

NOMENCLATORIAL CHANGES FOR SOME TAXA IN THE OREGON FLORA

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ABSTRACT

Five nomenclatorial changes are proposed at the species and subspecies level, based on taxonomic concepts adopted during the preparation of generic treatments for the Oregon Flora Project. The affected genera are *Crepis-Askellia* (Asteraceae), *Trillium* (Melanthiaceae), *Silene* (Caryophyllaceae), and *Limnanthes* (Limnanthaceae).

RESUMEN

Se proponen cinco cambios nomenclatoriales a nivel de especie y de subespecie, basados en conceptos taxonómicos adoptados durante la preparación de los tratamientos genéricos para el Proyecto de Flora de Oregon. Los géneros afectados son *Crepis-Askellia* (Asteraceae), *Trillium* (Melanthiaceae), *Silene* (Caryophyllaceae), y *Limnanthes* (Limnanthaceae).

ASKELLIA VS. CREPIS

Askellia was assigned by Weber (1984) to the 8 species he recognized as comprising section *Ixeridopsis* Babc. of the large genus *Crepis* (Babcock 1947, p. 212). He noted, in particular, that the chromosome base number of this section, $x = 7$, was unique in *Crepis*. However, his proposed new genus is not used as a segregate of *Crepis* in recent North American floras (Welsh et al. 1987; Douglas et al. 1988; Bogler 2006). In deciding to recognize *Askellia* as a separate genus, we are following the recommendation of Enke and Gemeinholzer (2008), who performed a phylogenetic cladistic study of a large representative sample of *Crepis* taxa (77 species) with data from nrITS and *matK* sequences. Their results placed *C. nana* and *C. flexuosa*, from section *Ixeridopsis*, as a sister clade to the combined clades of (1) *Crepis* proper (monophyletic), (2) species assignable to the segregate genus *Lagoseris*, and (3) the genera *Rhagadiolus* and *Lapsana*. According to these authors (p. 761), "... following the molecular, karyological, and morphological evidence, it is necessary to reassign the seven species of *Crepis* sect. *Ixeridopsis* to *Askellia*, a genus which was defined by Weber (1984) based on the unique number of chromosomes." Their conclusions are supported by a more recent phylogenetic study of numerous Asian Lactuceae genera (Zhang et al. 2011), using DNA data from nrITS, plastid *trnL-F* and *psbA-trnH* loci.

The most widespread American species of section *Ixeridopsis* is *Crepis nana* Richardson, comprising ssp. *nana* and ssp. *ramosa* Babc. Weber assigned the name *Askellia nana* (Richardson) W. A. Weber to the species and made a new combination in it for ssp. *ramosa*. However, in the synonymy for *C. nana* given in Babcock's monograph (1947, p. 541), the first mentioned name is *Prenanthes pygmaea* Ledeb. (Ledebour 1815). Although the epithet "*pygmaea*" is not available in *Crepis*, due to the earlier *Crepis pygmaea* L., it has priority and should replace the epithet "*nana*," dated 1823. We therefore propose the following new combinations, for use by authors who wish to recognize *Askellia* as a separate genus.

***Askellia pygmaea* (Ledeb.) K.L. Chambers & S.C. Meyers, comb. nov.** BASIONYM: *Prenanthes pygmaea* Ledeb., Mem. Acad. Imp. Sci. St. Petersburg Hist. Acad. V, ser. 5:553. 1815. TYPE: 18. *Hieracium*, var. II, *foliis radicalibus ovatis, dentatis*, tab. 7, fig. 3 (Gmelin 1752, p. 20), LECTOTYPE by C.F. Ledebour (1846, p. 838, sub *Youngia pygmaea* ú. *nana*, with the figure specified as the type—"certe quoad icon."). TYPE LOCALITY: SIBERIA: probably ca. 92° E. Lat., 55° N. Long. "ultra fluvium Janiseam," i.e. above the Yenisy River.

***Askellia pygmaea* (Ledeb.) K.L. Chambers & S.C. Meyers ssp. *ramosa* (Babc.) K.L. Chambers & S.C. Meyers, comb. nov.** BASIONYM: *Crepis nana* Richardson ssp. *ramosa* Babc., Univ. Calif. Publ. Bot. 22:542–544. 1947. TYPE: U.S.A. WASHINGTON. Jefferson Co.: above Lake Constance, 11 Aug 1931, J.W. Thompson 7943 (HOLOTYPE: UC 470750).

It is safe to apply the epithet “*pygmaea*” to the taxon *Crepis nana* ssp. *nana*, since Ledebour described the plant with such phrases as “(T)ota plantam. ... in formam hemisphaerii crescit. ... Caulis brevissimus (sic!). ... foliis numerosissimis.” This description is borne out by the lectotype figure in Gmelin (1752). Babcock synonymized *Prenanthes pygmaea* with ssp. *nana* on the above cited page of his monograph. Ledebour (1846, p. 838) made the combination *Youngia pygmaea* (Ledeb.) Ledeb. *á. nana* (Richardson) Ledeb., citing *Prenanthes pygmaea* Ledeb. as synonymous with this variety. In his 1815 description of *P. pygmaea*, Ledebour had made a syntype of 2 polynomial varieties of Gmelin’s (1752) “18. *Hieracium*” species. Just 1 of these was given as the type (effectively a lectotype) in his 1846 publication. It was suggested by Babcock (1947, p. 544) that a second variety described by Ledebour (*op. cit.*), given as *Youngia pygmaea* β . *flaccida* (Ledeb.) Ledeb. and based on the other of Gmelin’s 2 “18. *Hieracium*” varieties, might represent a minor variant of *C. nana* ssp. *ramosa*. Fortunately, such varietal epithets do not interfere with the priority of names at the subspecific level.

TRILLIUM

Trillium parviflorum Soukup (Soukup 1980) has attracted considerable attention from northwest American botanists interested in this genus. The name applies to the northern segment of *Trillium albidum* Freeman (Freeman 1975) found in southwestern Washington and the northern Willamette Valley, Oregon. It was maintained as a separate species by Case (2002). However, the results of a study by Bledsoe (1993) are best interpreted by making *T. parviflorum* a subspecies of *T. albidum*. A clinal relationship in morphology was shown to exist between the former entity (whose type locality is Ft. Lewis, Pierce County, Washington) and the latter (type locality near Selma, Josephine County, Oregon), with populations in the Willamette Valley, from Polk and Marion counties to at least as far south as Sutherlin, Douglas County, exhibiting a mixture of vegetative and floral traits of the 2 nominal extremes. This cline of variation in western Oregon was also described in detail by Dusek (1980), who informally proposed, but did not validly publish, a hybrid name for the intermediate plants.

It is appropriate to recognize this pattern of north-to-south intergradation between the 2 taxa with the following proposed new combination:

***Trillium albidum* Freeman ssp. *parviflorum* (Soukup) K.L. Chambers & S.C. Meyers, comb. nov.** BASIONYM: *Trillium parviflorum* Soukup, *Brittonia* 32:330. 1980. TYPE: U.S.A. WASHINGTON. Pierce Co.: Ft. Lewis Military Reservation, 21 Mar 1979, Soukup, Dusek & Graves s.n. (HOLOTYPE: CINC).

SILENE

Silene serpentinicola T.W. Nelson & J.P. Nelson (2004) was described as a red-flowered taxon distinct from *S. californica* Durand (*S. laciniata* Cav. ssp. *californica* [Durand] J. K. Morton). It was said to be endemic to serpentine of the Smith River drainage in Del Norte County, California, and adjacent Oregon. By chance, this silene had been incorporated in the cytological and genetic researches of A. R. Kruckeberg (1960, 1961) through a collection he had made at Gasquet on the Smith River, under the name *S. californica*, and counted as hexaploid with $2n = 72$ (Kruckeberg 3919, WTU). Kruckeberg (1961) noted the similarity of these red-flowered plants to *S. hookeri* Nutt., whose flower color is described by Hitchcock and Maguire (1947, p. 44) as “white to pink, cerise, violet, or nearly purple.” The chromosome number of *S. hookeri* is consistently hexaploid, $2n = 72$ (Kruckeberg 1960), unlike *S. californica*, in which the number $2n = 48$ (tetraploid) was counted in 5 accessions and $2n = 96$ (octoploid) in 1 accession (Kruckeberg 1954, 1960).

In an interspecific crossing program (Kruckeberg 1961), 2 hybrids were produced between hexaploid *S. hookeri* and the red-flowered Gasquet hexaploids. The first of these showed 80% stainable pollen and the second 65%. In the pollen tetrads he examined, the ratios of normal tetrads to those with micronuclei or microcytes were 142:9 and 98:9, respectively. In the meiotic cells studied, metaphase II and telophase II, the only stages seen, were consistently normal (Kruckeberg 1961, p. 324). These results are equivalent to, or better than, the numerous within-species homoploid crosses reported in table 4 of Kruckeberg’s paper.

As treated in *Flora of North America* (Morton 2005, p. 206), *Silene serpentinicola* is differentiated from *S. hookeri* and *S. laciniata* ssp. *californica* by “its erect, more or less solitary flowering stems and large, clearly vis-

ible petaloid appendages in the flowers.” In the year 2000, K.L. Chambers, in company with Henrietta Chambers, Susan Kephart, Veva Stansell, and Charlene Simpson, collected vouchers of *S. serpenticola* at 5 sites in northwestern Del Norte County (see Appendix). These show the same deep-seated taproot and slender, spreading, often branched rhizomes (called “stem bases” by Hitchcock & Maguire 1947) as in *S. hookeri*, the erect, above-ground, mostly unbranched stems (varying from 7–24 cm in our samples) being well within the size range of *S. hookeri* (2–25 cm per Hitchcock & Maguire, *op. cit.*). The petal blade dissection is the same as described for *S. hookeri*, with 2 larger medial lobes and 2 smaller lateral ones, but sometimes with an extraneous, smaller petal inserted at the base of the blade where the usual corolla appendages are found. This is merely an occasional feature, not a regular one as implied by Morton, above. Nelson and Nelson (2004) confusingly described the petals as “more or less equally two-lobed, each lobe with a lateral tooth.” The calyces and distal stems in our plants are densely glandular-pubescent, a characteristic also found in *S. hookeri* ssp. *pulverulenta* (M. Peck) C. L. Hitchc. & Maguire. From our study of morphological variation in the sampled populations, plus the cytological and crossing results of Kruckeberg (1960, 1961) we see no reason to keep *S. serpenticola* as a species separate from *S. hookeri*, despite the supposed differences inferred by Nelson and Nelson (2004) in their initial description of the taxon.

A species of *Silene* with “deep scarlet” flowers, was reported from “the southwest corner of Oregon” by Howell (1897) under the name *S. californica*. His herbarium voucher (ORE 30680), representing *S. serpenticola*, is labeled “OREGON. Coast Mountains, fortieth parallel. Thomas Howell. June 8th. 1884.” This must be a typographical error for 42nd parallel, the southern boundary of the state. A likely locality would be on serpentine along the old stagecoach route to the southern Oregon gold fields, between Gasquet and present-day O’Brien, Josephine County. There are no reports of recent collections of the taxon in Oregon.

We propose that the evident cytological, genetic, and morphological similarities, other than corolla color, between *Silene serpenticola* and *S. hookeri* are best expressed taxonomically at the subspecific level through the following new combination:

Silene hookeri* Nutt. ex Torr. & A. Gray ssp. *serpenticola (T.W. Nelson & J.P. Nelson) K.L. Chambers & S.C. Meyers, comb. nov. BASIONYM: *Silene serpenticola* T.W. Nelson & J.P. Nelson, Madrono 51:384. 2004. TYPE: U.S.A. CALIFORNIA. Del Norte Co.: T18N, R1E, Sec. 34, elev. 589 m, Low Divide road 8.85 mi N of junction with North Bank road, serpentine road cut, 20 Jun 2002, T.W. Nelson & S. Carothers 9175 (HOLOTYPE: HSC).

LIMNANTHES

Limnanthes floccosa Howell (1897) is considered by taxonomists and authors of contemporary floras (Arroyo 1973; Ornduff 1993; Kozloff 2005; Morin 2010), to contain 5 subspecies: *L. f.* ssp. *bellingariana* (M. Peck) C.T. Mason, *L. f.* ssp. *californica* Arroyo, *L. f.* ssp. *floccosa*, *L. f.* ssp. *grandiflora* Arroyo and *L. f.* ssp. *pumila* (Howell) Arroyo.

A recent study, using data obtained from microsatellite analyses, measured the amount of gene exchange occurring between selected sympatric populations (Meyers 2010). A total of 240 individuals, 120 of *L. f.* ssp. *floccosa* and 120 of *L. f.* ssp. *grandiflora*, were collected from 3 vernal pools (40 each pool) and surveyed. The results indicated that little or no gene exchange was occurring between wild populations of these subspecies. Additionally, 40 individuals of *L. f.* ssp. *floccosa* and 40 of *L. f.* ssp. *grandiflora* were crossed by hand, in both directions, in a greenhouse. Only 6% of the hybrid seeds obtained successfully germinated. Of the surviving germinants, most were depauperate in morphology and died within 1 to 3 weeks of emergence. The plants that reached maturity showed hybrid vigor but were sterile and produced no seeds.

Under the tenets of all biological species concepts, complete or nearly complete reproductive isolation must occur between two taxa in order that species status be conferred (Coyne & Orr 2004). The high levels of both pre- and post-zygotic reproductive isolation existing between *L. f.* ssp. *floccosa* and *L. f.* ssp. *grandiflora* meet this criterion. We therefore conclude that, according to this species concept, *L. floccosa* ssp. *floccosa* and *L. floccosa* ssp. *grandiflora* are parts of 2 distinct species.

The question of the placement of the remaining 3 subspecies of *L. floccosa* can also be addressed, based on

a molecular phylogenetic analysis included in the Meyers (2010) study. Using whole chloroplast genomes and partial mitochondrial and nuclear genomes, this analysis revealed that 2 distinct clades exist within *L. floccosa*. The first clade comprises the sister taxa *L. f. ssp. grandiflora* and *L. f. ssp. pumila*. The other contains the remaining *L. floccosa* subspecies *bellingieriana*, *californica* and *floccosa*.

Using commonly recognized phylogenetic species concepts (Baum & Donoghue 1995), the subspecies of the *L. floccosa* complex could be reclassified by a number of schemes. These range from elevating all subspecies to species status, to leaving all taxa at their current subspecific status within *L. floccosa*. However, given the results of the hybridization experiments and microsatellite study, in combination with the molecular phylogenetic analysis, we propose a conservative yet evolutionarily appropriate new arrangement of the *L. floccosa* subspecies. This involves the splitting of *L. floccosa* into 2 species: *L. pumila*, containing *L. p. ssp. pumila* and *L. p. ssp. grandiflora*, and *L. floccosa*, made up of *L. f. ssp. floccosa*, *L. f. ssp. bellingieriana* and *L. f. ssp. californica*. *Limnanthes pumila* was originally described as a distinct species (Howell 1897), hence only 1 new subspecific combination is required:

Limnanthes pumila Howell ssp. **grandiflora** (Arroyo) S.C. Meyers & K.L. Chambers, comb. nov. BASIONYM: *Limnanthes floccosa* ssp. *grandiflora* Arroyo, Brittonia 25:188. 1973. TYPE: U.S.A. OREGON, Jackson Co.: Modoc Road, 0.8 mi S of jct. with Hwy. 234, 23 Apr 1970, M.T. Kalin 7030A (HOLOTYPE: NY; ISOTYPE: UC).

APPENDIX

The following specimens of *Silene hookeri* ssp. *serpentinicola* referred to in the above discussion are deposited at OSC. All locations are on serpentine substrates in Del Norte County, California.

0.3 miles up Old Gasquet Toll Road from North Fork Road, Gasquet, by a trash disposal area, K.L. Chambers 6124, 15 Jun 1998; same location, K.L. Chambers et al. 6218, 12 Jun 2000, sheets 1 and 2 (packet of 13 petals dried separately); Humboldt Flat on French Hill Road south of Gasquet, 3.3 miles from junction with Hwy. 199, K.L. Chambers et al. 6219, 12 Jun 2000; 10-mile marker on Road 305 near Low Divide, T18N, R1E, Sect. 34/35, K.L. Chambers et al. 6221, 13 Jun 2000 (near type locality); Low Divide, Road 308, T18N, R1E, Sect. 35, at Altevile Historical Site, K.L. Chambers et al. 6222, 13 Jun 2000; Wimer Springs, T18N, R1E, Sect. 14, K.L. Chambers et al. 6224, 13 Jun 2000.

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