadow bordering lakelet in cirque on north slope Sheep Peak above lowest McCabe Lake, alt. 10,500 ft., Mt. Conness region, July 30, 1939, *Sharsmith 4085* (*type:* Herb. Univ. Calif.); Mt. Dana, 11,500 ft., *Sharsmith 2327* (UC, DS). MONO COUNTY: Slate Creek Valley, east of Mt. Conness, about 10,000 ft., *Clausen 1698* (UC, DS); Reverse Creek, about 7500 ft., *Peirson 6140* (robust form, RSA). FRESNO COUNTY: Humphreys Basin, 11,500 ft., *Sharsmith 3084* (UC); meadows near Black Mountain, 10,000 ft., *Hall and Chandler 607* (UC, DS in part). TULARE COUNTY: Center Basin, 11,500 ft., *Howell 25144* (CA); near Mineral King, *Coville and Funston 1553* (DS, MIN); Army Pass, 11,500 ft., *Howell 26026* (CAS). INYO COUNTY: Rock Creek Lake Basin, 10,800 ft., Aug. 4, 1933, *Peirson* (UC, DS); Consultation Lake, 12,000 ft., July 23, 1935, *Rose* (CAS).

The Oregon material is scanty, contains smaller plants with immature heads, and is only tentatively referred here. WALLOWA COUNTY, Wallowa Mountains: marshy meadow at Aneroid Lake, *Ferris and Duthie 1138* (DS); damp meadow, Aneroid Lake, *Peck 17994* (DS).

Luzula orestera, a member of the *Luzula campestris-L. multiflora* complex, appears to be uniformly constant in the features above described throughout its range in the Sierra Nevada. The only other member of this species complex occurring within the distributional limits of *L. orestera* in this region is a form of *L. multiflora* (Retz.) Lej., and there is no evidence of intergradation between them. Not only is *L. orestera* morphologically distinct from *L. multiflora,* but it is also generally confined to a very different habitat. Thus in the subalpine zone of the Sierra Nevada, within which *L. multiflora* reaches its upper altitudinal limits, the locally often abundant *L. orestera* is found almost exclusively in moist or wet depressions in cold meadows or similar sites in cold, exposed situations (as elsewhere in its range), while the relatively rare *L. multiflora* occurs mostly in moist meadowy sheltered sites in openly wooded areas, especially on south- or west-facing slopes. Only rarely are the two found together in the same site and, furthermore, in those few instances where they have been observed by the writer as occurring side by side in the same habitat, it appears that seed maturity is attained considerably earlier in *L. orestera* than in *L. multiflora.* Therefore, in view of the foregoing several distinctions and lack of intergrading forms, it appears obvious that *L. orestera* is not merely another one of the "congesta" forms such as appear frequently as sporadically produced ecological variants among diverse members of the widespread *L. campestris-L. multiflora* complex.

By several authors the plant here described as a new species has been erroneously referred to *Luzula sudetica* (Willd.) DC. (*L. campestris* var. *alpina* Gaud.; *L. campestris* var. *sudetica* Celak.; *Juncoides campestre sudeticum* Cov.). The first of these authors was Coville (Contr. U. S. Nat. Herb. 4: 208. 1893) who attributed *L. sudetica* to the Sierra Nevada on the basis of his determination of a single immature collection of our plant (Tulare County: Mineral King, *Coville and Funston* 1553). Coville's citation was seemingly accepted uncritically by Buchenau (Pflanzenr. 4^{36}: 89. 1906) and by Jepson (Fl. Calif. 1: 259. 1922; Man. Fl. Pl. Calif. 208. 1923). The same collection providing the basis for Coville's report was also referred to *L. sudetica,* but only tentatively, by Fernald and Wiegand (Rhodora 15: 43. 1913) and, while perhaps an oversight, it may be indicative that some doubt was entertained as to the correctness of his earlier determination that Coville himself omitted any mention of *L. sudetica* in the Sierra Nevada in his treatment of Juncaceae for Abrams' *Illustrated Flora of the Pacific States* (vol. 1. 1923). More recently, a plant from high altitudes in Washoe County, Nevada (doubtless from the Sierra Nevada), not seen by the present writer, has been referred also to *L. sudetica,* by Hermann (U. S. Dept. Agr., Contr. toward a Fl. of Nev., No. 16. 1940). In one respect, Hermann's identification is puzzling, because while the description in his key and text is clearly that of *L. sudetica,* no plant completely agreeing with that description is presently known from the major portion of the Sierra Nevada which is in California; however, since

he also includes the "Arctic-alpine Zone in California" in his statement of the geographical range, it seems logical to infer that the Nevada plant before him was the same as the California plant which has been misidentified as *L. sudetica* by other authors. With the abundant material now at hand, it is quite obvious that the California plant can no longer be identified with *L. sudetica.* Although no "authentic" European *L. sudetica* has been seen by the present writer, the common conception of this taxon among European and other authors is of a plant with few, loosely cespitose or solitary stems, glomerules usually congested into a head, perianth 1.8-2.5 mm. long "with the broadly lance-ovate sepals [tepals] nearly equalled by the capsule" (Fernald, *in* Rhodora 47: 265. 1945), outer tepals distinctly longer than the inner, tepals and capsule intensely castaneous or almost black, stylar column short to obsolete, and seeds with very small caruncle (seeds 1.0-1-6 mm. long, caruncle 0.1-0.2 mm. long, acc. Fernald, *loc. cit.*). The congested glomerules, color of tepals and capsule, short stylar column, and dimensions of seeds and caruncle of *L. sudetica* are therefore similar to those in *L. orestera,* but the other features are not.

In several respects *Luzula orestera* more closely resembles *Luzula frigida* (Buch.) Samuelss. (*L. capestris* var. *frigida* Buch.; *L. multiflora* var. *frigida* Samuelss.; *L. multiflora* subsp. *frigida* V. Krecz.; *L. sudetica* var. *frigida* Fern.) than *L. sudetica.* It is similar to *L. frigida* in the length of the perianth, the equal tepals and their narrowly lanceolate form, the color of the tepals and capsule, and in the size of the seeds and caruncle, while its possible counterpart as to shape of inflorescence is suggested in a subarctic and arctic form of *L. frigida* with congested glomerules (*L. multiflora* var. *frigida* forma *contracta* Samuelss.). In *L. frigida,* however, the tepals are distinctly attenuate into a very slender, soft, aristate tip, and the stems are similar to those in *L. sudetica* in being solitary or loosely cespitose, and taller, more slender in growth. Despite this, the greater resemblance to *L. frigida* in other features, together with the geographic distribution of the latter entity, make a stronger claim for closeness of relationship than does *L. sudetica.* As regards the geographic distribution, *L. frigida* or a form thereof is admitted to the Bering Straits region and central Alaska by Hultén (Fl. Alaska and Yukon, p. 438. 1943), probably on the authority largely of Samuelsson, and *L. frigida* is essentially circumpolar as well. In contrast, and following Hultén, *L. sudetica* is presently unknown in the subarctic and arctic area lying on either side of the Bering Straits. These areas constitute the Beringian or so-called "east-arctic" area. Although Fernald (Gray's Manual, 8th. ed., p. 418) admits *L. sudetica* to "Alaska," until agreement is reached on this point the North American range may be regarded as extending from the Mackenzie District (Raup, *in* Sargentia 6: 142. 1947) to Greenland (Fernald, *loc. cit.*) and southward from the Canadian eastern arctic to Newfoundland and the St. Lawrence Gulf region (Fernald, *in* Rhodora 47: 265. 1945), and in the Old World as extending from Iceland and Europe to about central Asia. As commonly understood, *L. sudetica* has therefore a northern amphi-atlantic or "west-arctic" type of distribution, while *L. frigida* is more completely circumpolar in that it includes the "east-arctic" in its total range. The occurrence of *L. frigida* in the "east-arctic" is perhaps of significance. In general, any far northern affinities exhibited among species of the subalpine and alpine flora of the Sierra Nevada lie in the northern cordillera and Beringian or "east-arctic" area, and not in the "west-arctic." This suggests that, on a geographical basis, the relationship of *L. orestera* is more likely to be with *L. frigida.*

On the other hand, the support for relationship as sought in the geographical distribution becomes greatly weakened if not annulled when that distribution is considered from another viewpoint. *Luzula frigida* is at present not known to occur in

the western United States, and, with exception of the very doubtful Nevada station, neither is *L. sudetica*. If on a geographical basis *L. orestera* is thought to be most closely related to one or the other of these far northern species, then *L. orestera* becomes highly isolated geographically from its nearest relative. As such, *L. orestera* would then stand as an anomalous exception to other subalpine and alpine Sierra Nevada species with close affinities in subarctic and arctic regions, since probably all these other species are represented elsewhere in high montane areas of the western United States by closely related or identical species, or races of the same species. In view of this difficulty, it would appear more reasonable to look for its nearest relative in the region adjoining its range. The apparent lack of intermediates notwithstanding, the relationship of our plant may well be nearest to *L. multiflora* or the forms or close relatives of the latter which occur in the Sierra Nevada or elsewhere in the Pacific States.

Phlox dispersa C. W. Sharsmith, sp. nov.

Herba perennis ex caudicibus subterraneis ramosissimis tenuibus stoloniformibus diametro aequabiliter 1-2 mm., 10-15 cm. longis caespites apicales epigeos dense foliosos 1.5-3 cm. altos 3-8 cm. latos emittentibus. Folia anguste lanceolata lineata, (4-) 6 (-11) mm. longa, 1.0-1.5 mm. lata, dense glandulari-puberulenta, ad marginem versus vix crassata, magne ex parte eciliata; flores sessiles; membrano calicis intercostali plano; sepalis firmis, costatis, pungentibus, dense glandulari-puberulentibus, 7.8-8.5 mm. longis; corolla alba, tubo 9-12 mm. longo; stylo 1.5-3.0 mm. longo.

Perennial herb arising from a diffuse caudex. Branches of caudex numerous, developed as very slender subterranean stolons 10-15 cm. long, uniformly 1-2 mm. thick, terminating in densely cespitose small leafy tufts 1.5-3 cm. high, 3-8 cm. wide; leaves narrowly lanceolate to linear, 4-11 (averaging about 6) mm. long, 1.0-1.5 mm. wide, subappressed to somewhat spreading, firm, pungent, dark or dull green, densely glandular-puberulent, the margins scarcely thickened, mostly non-ciliate, rarely ciliate with a few simple hairs; flowers sessile, strongly fragrant; intercostal membrane of calyx flat; sepals firm, costate, pungent, densely glandular-puberulent, 7.0-8.5 mm. long; corolla white, throat sometimes purplish, tube 9-12 mm. long with puberulent zone within just above base, lobes obovate, subentire to entire, 6.0-6.5 mm. long; style (including style branches) 1.5-3.0 mm. long; locules one-seeded.

Distribution.—Sierra Nevada in Tulare County, California. Alpine and high alpine; occasional in dry granitic gravels.

Specimens examined.—TULARE COUNTY: near Mount Whitney, *Bailey, Coville, and Funston 2072* (US); Mt. Langley, 13,000 ft., Sept. 1, 1911, *Taylor* (UC); plateau southeast of Mt. Langley, 13,400 ft., Sept. 30, 1948, *Jones* (DS); north slope Cirque Peak above Army Pass, altitude 12,250 feet, Aug. 26, 1937, *Sharsmith 3399* (type, Herb. Univ. Calif.); Cirque Peak, ca. 12,250 ft., *Howell 26183* (CAS); Mt. Guyot, ca. 12,000 ft., *Howell 25621* (CAS); summit of Boreal Plateau, southwest of Siberian Outpost, 11,400 ft., *Sharsmith 3441* (UC); Siberian Pass Creek, 11,000 ft., *Howell 25742* (CAS); Olancha Mt., 11-12,000 ft., *Hall and Babcock 5228* (UC).

Coville (Contr. U. S. Nat. Herb. 4: 152. 1893), in referring the collection *Bailey, Coville, and Funston 2072* doubtfully to *Phlox caespitosa* Nutt., noted its difference from the latter in his comment that "the leaves are glandular-pubescent throughout, while the rootstocks are very slender, almost filiform, and flexuous." This is a summary characterization of *Phlox dispersa*. The diffuse caudex cannot be interpreted as being merely a modification induced by a habitat in shifting gravels on slopes, since it is abundantly developed in level sites with a stable substratum, and is therefore a fixed habit of growth. On level sites in gravel fields a given individual may occupy

a roughly circular area two feet wide, a fact not at all evident in the undisturbed plant. Only careful digging discloses the small scattered cespitose tufts as interconnected by elongate and very slender subterranean stolons. The densely glandular, non-ciliate leaves somewhat suggest the geographically distant *Phlox douglasii* Hook., but the relationship is not clear.

COTYLEDON VARIATIONS IN JUNIPERUS OCCIDENTALIS HOOK.

WILLIAM M. KLEIN

Graduate Assistant, Rancho Santa Ana Botanic Garden

It has been observed that seedlings of *Juniperus occidentalis* Hook., when grown from collections made in northern and southern California, exhibit certain differences which appear to be rather constant for their respective regions. Seeds of *J. occidentalis* were collected between Susanville and Alturas in Northern Juniper Woodland and were planted in the greenhouse at the Rancho Santa Ana Botanic Garden with others taken in Yellow Pine Forest in the San Bernardino Mountains. After about one and one-half months the seedlings were studied for the very marked differences in their cotyledons. Of those raised from northern seed all but one of the 28 examined had two cotyledons. Of 28 seedings picked at random from the southern material only one individual had two cotyledons. The majority of these seedlings had three cotyledons and 18 per cent had four.

The length of each cotyledon was measured with a vernier caliper and the average for each lot of seedlings was determined (see Table). It was found that the cotyledons of those from northern California were on the average 5.38 mm. longer than those from the south. It was also determined that the length of the cotyledons was slightly more variable among southern California seedlings. Other rather constant differences in the two lots were noted in color and width of cotyledons. The northern were a light shining green on the upper and lower surfaces and were somewhat broader than those of the southern lot which were grayish above and red beneath.

TABLE

Propagation Number	*Average Number of Cotyledons*	*Average Length of Cotyledons*	*Extremes in Cotyledon Length*	
			Maximum	*Minimum*
8222[1]	2.03	23.54 mm.	27.7 mm.	18.2 mm.
9380[2]	3.14	18.16 mm.	25.0 mm.	13.4 mm.

In addition to the differences in seedlings of *J. occidentalis* there is considerable difference in habit of the trees in the two localities. The data on seedlings is therefore presented with the hope that it may be of use to some investigator in working out the ecotypes in a species ranging from southern California to Washington.

[1]Seedlings grown from seed collected in Lassen County between Susanville and Alturas and at an elevation of 4200 feet.

[2]Seedlings grown from seed collected in the San Bernardino Mountains, San Bernardino County, at an elevation of 7000 feet.