

## TAXONOMIC NOTES ON UTAH *ERIGERON* (ASTERACEAE)

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### ABSTRACT

*Erigeron sionis* Cronq. and *E. proselyticus* Nesom are distinct species, separate in morphology, ecology, and geography. *Erigeron religiosus*, previously regarded as a Utah endemic, has been collected in Mohave Co., Arizona, immediately adjacent to localities for the species in Kane Co., Utah. *Erigeron vagus* var. *madsenii* Welsh & Atwood is distinct from the rest of the species only in its separate geography, but population systems of *E. vagus* all are widely disjunct from one another and formal taxonomic status is not warranted for the central Utah populations. *Erigeron ursinus* var. *meyeræ* Welsh is distinguished by branching stems; this apparently is a populational tendency in, Garfield, Iron, Kane, and Washington counties, Utah, and Coconino Co., Arizona, and formal taxonomic status for such variants is not warranted. *Erigeron katiæ* Welsh, which is closely related to *E. pumilus*, appears to be a real entity and is recorded here as occurring in Rich and Wasatch counties, Utah, and Oneida Co., Idaho.

Recent study at BRY and RM provided an opportunity to examine several interesting taxonomic situations in Utah *Erigeron*.

### 1. *Erigeron sionis* and *Erigeron proselyticus*

In a taxonomic evaluation of *Erigeron flagellaris* var. *trilobatus* Maguire ex Cronq. (Nesom 1976), I found it distinct from typical *E. flagellaris* and probably most closely related to *E. sionis* Cronq., also possibly related to *E. religiosus* Cronq. In view of its distinction, I treated var. *trilobatus* at specific rank as *E. proselyticus* Nesom. Welsh (1993), however, regarded *E. proselyticus* and *E. sionis* as conspecific and combined them, treating each at varietal rank, noting only (p. 398) that "This combination is made necessary by recognition of the close affinity of the material from near Cedar Breaks, Iron County [= *E. proselyticus*], with that of Zion Canyon [= typical *E. sionis*]." He did not address evidence supporting specific rank for *E. proselyticus*. Welsh (2008, p. 215) noted that the northern populations (*E. proselyticus*) "are sometimes slightly more robust, but careful analysis of numerous specimens from both localities have not demonstrated consistent morphological differences ... ." In the *Erigeron* treatment for FNANM (Nesom 2006), I acceded to Welsh's point of view, but a review of collections of both entities at BRY supports their distinction as separate species, in contrast to Welsh's study of the same set of specimens. The most recent edition of the Utah Flora (Welsh et al. 2015) still treats them as conspecific but the Utah Rare Plant Guide (UNPS 2016) treats *E. proselyticus* at specific rank.

**Erigeron proselyticus** Nesom, Brittonia 28: 266. 1976 [nom. et stat. nov., not *E. trilobus* Sond. 1856 or *E. trilobus* (Decne.) Boiss. 1875]. *Erigeron flagellaris* var. *trilobatus* Maguire ex Cronq., Brittonia 6: 258. 1947. *Erigeron sionis* var. *trilobatus* (Maguire ex Cronq.) Welsh, Rhodora 95: 398. 1993. **TYPE: Utah.** Iron Co.: canyon to Cedar Breaks, 12 mi E of Cedar City, 5 Aug 1934, B. Maguire 14947 (holotype: NY digital image!).

**Erigeron sionis** Cronq., Brittonia 6: 258. 1947. **TYPE: Utah.** Washington Co.: Zion Canyon, Zion National Park, 1-3 Aug 1925, H.A. Pilsbry s.n. (holotype: PH digital image!).

The two population systems are distinct in morphology, have different ecologies, and are allopatric (see Fig. 1 and the ecological contrast below, based on data from BRY specimens). Plants of both are perennials with short, thick, and woody stolons; stems and leaves are glabrous to very

sparsely strigose, and leaves are mostly pinnately lobed or parted; ligules are mostly less than 40 per head. They differ as follows (following the FNA treatment).

1. Basal leaves usually with linear-oblongate lobes, less commonly entire to dentate, blades and/or lobes 1–3(–4) mm wide; ray corollas usually drying white to pink or light lavender;  $2n=36$  ..... ***Erigeron sionis***
1. Basal leaves entire or dentate, rarely deeply lobed, blades (2–)3–5(–11) mm wide; ray corollas usually drying pink to dark blue;  $2n=18$  ..... ***Erigeron proselyticus***

**ERIGERON SIONIS**

Sandstone (Navajo Sandstone, sometimes near the junction with underlying, sandy Carmel Formation); wall bases, cracks, ledges, and small soil pockets; (4100–)4500–7000(–7500) ft elevation. Surrounding vegetation of ponderosa pine-Douglas fir, ponderosa pine-oak, maple-Douglas fir, maple-oak, pine-manzanita-cercocarpus, pinyon pine-juniper, and velvet ash.

**ERIGERON PROSELYTICUS**

Limestone (mostly Claron Formation); vertical cliff faces, colluvium below cliffs, limestone gravels, loamy soil from limestone; 7200–10,000 ft elevation. Surrounding vegetation of spruce-aspen, spruce-fir-pine-aspen, aspen, bristlecone pine, bristlecone pine-limber pine, and Douglas fir-ponderosa pine.

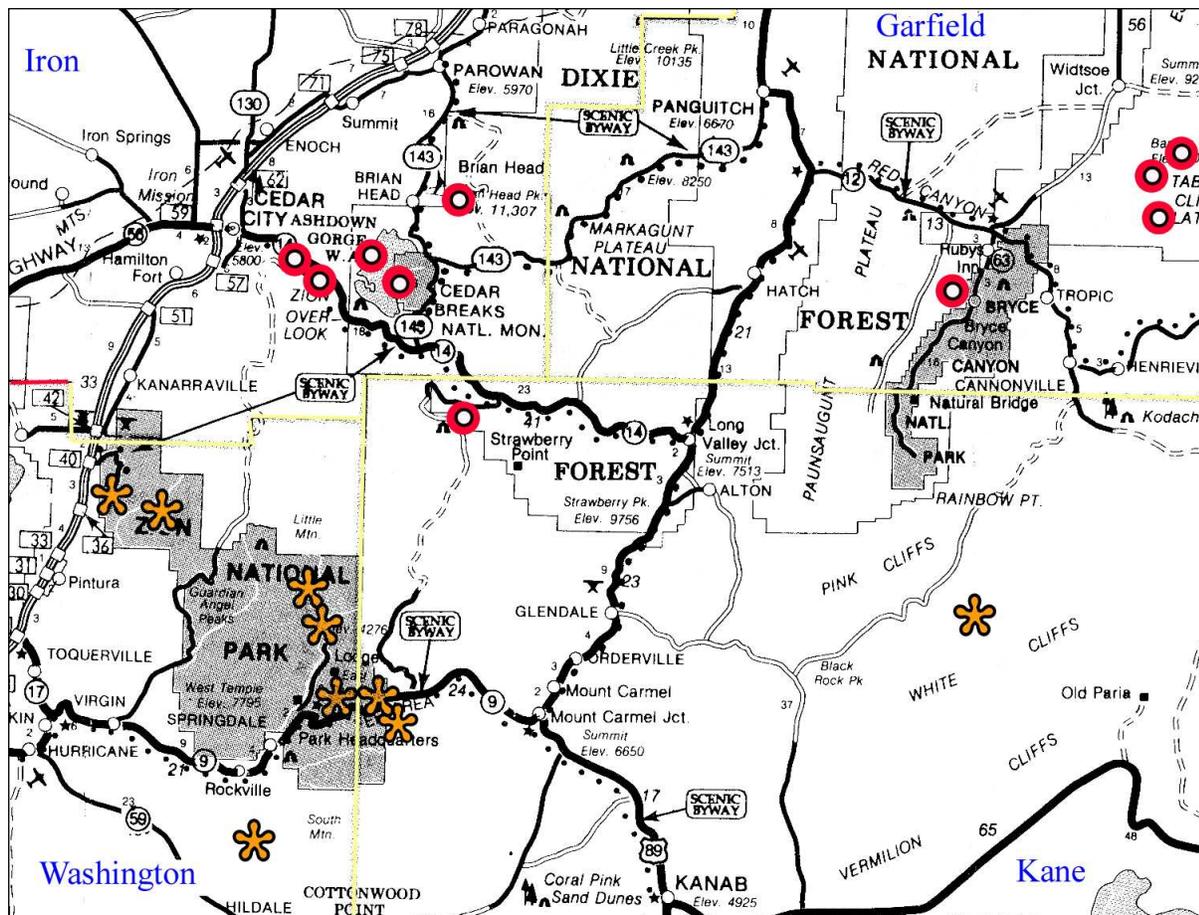


Figure 1. Distribution of *Erigeron sionis* (orange stars) and *E. proselyticus* (red circles). Symbols mostly represent more than one collection, based on specimens housed at BRY and studied July 2016. Base map is the "Map of State Roads" (1994 version) by the Utah Dept. of Transportation.

## 2. *Erigeron religiosus* in Arizona

*Erigeron religiosus* Cronq. is primarily an endemic of sandy sites in Washington and Kane counties, Utah, but it also has been found in closely adjacent localities in Arizona. Differences between *E. religiosus* and forms of *E. divergens* Torr. & Gray can be subtle and the identity of collections from San Juan Co. and Coconino Co. (those outside of the Washington/Kane/Mohave cluster) should be reevaluated.

**Pertinent collections examined of *E. religiosus*.** **Arizona.** Coconino Co.: Vermillion Cliffs National Monument, Paria Plateau, sandstone depressions, *Pinus edulis*, *Juniperus*, *Artemisia*, 5979 ft, 16 Sep 2003, *Atwood 29810* (ASC not seen, BRY!); Inscription House Canyon, 7 mi NW of Shonto, dry pond bottom, sandy soil, *Gutierrezia sarothrae*, *Salsola iberica*, 6400 ft, 29 May 1996, *Holiday 412* (ASC, not seen). Mohave Co.: Left Fork of Cottonwood Canyon, 36° 59.89' N, 112° 54.89' W, boxelder, dogwood, and serviceberry in sandy soil below Navajo sandstone, 5346 ft, 19 Jun 2003, *Atwood & Higgins 29603* (BRY!) and *Atwood & Higgins 29629* (BRY!). **Utah.** Kane Co. (immediately adjacent to the Mohave Co. site): Cottonwood Canyon, Navajo sandstone substrate, ponderosa pine, oak, sagebrush community, 1650 m, 19 Jun 2003, *Higgins & Atwood 24746* (BRY!); Cottonwood Canyon at Washington/Kane Co. line, 1750 m, Navajo sandstone and blow sand, pinyon-juniper-oak-sagebrush, 14 Jun 2001, *Higgins 23230* (BRY) and *23249* (BRY!). San Juan Co.: Glen Canyon National Recreation Area, Lake Powell, near Mile Marker 57 (lake), San Juan Arm, first cove to the north, ca 0.5 mi up hike N of lake, small alcove and arch, 10 Oct 2002, *Heil et al. 21018* (SJNM!); Glen Canyon National Recreation Area, San Juan Arm, Fourth large alcove that leads to two tributaries ca 1/5 mi up canyon by boat, 10 Oct 2002, *Heil et al. 21053* (SJNM!).

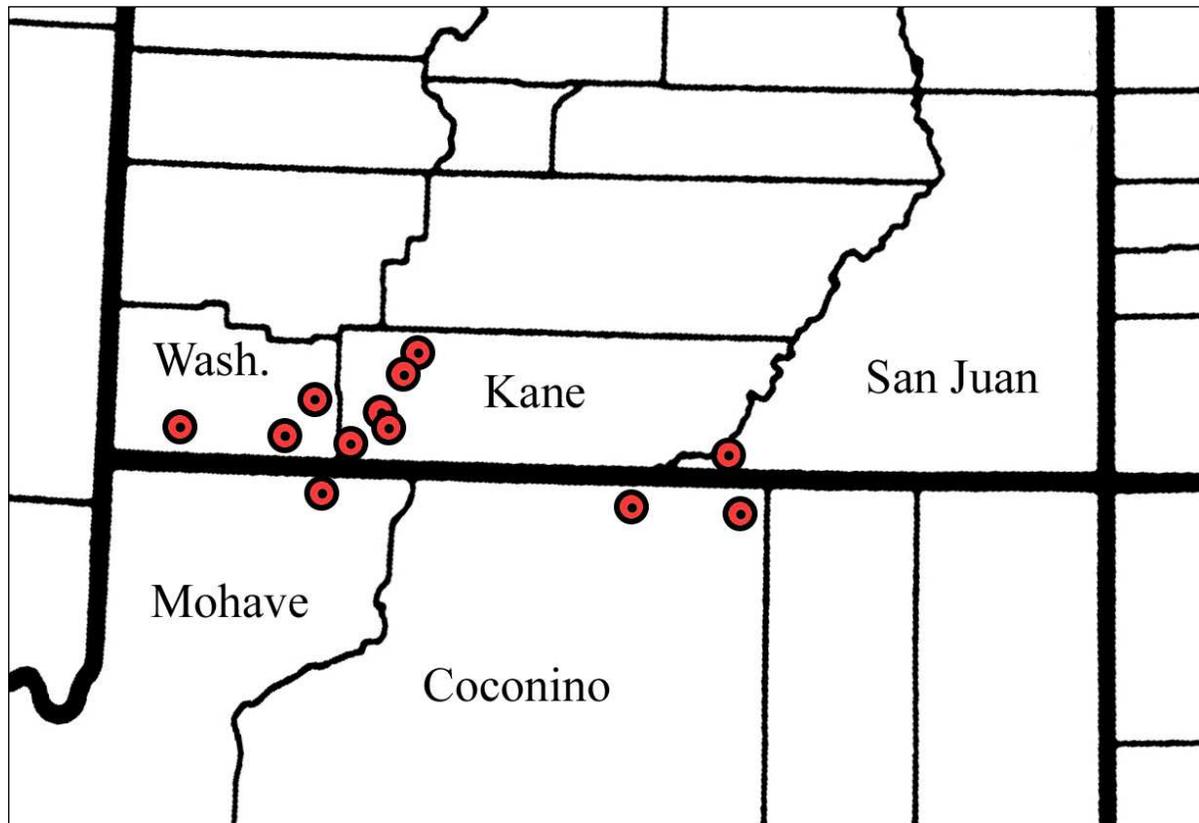


Figure 2. Distribution of *Erigeron religiosus*.



### 3. *Erigeron ursinus* var. *meyerae*

Welsh (2003, p. 189) formally recognized *Erigeron ursinus* D.C. Eat. var. *meyerae*, based on the branching stems of the variant, citing only two collections from Washington Co., Utah (cited below): they are "unique among our numerous collections in having branched stems, each of the curved-ascending branches bearing a solitary head. The remnant of the specimens are monocephalous." Study at BRY and RM, however, shows that plants of *E. ursinus* at the southwestern corner of the range of the species (Garfield, Iron, Kane, and Washington counties, Utah) are predominantly unbranched but collections from each of these counties sometimes have stems with 1-2 branches from midstem or above: Garfield Co.: Ellison 94941 (RM); Neese & White 3300A (RM). Iron Co.: Atwood 6978 (BRY), Cronquist 11833 (RM), Goodman & Hitchcock 1618 (RM), Hitchcock et al. 4607 (RM), Madsen 1723 (BRY), Welsh 15505 (BRY). Kane Co.: Atwood 7448 (BRY), Madsen 1215 (BRY), Madsen 1771 (BRY), Madsen 2995 (BRY). Washington Co.: the type and paratype.

The branched-stem variant of *Erigeron ursinus* also occurs in adjacent northern Arizona (e.g., Coconino Co.: Grand Canyon National Park, Arizona Trail, between North Kaibab Trailhead travelling towards Lindberg Hill, spruce-fir mountain meadow, 8100 ft, 31 Aug 2001, Hodgson 14715B (DES digital image!, Fig. 3). Identities of other collections from Coconino Co. filed as *E. ursinus* (see SEINET) need to be verified — at least two are other species (*Little* 4671, RM! = *E. grandiflorus*; *Taylor & Pinkava* 4453, ASU digital image! = *E. divergens*).

Welsh (2003, p. 189) also noted that "The two specimens [of branched-stem *Erigeron ursinus*] available for study are apparently intermediate morphologically between *E. ursinus* and *E. nauseosus*, both of which occur in the general vicinity." In my examination of the type, paratype, and others of the branched-stem plants, I do not see morphological intermediacy or other evidence for the genetic involvement of *E. nauseosus*. Welsh did not provide details of the basis for his observation.

In sum, I find no difference between typical *Erigeron ursinus* and var. *meyerae* except the branched stems. The variant is distinctive in morphology and geographically localized, but the branching appears to be only a populational tendency (pending field study) and formal recognition of the branched-stem plants seems unwarranted.

*Erigeron ursinus* var. *meyerae* Welsh, Utah Flora (ed. 3, rev.), 189. 2003. **TYPE: Utah.** Washington Co.: Lava Point Lookout, Zion National Park, Quaternary basalt, mesic to dry mesic mountain woodland, associated dominants — *Quercus gambelii*, *Artemisia tridentata*, *Sitanion hystrix*, *Abies concolor*, 7900 ft, 23 Aug 1970, S.E. Meyer 1453 (holotype: BRY!).

Paratype: Utah. Washington Co.: Kolob Reservoir, 8100 ft, 17 Jul 1970, Moor Z845 (BRY!).

### 4. *Erigeron vagus* var. *madsenii*

The original description of *Erigeron vagus* var. *madsenii* Welsh & Atwood provided a contrast to typical (presumably) *E. vagus* Payson: "Similis var. *vagus* in aspectum, sed foliis angustioribus viridis vel cinerascentibus bracteis involucrum viridis vel roseis vel purpureis differt." Var. *madsenii* is distinct from the rest of the species in its geography, but there appear to be 6 or 7 population systems of *E. vagus*, each of which is disjunct from the others (Fig. 4) and consistent morphological differences that would distinguish any of them are not apparent to me. In Utah, *E. vagus* is known from numerous sites (Garfield, Iron, Kane counties) on Claron limestone outcrops of the Paunsaugunt and Markagunt plateaus. While the var. *madsenii* populations probably are genetically distinct as a unit (based on their geographic isolation), the same probably is true for other disjuncts within the species and formal taxonomic status seem unwarranted for any of them without study of the whole group.

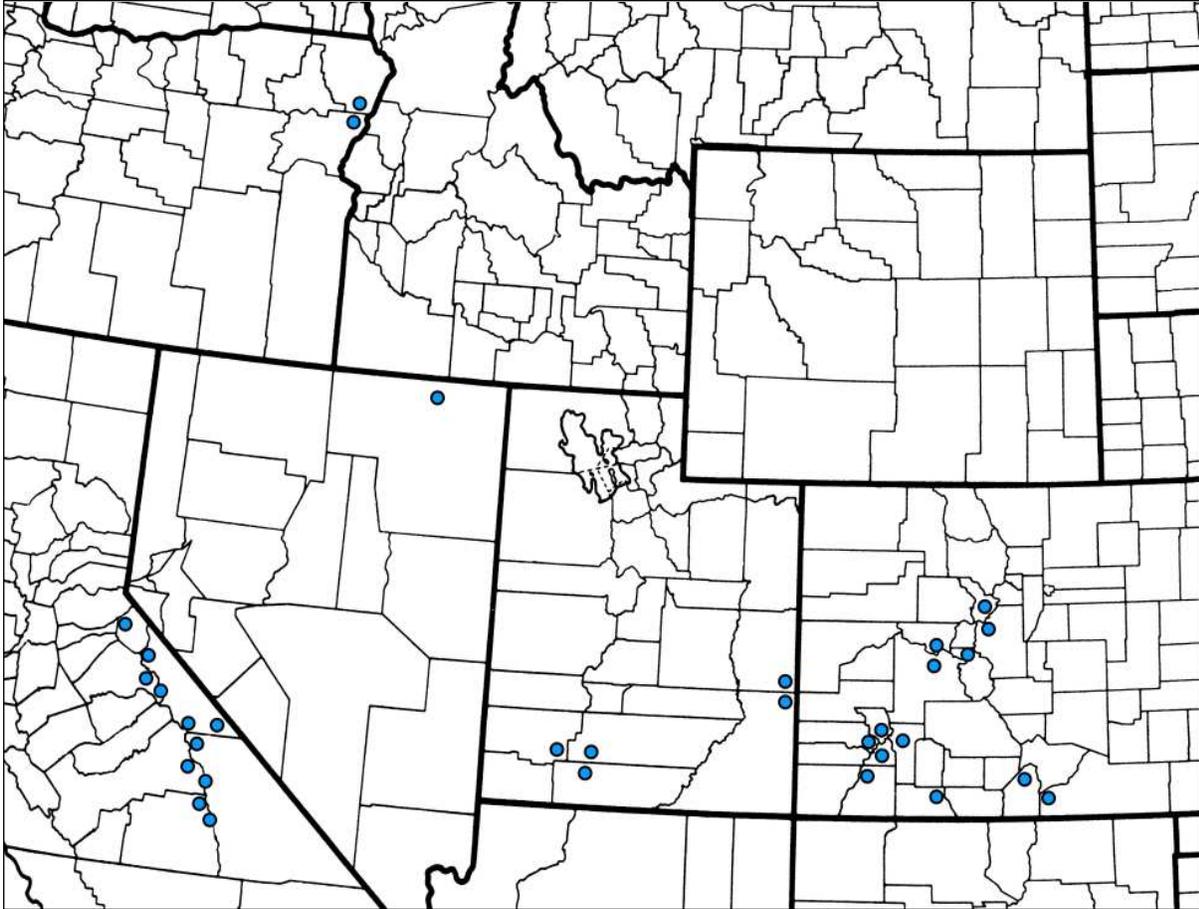


Figure 4. Distribution of *Erigeron vagus*, showing widely scattered-disjunct populations and population systems.

*Erigeron vagus* var. *madsenii* Welsh & Atwood, Utah Flora (ed. 4), 217. 2008. **TYPE: Utah.** Garfield Co.: Powell Point, on and near the scenic overlook, Table Cliff Plateau, Escalante RD/Dixie National Forest, white Claron limestone talus, 3105 meters, 8 Jul 2000, *M. Madsen 1025* (holotype: BRY!; isotype: NY digital image!).

### 5. *Erigeron katieae*

The plants described as *Erigeron katieae* Welsh & Atwood have antrorsely appressed stem vestiture, linear to linear-oblongate leaves, 31–40 ray flowers with white, reflexing laminae, and achenes 1.4–1.8 mm long with sparsely strigose faces and 9–10 pappus bristles. The diagnosis and protologue (Atwood & Welsh 2007) compared it to *E. nematophyllus* Rydb., which has strigose stems and linear leaves but ray flowers with coiling laminae and longer achenes (2.2–2.9 mm) with villous-hirsute faces and margins and 15–25 pappus bristles. The short achenes with few pappus bristles and especially the reflexing white rays indicate that *E. katieae* is more closely related to *E. pumilus* Nutt. and is a member of *Erigeron* sect. *Stenactis* Torr. & Gray (Nesom 2008, pp. 28-29).

*Erigeron katieae* is tentatively accepted here as a distinctive species of north-central Utah and adjacent Idaho (Fig. 5), but it seems unusually rare, inviting further study of its evolutionary status. Its distribution relative to *E. pumilus* and *E. concinnus* is shown in Figure 5. *Erigeron katieae* differs from *E. pumilus* var. *intermedius* in its strigose stems, narrower leaves, disc flowers without indurate-inflated throats (vs. indurate and inflated), fewer ray flowers (31-40 vs. 50-100), and fewer pappus bristles (9-10 vs. 12-20).

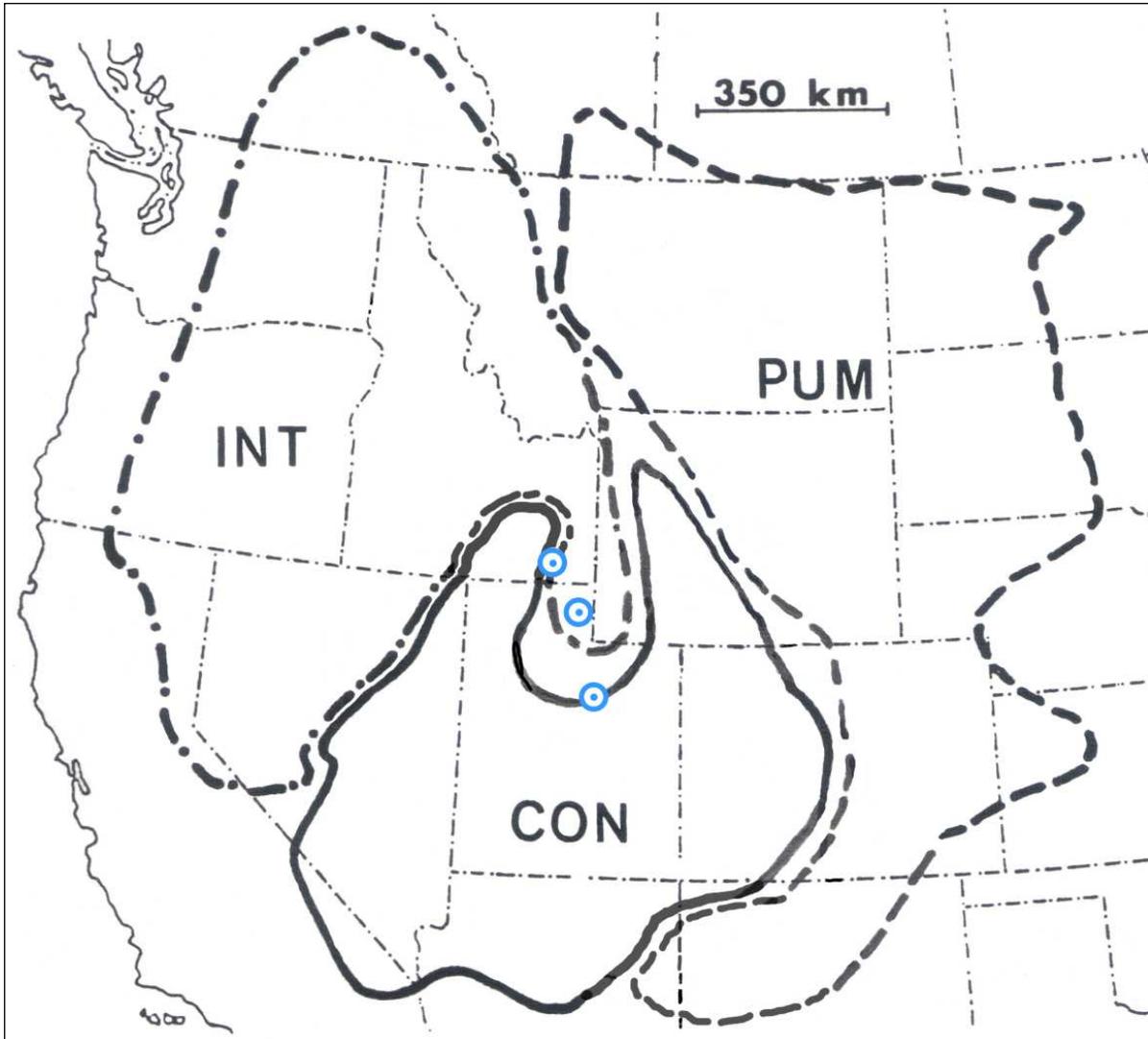


Figure 5. Distribution of *Erigeron katiae* (blue symbols) and close relatives *E. concinnus* (CON) and the two varieties of *E. pumilus* (var. *pumilus* PUM and var. *intermedius* INT). Map modified from Nesom (1983).

**Erigeron katiae** Welsh & Atwood, *Rhodora* 109: 411–413. 2007. **TYPE: Utah.** Rich Co.: Deseret Land and Livestock, Negro Dan Hollow, ca. 7 air mi SE of Deseret Home Ranch, rocky, SW-facing hillside, *Astragalus jejunus*, forb community [noted as "sagebrush community" elsewhere in the discussion], 6714 ft, 5 Jul 2005, *K. Moon et al.* 868 (holotype: BRY!; isotypes: BRY-3 sheets!).

**Additional collections examined.** **Idaho.** Oneida Co.: North Cerlew Valley, Idaho State Hwy 38, 2 mi N of jct with Idaho State Hwy 37, 16.5 airline mi W of Malad City, among sagebrush and crested wheatgrass, 5000 ft, 6 Jul 1971, *Holmgren* 5286 (BRY); no specific locality data, 5000 ft, 30 May 1972, *Moran s.n.* (BRY). **Utah.** Rich Co.: West Stacey pasture on Deseret Land and Livestock Ranch, 41 20'31" N, 111 06' 10" W, sagebrush, 2004, *Woodland s.n.* (UTC digital image!). Wasatch Co.: Uintah Natl Forest, Strawberry Valley, Windy Ridge, windswept ridge with *Artemisia frigida*, 7940 ft, 14 Jul 2011, *Goodrich* 28243 (BRY).



Figure 6. *Erigeron katiaae*, Rich Co., Utah. Isotype BYU 509191.



Figure 6. *Erigeron katiae*, Rich Co., Utah. From Woodland *s.n.* (UTC). Stems and leaves loosely strigose.

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