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## OUR TEMPERATE TUFTED POLEMONIUMS

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That the tufted Polemoniums of western temperate-subarctic range are taxonomically difficult becomes evident when an attempt is made to identify a random specimen by keying it out according to published treatments, or by comparing it with the contents of herbarium folders. Interpretations of taxa by different workers prove disconcertingly divergent, and sheets filed under one name hopelessly heterogeneous. Echoing Lindley's prophetic remark of as long ago as 1830, the group is "in a miserable state of confusion." To ascertain whether this situation might be capable of improvement, several hundred representatives of the thirty-odd taxa attributed to the group have been studied in the field and herbarium, with the results herewith presented.

The chief characters available for diagnosis concern the leaves and calyx. Number, shape, size, and extent of confluence of leaflets are readily observable and have usually been well handled, although in the *Vascular Plants of the Pacific Northwest*, Part 4, 1959, two taxa shown by excellent illustrations to be utterly distinct in these respects are incredibly separated only varietally.

The marked plasticity of the *Polemonium* calyx, and its bearing on the description and keying out of taxa, seems never to have received adequate attention in the literature. Within a single fresh inflorescence immature flowers may have the calyx lobes and tube equal in length, and mature ones the lobes up to twice as long as the tube. Moreover, different procedures for drying specimens may lead to varying degrees of lobe shrinkage. Correspondingly, species diagnoses, and key lines, in which but a single lobe-tube ratio is given, are unrealistic and misleading<sup>1</sup>. There seems, on the other hand, less tendency for the lobe-shape—that is, ratio of length to breadth at base—to change, so data relating to this are here reported.

When studied with the above considerations in view, the numerous tufted Polemoniums which have been assigned species status prove to fall into but six taxa sufficiently distinctive to merit this rank. Several of these are subdivisible, but whether the infra-specific taxa should be classed as subspecies or varieties is a subjective matter. Hopefully some light can be thrown on their relationships by cytogenetic, chromatographic, or other modern research procedures—provided these are fully documented—and tossing them around from one category to an-

<sup>1</sup>For example, *Polemonium californicum* was described as having calyx "segments twice as long as tube." However, observations on the type sheet, kindly confirmed by Mr. J. T. Howell, showed the lobe/tube ratio to vary from 1-1.5 (-1.7), and in one case from 1-2.

other, as has frequently been perpetrated in the past, should preferably await the results of such studies.

#### KEY TO MAJOR TAXA OF TUFTED POLEMONIUMS

Range eastern; height up to 50 cm; leaflets ca. 15 per leaf, up to 50 mm long and 25 mm broad; calyx-lobes ca. 1.5 times as long as broad, shorter than tube; ovary stipitate.....*P. reptans*

Range western; height not over 35 cm; leaflets mostly over 15 per leaf and under 30 mm long and 15 mm broad; ovary sessile.

Leaflets broadly elliptic, all normally free; calyx-lobes about as long as tube.

Calyx-lobes tapering straight up, their length 1.5-2.25 times breadth; range over Rocky Mountain system. ....*P. parvifolium*

Calyx-lobes tapering convexly, their length 1.25-1.75(-2) times breadth; range over Cascade Mountain system. ....*P. pulcherrimum*

Leaflets narrowly elliptic, varying from all free to confluent 1/3 way down leaf.

Inflorescence subthyrsoid; leaflets whorled; calyx-lobes slightly shorter than tube; n. Nevada. ....*P. nevadense*

Inflorescence paniculate; leaflets paired; calyx-lobes equal to or longer than tube.

Calyx-lobe length (2-)2.25-3 times breadth; 0-3(-5) leaflets confluent; range over Rocky Mountain system. ....*P. delicatum*

Calyx-lobe length 1.75-2.25 times breadth; 3-7 leaflets confluent; range over Cascade Mountain system. ....*P. californicum*

#### POLEMONIUM REPTANS L. 1759.

Substitute epithet: *P. humile* Salisbury, 1796.

Variants: Confluent-leaflet, *P. quadriflorum* Rafinesque, 1813; large-leaflet, *P. reptans* var. *macrophyllum* Brand, 1907; villous, *P. reptans* var. *villosum* E. L. Braun, 1940; reduced-flower, *P. longii* Fernald, 1949 (observed by the writer at the type locality to be a mere virus-infected plant).

#### POLEMONIUM PARVIFOLIUM Nuttall ex Rydberg. 1897.

Invalid epithet: *P. mexicanum* Nuttall, 1834, preoccupied.

This is the Rocky Mountain representative of the free short-leaflet group of taxa; it is divisible as follows:

## KEY TO SUBDIVISIONS

Height under 15 cm and leaves under 8 cm long;  
leaflets ca. 5 mm long and 3 mm broad. ....var. *parvifolium*

Height 15–30 cm and leaves 10–20 cm long;  
leaflets 7–15 mm long and 4–5 mm broad. ....var. *haydenii* (Nelson)  
Brand. 1907.

Variant of var. *haydenii*: Broad-leaflet, *P. orbiculare* Gandoger, 1918, *nomen subnudum*.

## POLEMONIUM PULCHERRIMUM Hooker. 1830.

The free short leaflet group is represented in the Cascade and neighboring mountain systems by this most variable of the tufted Polemoniums here classed as species. The two infraspecific segregates which have been based on adequate material are here keyed out, while the numerous ill-defined named varieties are listed in the hope that they will be further studied.

## KEY TO SUBDIVISIONS

Height up to 30 cm; leaflets 8–12 mm long and 4–6 mm  
broad; range, n. Oregon northward. ....var. *lindleyi* (Wherry)  
Anderson. 1930.

Height under 20 cm and leaflet-length under 7 mm.

Herbage sparsely pubescent; habit lax; corolla violet  
(white in albinos only); range n. California north-  
ward. ....var. *pulcherrimum*

Herbage copiously pubescent; habit compact; corolla  
white or nearly so; range Mt. Shasta to Mt. Rainier. ....var. *pilosum* (Greenman)  
Brand. 1907.

Named variants: Subconfluent leaflet, *P. berryi* Eastwood, 1904; minute leaflet, *P. fasciculatum* Eastwood, 1904; few leaflet, *P. rotatum* Eastwood, 1904; imbricate leaflet, *P. tevisii* Eastwood, 1904; small flower, *P. montrosense* Nelson, 1905 (as *P. montrosensis*). Of var. *lindleyi*—broad leaflet, *P. oreades* Gandoger, 1918, *nomen subnudum*. Of var. *pilosum*—long leaflet, *P. shastense* Baker ex Eastwood, 1905.

The tufted Polemoniums with relatively long and more or less confluent leaflets are also represented by taxa classed as species in the two major mountain systems, that in the Rockies being again considered first.

## POLEMONIUM DELICATUM Rydberg. 1901.

This species, like those previously discussed, has a large and a small extreme, which have been segregated as subspecies, and may be tentatively retained in that status.

## KEY TO SUBDIVISIONS

- Stems 15–30 cm, leaves 10–15 cm, and leaflets 12–20 mm long. ....ssp. *scopulinum* (Greene ex Rydberg) Wherry. 1942.
- Stems 10–15 cm, leaves 6–10 cm, and leaflets 6–12 mm long. ....ssp. *delicatum*

## POLEMONIUM CALIFORNICUM Eastwood. 1904.

The larger extreme of this taxon calls for special discussion. It has a rather restricted range, from w. Idaho and e. Oregon to s. British Columbia; but curiously enough, in its possession of relatively few and large leaflets, it approaches the remote eastern *P. reptans*. While originally named as a species, it usually has been treated as a mere subjective (taxonomic) synonym of something else, and has apparently never been formally assigned infra-specific status. An exception is accordingly being made to the stated plan of the present paper and one status-change proposed.

POLEMONIUM CALIFORNICUM Eastwood ssp. *columbianum*  
(Rydberg) Wherry, stat. nov.

*Polemonium columbianum* Rydberg, Bull. Torrey Bot. Club 40: 477. 1913.

## KEY TO SUBDIVISIONS

- Leaflet number 15–21, length 25–35(–50) and breadth (8–) 10–15 (–20) mm; range relatively northern. ....ssp. *columbianum* (Rydberg) Wherry. 1967.
- Leaflet number 17–25, length 12–25 and breadth 5–10 mm; range relatively southern. ....ssp. *californicum*

Named variants: Long calyx, *P. calycinum* Eastwood, 1904; short calyx, *P. tricolor* Eastwood, 1904; seven confluent leaflet, *P. oregonense* Gandoger, 1918, *nomen subnudum*; dense glandular, *P. paddoense* Gandoger, 1918, *nomen subnudum*.

## POLEMONIUM NEVADENSE Wherry. 1945.

On the mistaken basis that the only distinctive feature of this taxon consists of its verticillate leaflets, it has been made a subjective synonym of the actually unrelated *P. pulcherrimum*. While related to *P. delicatum*, it is preferably not combined with that since it represents a promising subject for the study of evolution in the genus: two of its features, verticillate leaflets and subthyrsoid inflorescence, otherwise characterizing Section *Melliosma*. To hide its very existence by reduction to subjective synonymy constitutes a disservice to the future worker in cytology, chromatography, or other modern fields, who it is hoped will be inspired to apply these procedures to this interesting group of tufted Polemoniums.

## LITERATURE CITED

Since the literature dealing with the genus *Polemonium* has been repeatedly summarized in fairly recent papers, it has been deemed unnecessary to repeat numerous references here. The most pertinent articles comprise:

- Davidson, J. F. 1950. The genus *Polemonium* [Tournefort] L. Univ. Calif. Publ. Botan. 23(5): 209-282.
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