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Haplopappus alpinus (Asteraceae): a new species from Nevada

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HAPLOPAPPUS ALPINUS (ASTERACEAE): A NEW SPECIES FROM NEVADA

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Abstract.— The new species, *Haplopappus alpinus* of section *Tonestus*, is formally described and illustrated. It is endemic to the high mountains of central Nevada. Vegetative and floral morphology of related species is detailed. The new species appears to be most closely related to *H. eximius* but also demonstrates close affinity to *H. aberrans* (all three are diploids with n = 9).

In North America, *Haplopappus* (Asteraceae) contains about 95 species represented in 17 sections. Additional species—including the type species, *H. glutinosus*—are in South America. Chromosomally, two major groupings can be identified in the genus (Anderson et al. 1974). One group is generally herbaceous and chromosomally based on x = 4, 5, or 6. The other, more woody group, is based on x = 9. These groupings are poorly distinguished by growth form. Woodiness in the "herbaceous group" is seen in sections *Isocoma* and *Hazardia* (correlated with their xeromorphy?), and reduced woodiness is seen in the "shrubby group" in sections *Tonestus* and *Stenotus* where their growth forms are apparently related to their montane or alpine habitats.

The generic integrity of this assemblage has been challenged. Many feel that *Haplopappus* is unnatural and should be broken up (Shinners 1950, Anderson 1966, Turner and Sanderson 1971, Clark 1977, Urbatsch 1978); some would raise each section to generic standing. Others feel many of the sections are interrelated; i.e., the South American taxa and *Hazardia* (Grau 1976). Jackson (1966) has demonstrated genetic relationship among many of the sections of the "herbaceous group" through intersectional hybridizations; he has recently (pers. comm.) hybridized South American taxa with those of section *Hazardia*.

Until more is known about the biology of *Haplopappus* (especially the South American taxa), Hall's conservative generic treatment (1928) seems better at the moment than the alternative of elevating each section to generic status. Possibly a half dozen genera are represented in the North American material, but I can not envision a precise treatment now.

Description of a new species in section *Tonestus* presents a problem. That section is in the x = 9 group, whereas the type species, *H. glutinosus*, is n = 5 (personal count in 1971 from Kew Garden material; Grau 1976). So, in retaining the wider generic interpretation at this time, a species of *Haplopappus* will be named that most likely will be transferred to another genus when the complex is better known. Deferring description of this species until a comprehensive generic revision is available might possibly withhold additional data that would be supportive of the ultimate revision.

Methods and Materials

Fresh and dried materials were processed as in Anderson, 1964. Five heads were measured for involucral and floral data. Cytological methods are those of Anderson, 1966.

Plant materials were collected personally in the field or supplied by Sherel Goodrich. Vouchers for various measurements and chromosome counts are at FSU.

Taxonomy

Haplopappus alpinus L. C. Anderson & S. Goodrich, sp. nov.

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Herba perennis et lignosa, 0.5–2.0 dm alta; stirpes glandulosae; folia in basi obovata vel oblanceolata, serrata vel dentata, 3–7 cm longa, 10–36 mm lata, folia caulina aliquantenus angustiora et serrata, 3–5.5 cm longa, 8–18 mm lata; inflorescentia vel monocephala vel cyma paucis cum capitibus; involucra 10–12 mm longa, circa 7 mm lata, phyllariis 21–28, exterioribus ovatis et folio similibus et glandulosis, interioribus bracteis angustioribus; disci florum 29–55, flavi, corollis 5.8–7.1 mm longis, lobis circa 1.3 mm longis, lineis stigmaticis saepissime longitudine paribus styli appendicibus; achaenia 4–5 mm longa et pubescentia.

TYPE: Nevada, Nye Co., granitic rocks at 10,600 ft on 11,077-ft peak on Toiyabe Crest between Washington Creek and Aiken Creek, 24 air mi SSW of Austin, 21 Jun 1979, *L. C. Anderson 4885* (BRY—holotype!, FSU!, NY!, UC!).

Perennial herb, woody only at base, short rhizomatous, (0.5)0.7–1.0(2.0) dm tall; stems branched only in the inflorescence or monocephalous, densely glandular-pubescent; foliage dark green, glandular-pubescent, basal leaves obovate to oblanceolate, petiolate, serrate to deeply toothed above the middle, 3–7 cm long, 10–36 mm wide, moderately viscous, cauline leaves oblanceolate to spatulate, cuneate or clasping the stem, saliently dentate, 3–5.5 cm long, 8–18 mm wide; inflorescence usually monocephalous (open sites) or with up to 5 heads in an elongate or flat-topped cyme (deep crevices or protected sites); heads campanulate to hemispheric, 10–12 mm long, 7–10 mm wide (pressed), phyllaries 21–28, outer ones nearly as long as involucre, leaflike, broadly ovate, 3-nerved, glandular, slightly spreading, obtuse with small mucro, inner bracts narrower, lanceolate-spatulate, with finely ciliate margins, acuminate-cuspidate; ray flowers absent; disk flowers (29)35–50(55), golden-yellow, corollas (5.8)6.4–7.1(7.6) mm long, lobes (1.0)1.3(1.6) mm long, lanceolate, slightly spreading to recurved; anthers about 2.6 mm long, appendages 0.6 mm long, style branches slender, stigmatic lines nearly as long as style appendages; achenes cylindric to fusiform, 4–5 mm long, pubescent, pappus dull white, 6–7 mm long; n = 9 (Fig. 1). Infrequent on boulders, talus, or rocky summits near treeline (primarily on light-colored granites but occasionally on basalt, andesite, metamorphics, or limestone), 9,000–11,000 ft, Toiyabe and Toquima mountains of southern Lander and Nye counties, Nevada. Mid-July–September.

Additional specimens examined: Nevada, Lander Co., peak between Aiken and Carsely Creek, S. *Goodrich 12137* (FSU, UTC); Nye Co., type locality, S. *Goodrich 12126* (FSU, NY, UTC), head of left fork San Juan Creek, S. *Goodrich 11997* (BRY, UTC), S. *Goodrich 12006* (FSU, UTC), McLeod Creek, S. *Goodrich 13437* (BRY, FSU), crest between Tim-

Fig. 1. Representative, but somewhat stout, specimen of *H. alpinus*; drawn largely from *Goodrich 12233* (FSU).

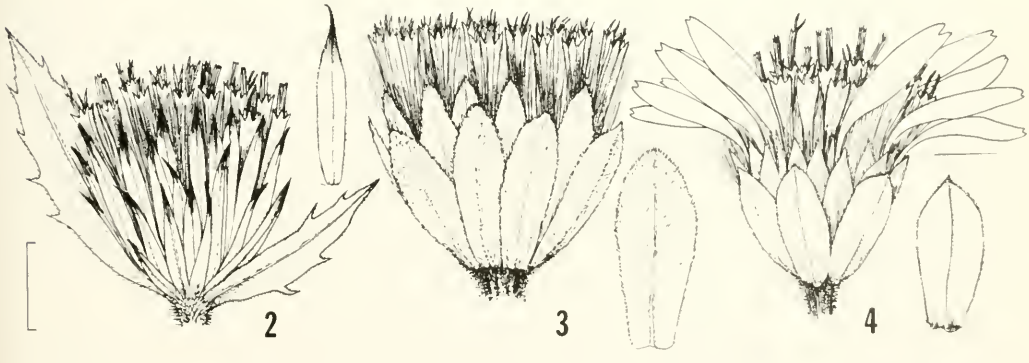
blin Creek and Marysville Canyon, *S. Goodrich 12226* (BRY), Toiyabe crest at French VABM, *S. Goodrich 12233* (FSU), right fork Stewart Creek, *S. Goodrich 13502* (BRY), top of Shoshone Mtn., Toquima Range, *S. Goodrich & F. Smith 13267* (FSU). All collections but the last came from the Toiyabe Range. Goodrich (pers. comm.) also reports seeing a population on Mt. Jefferson at 11,000 ft at the head of left fork of Barker (Shipley) Creek in the Toquima Range. The species is found for about 23 miles along the crest of the Toiyabe Range from the Lander-Nye County line south to the head of Stewart Creek and is reported for two sites in the Toquimas.

At the type locality, *H. alpinus* occurs on windswept slopes above the treeline with *H. macronema*, *Chrysothamnus viscidiflorus*, *Erigeron compositus*, and *Eriogonum umbellatum*. Some sites are at or just below treeline, where the species occurs on rocks in scattered *Pinus flexilis* or *Cercocarpus ledifolius*. Other alpine endemics from central Nevada that have been found in the vicinity of *H. alpinus* are *Draba arida*, *Eriogonum ovalifolium* var. *caelestinum*, *Geranium toquimense*, *Hackelia* sp. nov., *Senecio* sp. nov., and *Smelowskia holmgrenii*.

Relationships and Phytogeography

This species belongs to section *Tonestus* and is related to *H. aberrans* and *H. eximius* (Figs. 2–4). Comparative floral features for the three species plus the more distantly related *H. peirsonii* are given in Table 1; all are distinctive. The Nevadan endemic is like *H. aberrans* in its eradiate heads of similar size; however, the latter has differently shaped cauline leaves that overtop the racemosely disposed, turbinate to narrowly campanulate heads. Also, the bracts are more numerous, narrower, and somewhat squarrose in *H. aberrans* compared to *H. alpinus*. The new species is more similar to *H. eximius* in leaf size and shape, and, although the phyllaries are fairly similar, the campanulate heads differ with those of *H. eximius*, being radiate with shorter involucres. *Haploppapus alpinus* also differs from *H. eximius* in the following minor floral features: *H. alpinus* has stouter corolla tubes (as in *Chrysothamnus spathulatus* versus *C. viscidiflorus*; illustrated in Anderson 1964); its pappus is shorter than the corolla length, whereas pappus equals corolla length in *H. eximius*; and it has longer corolla lobes.

Original meiotic chromosome counts for the taxa include: *H. alpinus*, n = 9 (*Anderson 4885*, the type collection); *H. aberrans*, n = 9 (*Anderson 3660* from Blaine Co., Idaho); and *H. peirsonii*, n = 45 (*Anderson 4326* from Inyo Co., California). The count for *H. peirsonii* agrees with the earlier count by Stebbins, who also reported *H. eximius* as a diploid (Howell 1950). The other counts represent first reports for those species. Meiosis appeared normal with pairing as bivalents in all instances. Pollen stainability for *Anderson*



Figs. 2–4. Flowering heads and individual outer bracts; heads scaled to 5 mm bracket, individual bracts slightly enlarged. Fig. 2. *H. aberrans* (*Anderson 3660*, FSU). Fig. 3. *H. alpinus* (*Goodrich 12137*, FSU). Fig. 4. *H. eximius* (*Anderson 4320*, FSU).

4885 was 97.7 percent, and there were no indications of apomixis in *H. alpinus*.

Haplopappus aberrans was originally described as an aberrant member of section *Macronema* and was later tentatively assigned to *Tonestus* (Hall 1928), but until now it has been considered poorly placed in *Tonestus* (Cronquist 1955). With the addition of *H. alpinus*, the section houses *H. aberrans* more comfortably.

Haplopappus alpinus is somewhat intermediate between *H. aberrans* and *H. eximius* morphologically and geographically. Harper et al. (1978) consider the Great Basin mountain ranges floristically as islands in the surrounding desert possibly populated by migrations from the "mainland" mountain systems of the Rockies or Sierras. The introduction of *H. alpinus* from eximiuslike precursors from the Sierra Madre seems very plausible. The possible origin of *H. aberrans* in the Sawtooth Mountains of Idaho from alpinuslike stock poses an interesting situation. *Haplopappus aberrans* occurs in the Rocky Mountain "mainland" system (in which *H. lyallii* and *H. pygmaeus* of Section *Tonestus* occur). Still, its affinities lie with *H. alpinus* and *H. eximius*. The species could represent the culmination of a migration from the western Sierra mainland across the Great Basin deserts to the Sawtooths and the eastern mainland. These mountain groups were less isolated in the relatively recent past (Harper et al. 1978), and such a migration is plausible.

Billings (1978) suggests the alpine flora in the Great Basin may have resulted from "upward evolution" of preadapted desert species of lower elevations. This doesn't seem to apply to *H. alpinus* or other *Tonestus* taxa. Billings further suggests that due to reduced habitat diversity in Great Basin mountains there is a trend toward edaphic endemism. Again, *H. alpinus* does not follow the trend; it has been collected on granite, basalt, metamorphics, andesite, and limestone in the geologically diverse Toiyabe Mountains. Clearly, these alpine areas of central Nevada do need more vegetational work, as Billings (1978) observed. Our ideas of that region may be greatly changed with further study; endemism apparently is not as low as Harper et al. (1978) record. Goodrich, for example, has found several undescribed endemics in his current survey of the region.

TABLE 1.—Averaged floral data (and ranges entered parenthetically) for selected taxa of *Haplopappus*, section *Tonestus*.

	Taxon and collection					
	H. aberrans	*H. alpinus*		*H. eximius*		*H. peirsonii*
Feature	*Anderson 3660*	*Anderson 4885*	*Goodrich 12137*	*Anderson 4320*	*Anderson 4899*	*Anderson 4326*
Involucre						
Bract number	42.0 (37–49)	24.2 (21–25)	23.8 (21–28)	27.2 (25–30)	29.0 (24–35)	27.0 (23–29)
Length, mm	11.0 (10–12)	10.6 (10–11)	11.0 (10–12)	8.5 (8–9.5)	9.0 (8.2–10)	15.2 (13–16)
Ray flowers						
Flower number	–	–	–	13.6 (11–19)	15.0 (12–20)	21.8 (21–23)
Flower length, mm	–	–	–	10.5	10.2	10.4
Flower width, mm	–	–	–	2.2	2.1	4.4
Disk flowers						
Flower number	38.0 (29–48)	41.6 (35–49)	44.4 (29–55)	59.2 (54–69)	51.6 (44–60)	55.8 (45–75)
Flower length, mm	7.6 (7.0–8.2)	6.3 (5.8–7.1)	7.1 (6.4–7.6)	7.1 (6.6–7.4)	6.4 (6.0–7.0)	8.4 (7.0–9.5)
Lobe length, mm	1.0 (0.9–1.1)	1.3 (1.0–1.6)	1.3 (1.2–1.4)	1.1 (1.0–1.2)	1.0 (0.7–1.2)	1.1 (1.1–1.2)
Stigmatic area–total style branch, %	51.7 (50–54)	50.0 (43–55)	48.1 (45–50)	56.3 (44–62)	53.7 (50–56)	38.1 (33–43)

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