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AN UNUSUAL POPULATION OF *ERIGERON* (ASTERACEAE), FROM SOUTHERN COLORADO

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ABSTRACT

Plants of an *Erigeron* population in Archuleta Co., Colorado, are morphologically similar to *E. flagellaris* and *E. tracyi* in their low habit, single heads, and leafy runners but distinct in their combination of perennial duration, woody caudex branches, late-season runners, short and ebracteate peduncles, and short-strigose stem vestiture. ITS sequence data show the Cat Creek plants to group with *E. flagellaris* and *E. tracyi*, together forming a group separate from the remaining members of sect. *Olygotrichium*. In situ photos of plants and habitat, a phylogenetic analysis of generic placement, as well as photos of specimens of *E. flagellaris* and *E. tracyi* from southern Colorado are provided for comparison.

A population system of *Erigeron* in Archuleta County (along Cat Creek Road) of south-central Colorado is similar and clearly closely related to *E. flagellaris* A. Gray and *E. tracyi* Greene — all have a low habit with leafy runners and small, solitary heads — but an unequivocal identification of the Cat Creek plants is difficult to make. We call attention to their distinction by providing a description of diagnostic features, photos, and a phylogenetic analysis of placement within the genus.

Colorado. Archuleta Co.: Cat Creek Rd, 7.6 mi from US Hwy 160, [ca. 4 mi SSE of Altura], roadside, [ca. 6850 ft], 4 May 2002, *C.C. King s.n.* (FLD, Figs. 1-3); Ca. 8 miles south of the intersection of Co. Rt. 700 (Cat Creek Rd) and US 160 along Cat Creek Rd, just west of road, ca. 1 km N of Kearns Canyon, 13N 0308070E 4112821N ±6m (WGS 84), 2098 m elev, 6 May 2021, *McCauley 1283* (FLD); Between Altura and Lonetree along Co. Rt. 700 (Cat Creek Rd) along fence line of pasture at east side of road, 13S 0306235E 4116276N ±3m (WGS 84), 2153 m elev, 6 May 2021, *McCauley 1285* (FLD); Same location as *McCauley 1283*, 18 Jul 2021, *McCauley 1474* (FLD). The principal locality is in a large basin — in a meadow at the base of a hillside of degraded shale (Fig. 4).

The antrorsely appressed (strigose) stem vestiture of the Cat Creek plants is like that of typical *E. flagellaris*, in contrast to the spreading-deflexed (hirsute to hispid-hirsute) vestiture of *E. tracyi*, and the route through most identification keys (e.g., Nesom 2006) leads to *E. flagellaris*, via the stem vestiture. In hundreds of collections, this difference in stem vestiture is a consistent feature separating the two — intermediates are rare. But the Cat Creek plants are more similar to *E. tracyi* (vs. *E. flagellaris*) in a number of features.

* Runners prolifically branching, prostrate or decumbent, up to 30 cm long, with plantlets apparently produced beginning in early July, well after initiation of flowering in late April (vs. simple or few-branched runners with plantlets produced concurrently with flowering).

* Perennial, with a ligneous taproot or few and thick fibrous roots, and prominently branching (multicipital) caudex (vs. simple caudex and stronger tendency for an annual duration).

* Peduncles relatively short (2–5 cm), unbranched, sometimes leafy at the base but distally ebracteate or few-bracteate (vs. longer, sometimes branching, leafy).

* Leaves mostly linear-oblanceolate to narrowly oblanceolate (vs. mostly oblanceolate to nearly spatulate), with surfaces evenly strigose-hirsutulous (vs. mostly glabrous).

To observe the pattern of relationship between *Erigeron flagellaris* and *E. tracyi*, ITS sequence data was obtained from herbarium tissue of the Cat Creek erigeron (*McCauley 1283*, FLD), *E. flagellaris* (*McCauley 1023*, FLD), and *E. tracyi* (*Heil 21346*, SJNM) using the protocol described in Fernández-Mazuecos et al. (2020) to reanalyze a subset of the dataset of Noyes (2000) with an additional taxon from Urbatsch et al. (2003). A parsimony bootstrap analysis implemented in PAUP* (ver. 4.0a169, https://paup.phylosolutions.com, accessed 10 Feb 2021) shows the Cat Creek plants to group with *E. flagellaris* and *E. tracyi* (Fig. 9), together forming a group separate from the remaining members of sect. *Olygotrichium* (Nesom 2008).

All of numerous chromosome counts for *Erigeron tracyi* are triploid and it plausibly is of hybrid origin, perhaps with *E. flagellaris* and *E. divergens* Torr. & Gray as parents, but it is not clear that only a single origin is involved. Basal leaves of *E. tracyi* vary from entire to subpinnately toothed or shallowly lobed, and the degree of perenniality seems variable, judging from variation in root and caudex. *Erigeron tracyi* apparently hybridizes with forms of *E. divergens* and with *E. incomptus* A. Gray (Nesom 2015). The genetic sequence of both *E. flagellaris* (*McCauley 1023*) and the Cat Creek *Erigeron* showed identical patterns of heterozygous substitutions at seven nucleotide positions within the ITS region. This unique genetic signature points to a common origin for plants of the *E. flagellaris* complex, which deserves further study.

LITERATURE CITED

Fernández-Mazuecos, M., P. Vargas, R.A. McCauley, D. Monjas, A. Otero, J.A. Chaves, J.E. Guevara Andino, and G. Rivas-Torres. 2020. The radiation of Darwin's giant daisies in the Galapagos Islands. Current Biology 30: 4989–4998.e7.

Nesom, G.L. 2006. *Erigeron* Linnaeus. Pp. 256–348, in Flora of North America North of Mexico, Vol. 20. Oxford Univ. Press, New York and Oxford.

Nesom, G.L. 2008. Classification of subtribe Conyzinae (Asteraceae: Astereae). Lundellia 11: 8–38.

Nesom, G.L. 2015. Variants of *Erigeron divergens* (Asteraceae). Phytoneuron 2015-61: 1–24.

Noyes, R.D. 2000. Biogeographical and evolutionary insights on *Erigeron* and allies (Asteraceae) from ITS sequence data. Pl. Syst. Evol. 220: 93–114.

Urbatsch, L.E., R.P. Roberts and V. Karaman. 2003. Phylogenetic evaluation of *Xylothamia*, *Gundlachia*, and related genera (Asteraceae, Astereae) based on ETS and ITS nrDNA sequence data. Amer. J. Bot. 90: 634–649.

Figure 1. Cat Creek *Erigeron*. *King s.n.* (FLD), collected 4 May 2002.

Figure 2. Cat Creek *Erigeron*, single plant from *King s.n.*

Figure 3. Cat Creek *Erigeron*, single plants from *King s.n.* Lignescent remnants of runners are showing.

Figure 4. Locality of Cat Creek *Erigeron*. Archuleta Co., Colorado, looking south. Photo by R. McCauley, 6 May 2021.

Figure 5. Cat Creek *Erigeron*. Photo by R. McCauley, 6 May 2021.

Figure 6. Cat Creek *Erigeron*. Photo by R. McCauley, 6 May 2021.

Figure 7. Cat Creek *Erigeron*. Photo by R. McCauley, 18 July 2021.

Figure 8. Cat Creek *Erigeron*. Photo by R. McCauley, 18 July 2021.

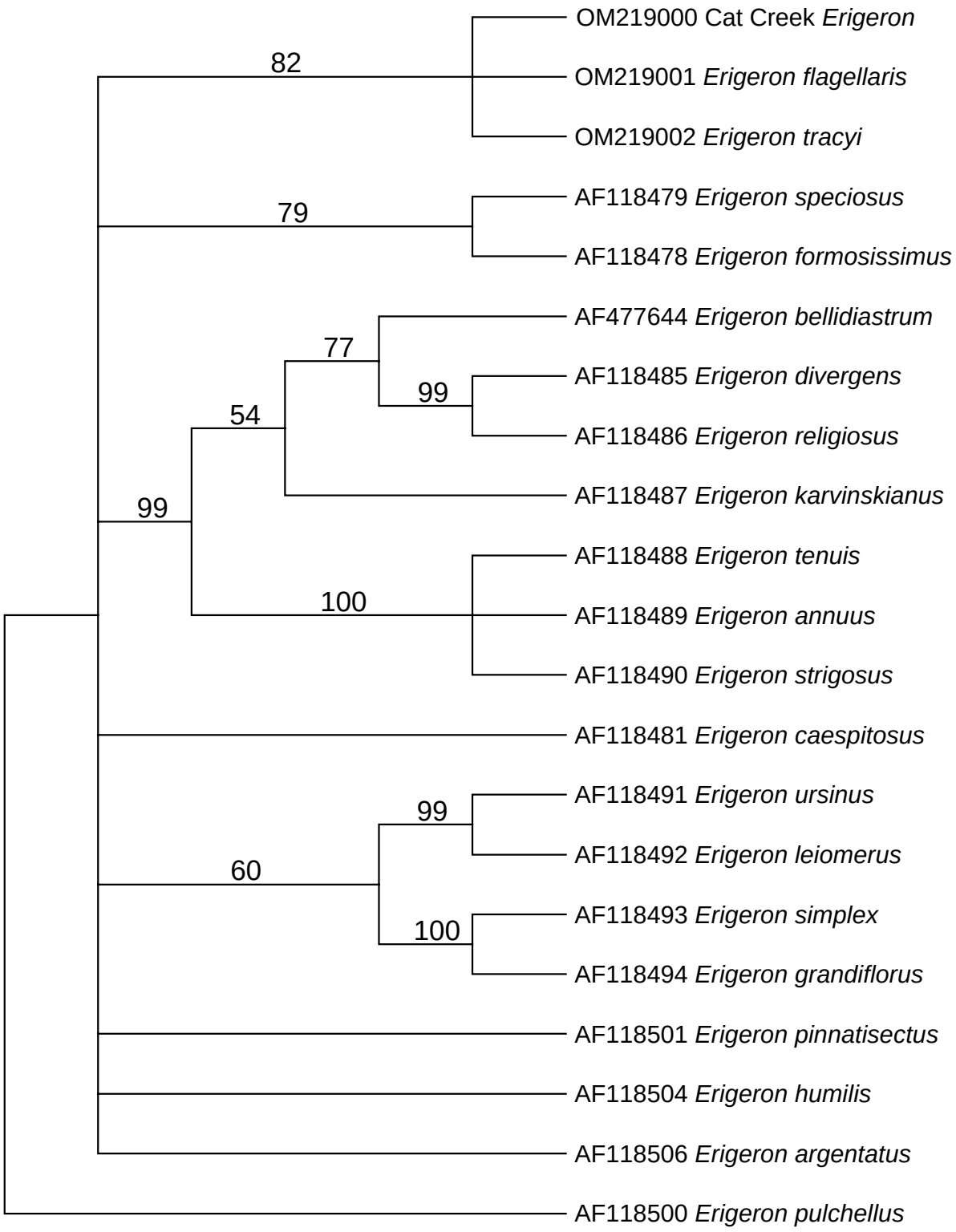

Figure 9. Parsimony bootstrap analysis of ITS sequence variation in select species of North American *Erigeron*.

Figure 10. *Erigeron tracyi*. Archuleta Co., Colorado, *Baker 662* (NY).

Figure 11. *Erigeron tracyi*. Baca Co., Colorado, *Clark 2342* (KHD).

Figure 12. *Erigeron tracyi*. Conejos Co., Colorado, *Douglas 1565* (CS).

Figure 13. *Erigeron tracyi*. La Plata Co., Colorado, *Ferril s.n.* (CS).

Figure 14. *Erigeron tracyi*. Las Animas Co., Colorado, *Wingate 5653* (KHD). Long runners are producing heads at the tips.

Figure 15. *Erigeron tracyi*. Pueblo Co., Colorado, *King 10836* (CS).

Figure 16. *Erigeron flagellaris*. Custer Co., Colorado, *Morse 3159* (CS).