

A NEW SPECIES OF *LATHYRUS* (FABACEAE) FROM
NORTHWESTERN CALIFORNIA

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ABSTRACT

Lathyrus glandulosus, a new species from Humboldt and northern Medocino Counties in California, is described and illustrated. Its distinctive features include a winged stem, 14–18 leaflets, relatively small (10–12 mm long) purple flowers and a vestiture of stalked, glandular trichomes on lower leaflet surfaces, stems, calyces and ovaries. *L. glandulosus* has a chromosome number of $2n = 14$.

A systematic study of *Lathyrus* of the Pacific Coast of North America has revealed the existence of a new species, herein described.

Lathyrus glandulosus Broich, sp. nov.

Planta perennis, rhizomatos, dense glandulosa pubescens; caulibus 3–6 dm altis, anguste vel late alatis, erectis vel scandentibus. Foliolis 14–18, inferne dense glandulosis pubescentibus, ovatis ad lanceolatis, 3–5 cm longis, 1–2 cm latis. Racemis (5)7–11(14)-floris, foliis brevioribus. Floribus 10–12(14) mm longis, vexillo purpureo, alis et carina albis; ovariis dense glandulosis pubescentibus; stylo 4–5 mm longis, complanato, non torti. Leguminibus 3–5 cm longis, 6–8 mm latis, parce glandulosis pubescentibus (Fig. 1).

Rhizomatous perennial; stems 3–6 dm long, narrowly to broadly winged, erect to clambering, unbranched or branched at ground level. Leaves paripinnate, 14–18 cm long; stipules semi-hastate, narrowly lanceolate to linear, 10–20 mm long, 1–5 mm wide, usually constricted into two acute lobes, much smaller than leaflets; leaflets 14–18, ovate to lanceolate, 3–5 cm long, 1–2 cm wide, sparsely puberulent and densely glandular pubescent below; tendrils well developed, branched. Racemes 10–16(20) cm long, shorter than the rachis of the subtending leaf, with (5)7–11(14) flowers at 1–2 per cm. Flowers 10–12(14) mm long; calyx obliquely campanulate, tube 3–4 mm long with five unequal teeth, upper (“banner”) teeth deltoid, 1–2 mm long, lateral teeth narrowly lanceolate, subequal to or longer than calyx tube, 3–5 mm long, ca. 1 mm wide, lower (“keel”) tooth linear, 4–6 mm long; corolla papilionaceous, banner purple, wings and keel lavender to white; banner claw 7–10 mm long, 5–7 mm wide, banner blade 7–10 mm long, 11–14 mm wide, erect in flower;

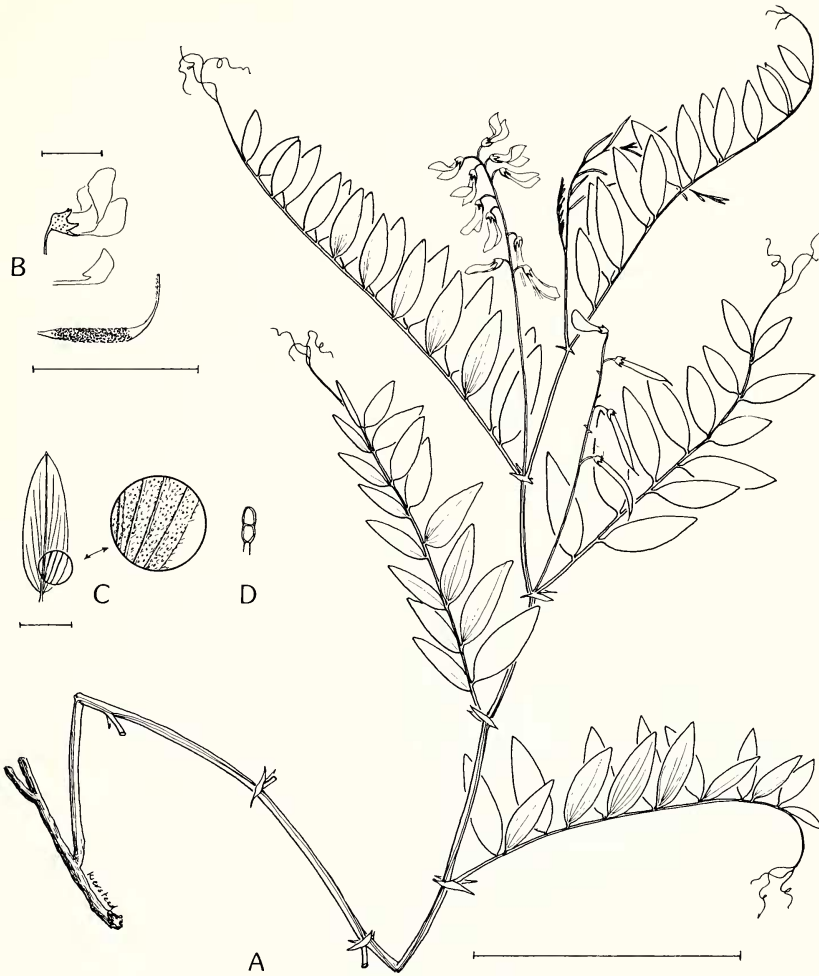


FIG. 1. *Lathyrus glandulosus*. A. Habit of flowering stem. B. Flower: keel, petal, and gynoecium. C. Leaflet pubescence. D. Detail of stalked glandular trichome. Scale equals 10 cm in A, 1 cm elsewhere.

wings 1–3 mm longer than keel, claws 5–7 mm long, blades 7–10 mm long, 4–6 mm wide; keel claws 5–7 mm long, keel blades 4–5 mm long, 6–7 mm high, strongly recurved apically; ovary densely glandular pubescent, 6–10 mm long in flower, containing 10–14 ovules; style 4–5 mm long, flattened, not twisted. Legumes sparsely glandular pubescent, 3–5 cm long, 6–8 mm wide. Seeds mottled green or tan and black, weighing 15–30 mg. Chromosome number $2n = 14$.

TYPE: USA, California, Humboldt Co.: 8.5 km ne. of the Freshwater-Kneeland road on the road to Maple Creek (T4N R2E ca. S2), 9 Jun 1981, *Broich 1146* (Holotype: OSC; isotypes: HSC, ISC, WTU).

PARATYPES: USA, California, Humboldt Co.: along Maple Creek Rd., 0.8 km from junction with Kneeland-Bridgeville rd, 20 May 1980, *Broich 772* (OSC); 42 km n. of Bridgeville on rd to Kneeland, 20 May 1980, *Broich 777* (OSC); 1.9 km se. of Blue Lake on rd to Maple Creek, 9 Jun 1981, *Broich 1141* (OSC); along rd to Maple Creek 11.6 km ne. of junction with the Kneeland-Bridgeville rd, 9 Jun 1981, *Broich 1147* (OSC); along rd to Maple Creek 1.1 km ne. of junction with the Kneeland-Bridgeville rd, 9 Jun 1981, *Broich 1148* (OSC); along rd to Maple Creek 1.6 km ne. of the junction with the Kneeland-Bridgeville rd, 9 Jun 1981, *Broich 1149* (OSC); 1.9 km s. of Kneeland School on rd to Bridgeville, 9 Jun 1981, *Broich 1153* (OSC); 7.9 km s. of the Kneeland School on rd to Bridgeville, 9 Jun 1981, *Broich 1154* (OSC); headwaters of Bear Creek along Cow Creek fire trail, 8 Jun 1934, *Constance 837* (HSC, JEPS); Eureka, Apr 1913, *Hutchinson s.n.* (CAS); Kneeland Prairie, 10 Jun 1906, *Tracy 2474* (UC); Kneeland Prairie, 26 Jun 1912, *Tracy 3855* (UC); Kneeland Prairie, 24 Aug 1930, *Tracy 9170* (UC); valley of South Yager Creek near "Redwood House," 26 Jul 1942, *Tracy 17298* (UC, WTU); Cameron Hill, Kneeland, 19 May 1946, *Tracy 17530* (UC); along "Lord Ellis Rd.," w. of Summit between n. Fork of Mad River and Redwood Creek, 15 Jun 1946, *Tracy 17571* (UC); near the Dan McBride place se. end of Kneeland, 23 Jun 1946, *Tracy 17595* (UC); Fickle Hill, 7 Aug 1948, *Tracy 18085* (UC); Fickle Hill, 20 Jun 1949, *Tracy 19313* (UC); 4.8 km e. of Kneeland on Butter Valley Rd., 29 Jun 1950, *Tracy 18934* (UC); 3.2 km e. of Korbelt on Korbelt-Maple Creek rd., 23 Apr 1960, *Winter s.n.* (HSC 15267). Mendocino Co.: ca. 14.5 km s. of Leggett on rd to coast, 21 May 1980, *Broich 784* (OSC); s. Fork of Eel River opposite Red Mt., 16 km s. of Humboldt Co. line, 28 Apr 1933, *Tracy 12074* (UC).

L. glandulosus is found along roadsides and in the oak woodlands upland from the coastal redwood forests of Humboldt and northern Mendocino Counties in California. It flowers from April to early June and bears seed by mid-July.

Evidence for the existence of *L. glandulosus* surfaced during a taximetric study of *L. vestitus* Nutt. in T. & G. and its allies endemic to the Pacific Coast of North America (Broich 1983). Cluster analyses (hierarchical and non-hierarchical) indicated that three specimens, superficially resembling *L. polyphyllus* Nutt. in T. & G., were, in fact, morphologically unique. Subsequent herbarium and field investigations and additional taximetric studies confirmed the initial observations. Figure 2 displays the results of a discriminant analysis of eight species of Pacific coast *Lathyrus* and demonstrates the dis-

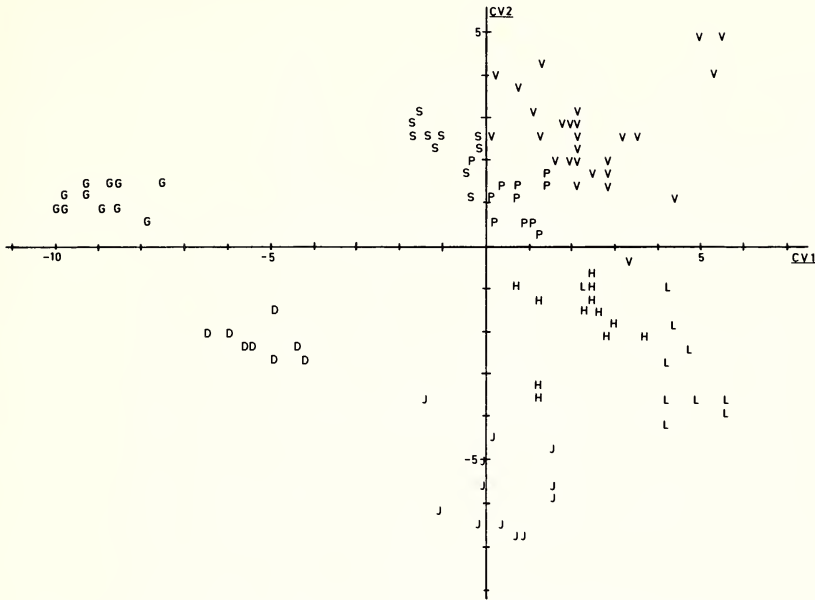


FIG. 2. Ordination of specimens of eight species of *Lathyrus* by scores of the first two canonical variables (CV) resulting from stepwise discriminant analysis of data collected on 36 traits from 112 herbarium specimens (Broich 1983). The computer program used was BMDP7M (Biomedical Computer Programs, P-series, Univ. California, Los Angeles 1979). Species include: G = *L. glandulosus*, D = *L. delnorticus*, H = *L. holochlorus*, J = *L. jepsonii*, L = *L. laetiflorus*, P = *L. polyphyllus*, S = *L. sulphureus* and V = *L. vestitus*. The 14 traits selected by the analysis included: number of lateral branches, presence or absence of stem wings, number of leaflets, adaxial leaflet non-glandular pubescence density, flower density, calyx lateral tooth width, calyx lateral tooth shape, calyx non-glandular pubescence density, calyx glandular pubescence density, keel claw length, keel blade height, keel blade reflex, ovary glandular pubescence density, and style length.

tinctness of *L. glandulosus*. Table 1 lists Mahalanobis distances among these taxa; the morphological divergence of specimens referable to *L. glandulosus* is apparent from these data. Examination of other western North American species of *Lathyrus* not included in taximetric studies (*L. nevadensis* Wats., *L. lanszwertii* Kellogg *sensu* Welsh 1965, *L. pauciflorus* Fernald, *L. tracyi* Bradshaw, *L. torreyi* Gray and *L. biflorus* Nelson and Nelson) also indicated that *L. glandulosus* is distinct.

Vegetatively, *L. glandulosus* most closely resembles *L. polyphyllus* but has winged stems as do *L. delnorticus* C. L. Hitchcock and *L. jepsonii* Greene. In flower shape, *L. glandulosus* most closely resembles *L. pauciflorus* Fernald, but racemes of the latter species bear fewer flowers. A few stalked, glandular trichomes can be found on the epidermal surfaces of almost all Pacific Coast *Lathyrus* species

TABLE 1. MAHALANOBIS D^2 DISTANCES AMONG EIGHT *Lathyrus* SPECIES NATIVE TO THE PACIFIC COAST OF NORTH AMERICA. Data were derived from the stepwise discriminant analysis described in Fig. 2.

	<i>glandulosus</i>	<i>polyphyllus</i>	<i>holochlorus</i>	<i>delnorticus</i>	<i>sulphureus</i>	<i>jepsonii</i>	<i>laetiflorus</i>
<i>vestitus</i>	190.2	57.1	71.3	139.4	84.0	103.1	70.1
<i>laetiflorus</i>	492.9	136.4	126.0	320.9	296.4	109.8	
<i>jepsonii</i>	309.3	156.7	121.8	154.8	225.9		
<i>sulphureus</i>	331.6	146.6	128.2	179.7			
<i>delnorticus</i>	173.6	222.6	193.0				
<i>holochlorus</i>	368.7	122.6					
<i>polyphyllus</i>	270.8						

TABLE 2. MORPHOLOGICAL COMPARISONS AMONG THE NATIVE SPECIES OF *Lathyrus* FROM THE KLAMATH MOUNTAIN REGION OF NORTH-WESTERN CALIFORNIA AND ADJACENT OREGON.

	Stem wings	Number of leaflets	Leaflet pubescence	Number of flowers	Flower length (mm)	Flower color	Ovary pubescence
<i>L. glandulosus</i>	present	13-17	puberulent & glandular	7-11	10-12	purple	puberulent & glandular
<i>L. pauciflorus</i>	absent	6-10	glabrous	2-5	12-14	purple	glabrous
<i>L. polyphyllus</i>	absent	12-14	glabrous	8-12	15-17	purple	glabrous
<i>L. vestitus</i>	absent	8-12	puberulent	8-12	14-16	purple	puberulent
subsp. <i>bolanderi</i>	absent	8-12	glabrous	8-12	14-16	purple/white	glabrous
<i>L. jepsonii</i>							
subsp. <i>californicus</i>	present	8-12	puberulent	6-14	15-17	pink to purple	glabrous
<i>L. sulphureus</i>	absent	8-11	glabrous	9-15	11-13	cream to white	glabrous
<i>L. delnorticus</i>	present	9-12	glabrous	9-11	10-12	cream to white	glabrous
<i>L. nevadensis</i>	absent	4-8	glabrous to puberulent	3-5	12-16	purple	puberulent
<i>L. tracyi</i>	absent	4-6	glabrous	5-8	9-10	white	glabrous
<i>L. lanszwertii</i>							
subsp. <i>aridus</i>	absent	6-8	puberulent	2-4	8-12	purple to rose	glabrous
<i>L. torreyi</i>	absent	10-12	villous	1-2	8-10	purple to rose	villous & glandular
<i>L. biflorus</i>	absent	4	villous	2	8-10	greenish white	glabrous

and glandular hairs are common throughout the Vicieae (Kupicha 1977). The relatively dense vestiture of glandular trichomes found on *L. glandulosus*, however, makes this species quite distinctive. Table 2 presents a comparative summary of morphological features of native *Lathyrus* species found in the Klamath Mountains of northern California.

Lathyrus glandulosus has a chromosome number of $2n = 14$, as do the great majority of *Lathyrus* species (Kupicha 1977). I have found that in chromosome number and morphology *L. glandulosus* is not distinguishable from other Pacific Coast *Lathyrus* species.

Hitchcock (1952) cited and annotated several collections of *Lathyrus glandulosus* as possible hybrids between *L. polyphyllus* and *L. jepsonii* subsp. *californicus* (Wats.) C. L. Hitchcock. Neither of the putative parental species, however, is notable for glandular pubescence; the ovaries of both are entirely glabrous and the flowers of *L. glandulosus* are smaller than both.

A number of specimens of *L. glandulosus* in HSC and UC were annotated by J. A. Lackey in 1972 as being an "undescribed entity in *Lathyrus*"; however, this observation was never published.

The majority of native species of *Lathyrus* that occur along the Pacific Coast of North America can be found in the Klamath Mountains of northwestern California and adjacent Oregon. *Lathyrus* is considered to be Arcto-Tertiary in origin (Raven and Axelrod 1978), and the Klamath Mountains are known to be a center of endemism for relicts of the Arcto-Tertiary Geoflora (Stebbins and Major 1965). Three other species of *Lathyrus* are endemic to the Klamath region: *L. delnorticus*, *L. tracyi*, and the recently described *L. biflorus* (Nelson and Nelson 1983).

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REVIEW

A Field Manual of the Ferns & Fern-Allies of the United States and Canada. By DAVID B. LELLINGER. ix, 389 pp., 45 pp. color photographs (mostly by A. Murray Evans). Smithsonian Institution Press, Washington, DC. 1985. ISBN 0-8747-602-7, \$45.00 (hardcover); ISBN 0-8747-603-5, \$29.95 (paperbound).

This manual is the most current and complete treatment available for ferns and fern allies of the conterminous United States, Canada, and Alaska. It is written in an easily readable but scientifically accurate style that is suitable for all students of ferns, both professional and laic. Features that make it useful for non-professionals include the extensive illustrated glossary, helpful introduction on various aspects of fern biology and classification, an index to common names, notes on cultivation for each species, and 402 color photographs (nine per page). These features, plus an index to scientific names, keys to families, genera, and species, descriptions for some 406 taxa (species, varieties, hybrids), and the attention paid to nomenclatural details, make it equally useful to those who make a living studying ferns.

The photographs deserve special mention because they distinguish this book from several others that cover similar territory. Generally they are of high quality and helpful in identification. In genera such as *Isoetes* and *Selaginella*, whose diagnostic characters are largely microscopic and technical, photographs alone will be insufficient, but this is hardly the fault of Evans, who has done an admirable job with difficult subjects. Many very rare or infrequently seen taxa are represented, e.g., *Botrychium mormo* and *Anemia wrightii*. Herbarium specimens provide the basis for photographs of some species, mostly those from western North America.

Deficiencies in this book are few and almost too trivial to mention. There is a slight eastern North American bias to the work (or is it my greater familiarity with western ferns?), which is understandable given the base of operations of the author and photographer. For example, a higher proportion of western taxa are unillustrated (but only ca. 60 of the total 406 taxa are not represented by photographs). Evidently, Evans' photographic trip to the western states was during the dry season, as several illustrations show dormant or dried plants. *Aspidotis carlotta-halliae* (incorrectly treated as a sterile hybrid; p. 313) from California is mentioned only casually, whereas eastern taxa of rarer occurrence (e.g., *Pleopeltis astrolepis*, *Thelypteris grandis*) are given full treatment (description, habitat, distribution, and photograph). Similarly, several rare eastern hybrids (e.g., *Pteris* × *delchampsii*), are given full treatment, but the western *Pellaea* × *glaciogena* receives cursory mention. Distribution statements are generally accurate, but *Woodsia plummerae* is not cited for California, where it is known from the Mojave desert. One will look in vain for *Ophioglossum vulgatum*, a rarity but well documented from California; does it go under a different name now? Because synonymy is not given, it is impossible to tell.

These quibbles and a few others do not detract significantly from an excellent work, which is destined for a long and useful life in our libraries and offices, even considering the high mutation rate of fern nomenclature.—ALAN R. SMITH, Dept. Botany-Herbarium, Univ. California, Berkeley 94720.