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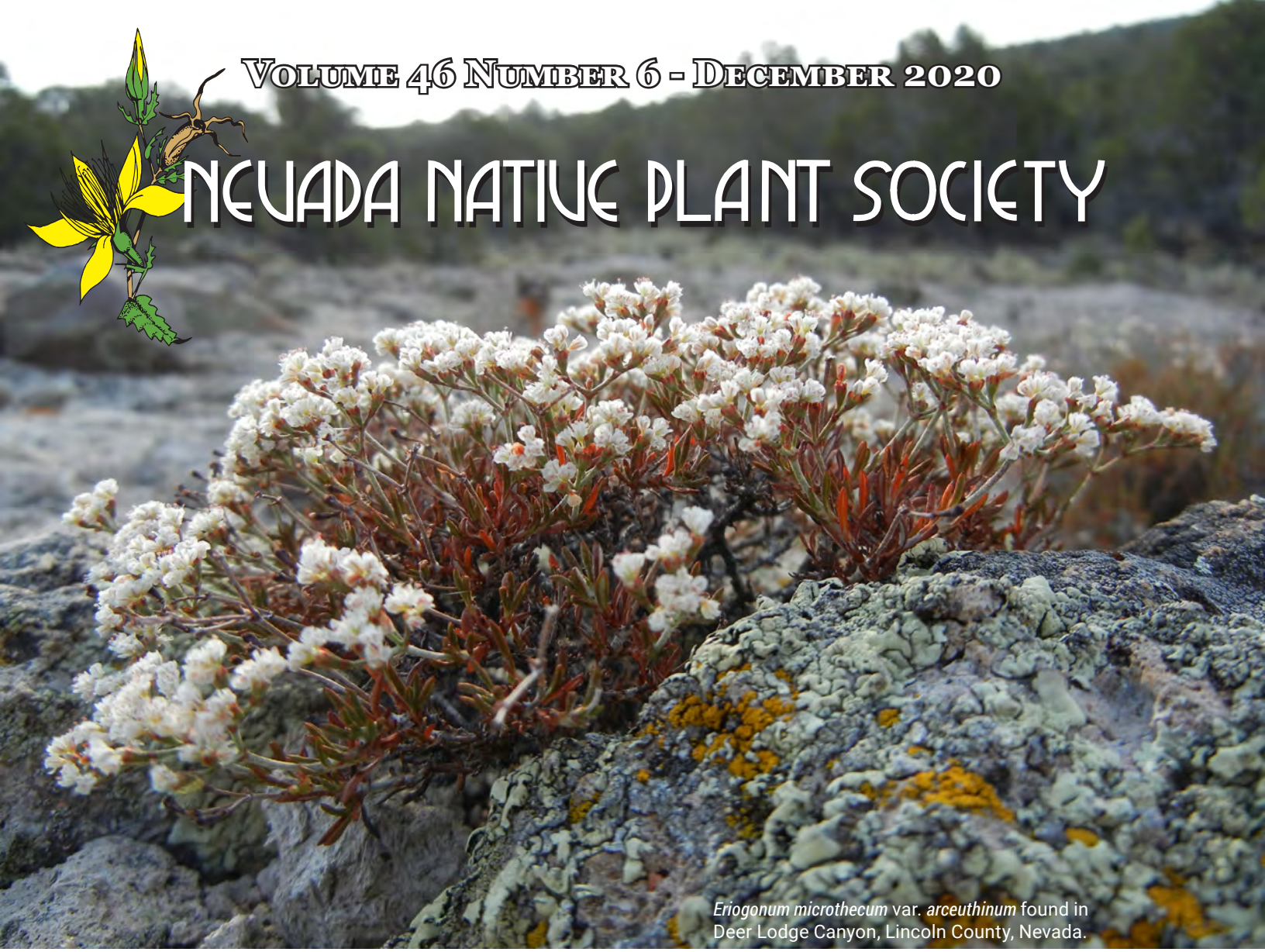

Eriogonum microthecum var. *arceuthinum* found in Deer Lodge Canyon, Lincoln County, Nevada.

A Rare Buckwheat Seen Again

Story and photographs by Teague Embrey

In 1998, Leila Shultz described a new species of buckwheat from western Utah and eastern Nevada, calling it *Eriogonum phoeniceum* (Shultz 1998). The type specimen used was collected in Millard County, Utah, at the northern end of the Wah Wah Mountains. In 2004, James Reveal downgraded the species, determining it a variety within the *E. microthecum* complex, and stated that it was "weakly defined" and "marginally distinct" from other varieties (Reveal 2004a, Reveal 2004b). So, it became *E. microthecum* var. *phoeniceum*. According to the **Nevada Natural Heritage Program rare plant atlas**, the last survey for this plant occurred in 1987; they recommended further surveys (NNHP 2001). Digital herbarium searches indicate that the most recent collections for *E. microthecum* var. *phoeniceum* in Nevada are from 1983, and 2008 in Utah (SEINet 2020, NY 2020). This is where things get interesting.

E. microthecum var. *phoeniceum* does not actually occur in Nevada. Two paratypes from Nevada cited by Shultz as being *E. phoeniceum* were later determined by Reveal to be two different varieties of *E. microthecum*: *arceuthinum* and *lapidicola* (Reveal 2004b, NY 2020).The last paratype cited by Shultz,

Eriogonum microthecum var. *arceuthinum* occupies a pinyon-juniper forest (top), appearing only on barren, exposed volcanic outcrops (bottom, opposite page).

collected by Carl Purpus in 1898, was then used by Reveal as the type for *E. microthecum* var. *arceuthinum* (Reveal 2004b). Reveal described *E. microthecum* var. *arceuthinum* as "narrowly restricted," known only from the Deer Lodge Canyon area in Lincoln County, Nevada (Reveal 2004b). Tightly revolute and glabrous, green leaves distinguish this variety from other varieties.

Arnold Tiehm also collected what he thought, at the time, was *E. phoeniceum* at Deer Lodge Canyon; these specimens were misplaced once they reached Leila Shultz, who was working on describing *E. phoeniceum*. Although the collections of *E. phoeniceum* by Tiehm were never examined by Reveal as they went missing, they are from the Deer Lodge Canyon area, and, following Reveal's determination of Shultz's collections from that area to be *E. microthecum* var. *arceuthinum*, it would follow that the Tiehm collections also belong to that variety (Reveal 2004b).

In 2019, I discovered that these misplaced specimens had been digitized and added to the collections at Arizona State University and Utah State University, with the original locality data available after being missing for close to forty years. Earlier this year, with support of the **Margaret Williams Research Grant** from the Nevada Native Plant Society, I traveled

to the Deer Lodge Canyon area within the Mahogany Mountains to rediscover Tiehm's original collection locality and to search for additional populations. I am happy to report that this interesting buckwheat can still be found in this remote part of Nevada. I present here my findings and what are, as far as I know, the first photographs of this Nevada edaphic endemic.

Habitat

Eriogonum microthecum var. *arceuthinum* occupies barren, volcanic bedrock areas within pinyon-juniper forest (A. Tiehm, pers. comm.). Before heading out to the field, I used satellite imagery to identify several areas that appeared to be bedrock outcrops. Once in the field, I targeted these areas. This buckwheat was found growing exclusively on or directly adjacent to barren volcanic outcrops, except for a few sites where it was absent.

The geology of the Deer Lodge Canyon area is of volcanic origin, a result of eruptions and ash flows (Best 1992). The sites where *E. microthecum* var. *arceuthinum* occurs is mapped as Tertiary tuff (felsic volcanic rock) from the Miocene Epoch. However, within this unit, it was only at the barren areas where I encountered the target plant. It appears that *E. microthecum* var. *arceuthinum* has adapted to grow exclusively on these barren zones. Like other edaphic endemic buckwheats, their presence at a particular site is tied to — and indicative of — a certain geologic formation

Teague Embrey is a botanist from Arizona who has worked in the Mojave, Sonoran, and Great Basin deserts and Latin America. His numerous research grants include two projects surveying for rare buckwheats in Arizona.

Top: *Eriogonum microthecum* var. *phoeniceum*
Bottom: *Eriogonum microthecum* var. *lapidicola*

or substrate. Associated plants at these sites include *Purshia tridentata*, *Ericameria parryi* var. *nevadensis*, *Petradoria pumila*, and *Artemisia tridentata*, with the occasional stunted pinyon or juniper.

Although *Eriogonum microthecum* var. *arceuthinum* is part of a wide-ranging and morphologically varied expression of a single species (13 varieties to date), it can be further grouped within that taxon as a complex of varieties that occur as low subshrubs confined to the desert mountain ranges of eastern California, Nevada, and Utah; these plants are *E. microthecum* var. *arceuthinum*, *E. mic.* var. *phoeniceum*, and *E. mic.* var. *lapidicola*. Quite interestingly, these plants are morphologically similar to *E. thornei*, *E. ericifolium*, *E. pulchrum*, and *E. terrenatum*, species which are also fall-flowering and restricted to specific substrates in the desert mountains and valleys of California and Arizona (Reveal and Henrickson 1975, Shultz 1998, Duncan and Reveal 2003, Reveal 2004b, Anderson 2007). With the exception of *E. microthecum* var. *lapidicola* and *E. pulchrum*, all of the above taxa are edaphic endemics and hyper localized — in an extreme example, *E. thornei* is confined to a small, copper-rich hilltop in the New York Mountains of California.

Uniqueness

Though similar to both *Eriogonum microthecum* var. *lapidicola* and var. *phoeniceum*, var. *arceuthinum* is morphologically more distinct from either of those varieties than *lapidicola* is from *phoeniceum*. Compact subshrubs — some of the older plants appearing bonsai-like — with dark green, glabrous or nearly glabrous revolute leaves. Flowering stems are glabrous, of variable length, sometimes far exceeding the leaf height. The particular varietal epiphet,

This column, top: ***Eriogonum ericifolium***
Middle: ***Eriogonum pulchrum,*** photo by Hallie Larson
Bottom: ***Eriogonum terrenatum***
Previous page: ***Eriogonum thornei***

Examples of the morphology of ***E. microthecum*** var. ***arceuthinum.*** Older plants become compact subshrubs (top). Glabrous flower stems (middle) sometimes exceed the leaf height (bottom).

Eriogonum microthecum var. *arceuthinum* has linear leaves tapering to a needlelike tip.

arceuthinum, means 'of juniper,' as Purpus' label denoted his 1898 collection site the 'Juniper Mountains' — what we now know as the Mahogany Mountains. After seeing these plants in the field, this name is particularly fitting; like the common juniper, *Juniperus communis*, the leaves of *E. mic.* var. *arceuthinum* are linear and taper to a needlelike tip, further distinguishing it from congeners.

Acknowledgements

I wish to thank the Nevada Native Plant Society for funding this venture. Arnold Tiehm helped sort out the confusing taxonomic history and provided detailed locality information aided in finding this plant in situ. Leila Shultz also provided locality information and taxonomic commentary.

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Growing Milkweed and Releasing Monarchs at Northern Nevada Correctional Center (NNCC)

Story and photographs by the NNCC Unit 5 Sagebrush Crew and Sagebrush in Prisons Project Coordinator Shannon Swim

After four years of growing sagebrush at the Northern Nevada Correctional Center in Carson City, the Sagebrush in Prisons Project Unit 5 crew got a new task: milkweed for monarch butterflies. Previously, the inmates in the program had raised sagebrush from seed — over 55,000 plants in 2019 alone — for use in revegetation projects in western states. Sagebrush provides crucial habitat for the sage-grouse, but years of fire and poor range management have devastated sagebrush throughout the west and contributed to a decline in sage-grouse populations. Attempting to restore sagebrush by reseeding in drought conditions has yielded only limited success. The Sagebrush in Prisons Project raises sagebrush in a nursery for transplant. While this is more labor intensive, it has a much higher success rate and offers educational opportunities for incarcerated adults. The program is coordinated by the **Institute for Applied Ecology** (IAE), a non-profit based in Corvallis, Oregon, who partners with the Department of Corrections and the Bureau of Land Management.

Convincing inmates of the importance of sage grouse conservation is relatively easy as the grouse is a game bird and popular with local hunters. One might think that saving butterflies, on the other hand, would be a somewhat tougher sell. Happily, our crew took to it right away.

Monarch butterflies (*Danaus plexippus*) have a symbiotic relationship with *Asclepias* spp., commonly known as milkweed. The butterflies pollinate the plants' flowers and lay their eggs on backside of the leaves. Once the eggs hatch, the caterpillars feed on the leaves and stems which provide their sole nourishment. Herbicides and expanding urban areas have led to loss of milkweed populations. As the milkweed disappears, so do the monarch butterflies.

As part of a research project at UNR, this year the Unit 5 crew also grew some milkweed. Having no experience doing this, we had to devise our own techniques for everything from sowing seeds to transplanting the seedlings. In fact, we were so successful that the two trays of plants we had planned for turned into five full trays.

Our plants, already in bloom, were then transferred to the care of Aramee Diethelm, a PhD candidate at UNR, who is researching chemically mediated communication between Monarchs and milkweed.

Ms. Diethelm describes her study:

Butterflies (Lepidoptera) use many chemical cues to select their host plants. In plants within the Asclepias genus, the primary chemical signals for monarch butterflies are cardenolide and flavonol glycosides. Gravid females can detect oviposition stimulants within plants by tapping the leaf surface with olfactory organs on their feet and antennae. We do not currently understand how changes to plant chemistry as a result of water-availability will influence monarch host-plant selection. Understanding oviposition preferences are crucial to predicting monarch population responses to changing climatic conditions, particularly in the arid Western United States where water-availability is decreasing.

As early stage monarch larvae are limited in mobility, maternal host-plant selection has a direct effect on offspring performance. In this experiment, oviposition preference will be determined by the number of eggs deposited per narrowleaf milkweed from either control or water-limited treatments. The results from this study will shed light on the ecological impacts of climate change and inform future conservation measures for an insect species that is rapidly declining.

Seeing pictures of our plants being used in the study brought a huge sense of accomplishment. Our work benefitting someone else's project made us feel like we were part of the project. To top off this season, we have been given some monarchs still in their chrysalises. On their arrival here, two had already emerged from their chrysalises. We released them in some milkweed we have planted in a little garden area. Now (as I write this in summer), the others reside in our cells at night, waiting to emerge. We hope to release them soon.

Everyone in the Unit 5 crew is excited about finishing up the season. This partnership has been beneficial for all parties involved and in addition to growing all those sagebrush plugs for the BLM, the Sagebrush in Prisons Project will continue to grow *Asclepias fascicularis* and expand to also growing *Asclepias speciosa* next year for this UNR project.

Thank you to our IAE contractors for all the help and support and for believing in us.

Southern & Northern Nevada Events

All meetings are currently canceled.
NNPS will post updates on our website,
NVNPS.org, when we have more information.

Sphaeralcea ambigua rosacea

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