

GOODRICH ON BADLANDS by Tony Frates

Ashley National Forest ecologist Sherel Goodrich was the featured speaker at the Utah Native Plant Society's October 2004 annual meeting. Sherel is also a co-author of *A Utah Flora*, and an expert on the flora of the Uinta Basin and in the genus *Carex*. His topic related to the association of narrow endemic plants of the Uinta Basin with geologic strata.



UNPS October 2, 2004 annual meeting in Provo, Utah

Taking members on a tour of botanical exploration of the region as well as its unique geologic formations and the plants that grow on them, Sherel gave us a glimpse of the rich diversity of endemic plants in this area. Some 17 endemic species are found on the Duchesne River formation and may slip onto the Moenkopi or Morrison, lands which tend to erode into badlands. This includes plant species like *Penstemon fremontii*, *Gilia stenothyrsa*, *Cymopterus duchesnensis*, *Astragalus saurinus*, *Chrysothamnus nauseosus* var. *uintahensis*, *Eriogonum brevicaule* var. *viridulum*, *Penstemon goodrichii*, and *Astragalus hamiltonii*. "Badlands are good lands when it comes to endemic plant species," Sherel explained.



Badlands are *good* lands for endemics.

On the Green River Shale are some 21 endemics, several named in honor of Rupert C. Barneby (1911-2000), who early on in his botanical explorations in Utah and elsewhere in the West figured out that he would find good stuff on bad stuff, species like *Cryptantha barnebyi*, *Cirsium barnebyi* and *Aquilegia barnebyi*. Other Green River Shale species include *Astragalus asclepiadoides*, *Mentzelia goodrichii*, *Astragalus lutosus*, *Erigeron untermanii* and *Penstemon grahamii*.

On the Morrison not as many endemics are found. There however one can find plants like *Cleomella palmeriana* var. *goodrichii* and *Phacelia demissa*; and on the Moenkopi in the Uinta Basin, fewer still, with one example represented by the relatively recently described *Lepidium huberi*.

In the Weber Sandstone, endemic plants such as the red flowered *Aquilegia grahamii* again illustrate the point that different types of geology give rise to different kinds of native plant species.

High Uinta mountain species Sherel discussed included *Papaver radicum* var. *pygmaeum*, *Penstemon uintahensis* and *Penstemon acaulis*, (our smallest Penstemon), *Erigeron huberi*, *Oenothera flava* var. *acutissima* and *Artemisia norvegica* var. *piceetorum*

Another endemic with a very small range on either side of the town of Duchesne, Utah is *Penstemon duchensensis*.

Sherel summed up by stating that, "These specialists don't like competition." This lack of competition may have as much to do with why they continue to exist as their adaptations to, and preferences for, unusual soil chemistry. Habitat harshness provides an opportunity for those taxa that can take advantage of it.



You won't find rare plants in Aspen groves.

We are very grateful to Sherel and his wife for making the trek from Vernal to Provo just for our meeting. If you were in the audience, you were listening to one of Utah's foremost native plant experts (past or present).

To the extent that invasive species gain a foothold in the habitats of these species, they represent a potentially serious threat. Like animal species that

evolved on oceanic islands devoid of certain types of predators, these plant species too have evolved without intense competition on these substrates.

A discussion relating to Uinta Basin plants was particularly timely. Many of these species have an unfortunate affinity for oil-rich shale substrates and grow in direct association with one another (example: *Astragalus lutosus* with *Aquilegia barnebyi* and *Cryptantha barnebyi* and *Penstemon grahamii*).

Oil and gas activity in the area is booming. These endemic species are a part of not only our Utah heritage but also of our natural heritage. Reasonable compromises between development and conservation must be achieved. This requires awareness and concern on the part of our citizenry, federal and state agencies, and developers alike. Populations of rare endemics should not be disturbed and their pollinators and pollination requirements need to be further studied and understood on an urgent basis.

Modern day Utah botanists and biologists who have longed worked in the Uinta Basin such as Goodrich, Neese, Shultz, Atwood, Franklin, England, Welsh, Tuhy, Huber, Naumann, Tepedino and others have given us the gift of knowledge which we collectively must now use and consider in managing these precious resources.

While the drought of recent years is also of concern to biologists (some rare plant species will be at risk and it is unknown how pollinators, seed dispersers, etc. will react), these species have perhaps survived worse conditions over the thousands of years that they have likely existed. Understanding them may be a key to our own survival.

BADLANDS, GOOD PLANTS



Penstemon goodrichii



Mentzelia goodrichii



Cleomella palmeriana var. *goodrichii*

Selective list of Uinta Basin area endemics and rare plants*

To supplement the foregoing, a list that includes many of the species that Sherel discussed plus a few others follows. This is not meant in any way to be a definitive list of all endemics in the area. Nor it is meant to be by any means a list of all rare plants in the region. It is rather being provided in order to (a) give the reader more information about the plant names listed above and thereby help to bring these species to life, (b) further outline the amazing amount of diversity in the Uinta Basin and surrounding area and help to illustrate how many (although not all!) of these species are related to specific geologic strata, the subject of Sherel's talk, and (c) provide a cross-reference to pictures and additional information that exists for many of these species on the Utah Rare Plants Guide web site (www.utahrareplants.org) hosted by the Utah Native Plant Society (UNPS).

This list and text was inspired but not prepared nor reviewed by Sherel; any and all errors are mine.

It should be noted that four of Utah's currently 24 federally listed species are Uinta Basin endemics.**

| Scientific name (common name) | Family | Geologic formation or habitat | On URPG web site? ESA status | Comments |
|--|-----------|---|------------------------------|--|
| <i>Aquilegia barnebyi</i> (Shale columbine) | Buttercup | Green River and Uinta | No | |
| <i>Aquilegia grahamii</i> (Graham columbine) | Buttercup | Weber Sandstone | Yes | The only red flowered columbine in the area. |
| <i>Artemisia norvegica</i> var. <i>piceetorum</i> (Spruce wormwood) | Sunflower | Spruce-fir, alpine tundra | Yes | |
| <i>Astragalus asclepiadoides</i> (Milkweed milkvetch) | Pea | Mancos, Tropic, Carmel, Moenkopi, Arapien Shale, Duchesne River | No | First collected by Marcus Jones, this was the species that drew Rupert Barneby from England to the US. Leaves are like those of a milkweed (<i>Asclepias</i>). |
| <i>Astragalus equisolensis</i> (Horsehoe milkvetch) | Pea | Duchesne River | Yes C (1985) | |
| <i>Astragalus hamiltonii</i> (Hamilton milkvetch) | Pea | Duchesne River, Wasatch and Mowry Shale | Yes | |

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|--|-----------|--|-------------------------|---|
| <i>Astragalus lutosus</i> (Dragon milkvetch) | Pea | Green River | No | |
| <i>Astragalus saurinus</i> (Dinosaur milkvetch) | Pea | Duchense River, Uinta, Wasatch, Dakota, Morrison, Curtis, Carmel, Chinle and Moenkopi | No | |
| <i>Chrysothamnus</i> <i>nauseosus</i> var. <i>uintahensis</i> (Uinta rabbitbrush) | Sunflower | Duchesne River, rabbitbrush, juniper | No | |
| <i>Cirsium barnebyi</i> (Barneby's thistle) | Sunflower | Green River | No | |
| <i>Cleomella palmeriana</i> var. <i>goodrichii</i> | Caper | Morrison | Yes | |
| <i>Cryptantha barnebyi</i> (Barneby's cryptanth) | Borage | Green River | No | |
| <i>Cryptantha grahamii</i> (Graham's cryptanth) | Borage | Green River | Yes | |
| <i>Cymopterus</i> <i>duchesnensis</i> (Uinta Basin spring- parsely) | Parsley | Duchesne River, Mancos, Morrison, Uinta and Wasatch on clay semibarrens | No | |
| <i>Erigeron huberi</i> (Huber's daisy) | Sunflower | Alpine ridge crests above limestone talus | Yes | |
| <i>Erigeron untermannii</i> (Untermann daisy) | Sunflower | Uinta and Green River | Yes | |
| <i>Eriogonum brevicaulis</i> var. <i>viridulum</i> (Duchesne buckwheat) | Buckwheat | Duchesne River, pinyon-juniper, shadscale, mixed desert shrub | No | |
| <i>Gilia stenothyrsa</i> (Lake Fork gilia) | Phlox | Shale or clay barrens in a variety of habitats | No | Collected by Fremont; on the Colorado Rare Plant Field Guide web site. |
| <i>Mentzelia goodrichii</i> (Goodrich blazingstar) | Stickleaf | Green River | Yes | |
| <i>Lepidium barnebyanum</i> (Barneby peppergrass) | Mustard | Uinta, white shale outcrops | Yes LE (1980) | |
| <i>Lepidium huberi</i> (Huber's pepperplant) | Mustard | Chinle, Park City and Weber Sandstone | Yes | |

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|--|-----------------------|---|----------------------------|---|
| <i>Oenothera flava</i> var. <i>acutissima</i> (Large yellow evening-primrose) | Evening-primrose | Sagebrush, gross-forb, ponderosa pine | Yes | |
| <i>Papaver radicum</i> var. <i>pygmaeum</i> (Alpine poppy) | Poppy | Alpine tundra | Yes | Recognized as a new endemic species, <i>Papaver uintaense</i> , by Welsh et al (2003); recognized as <i>Papaver radicum</i> ssp. <i>kluanense</i> in Flora of North America |
| <i>Penstemon acaulis</i> var. <i>acaulis</i> (Stemless penstemon) | Figwort or Snapdragon | Pinyon-juniper and sagebrush-grass on semibarren substrates | Yes | Penstemons are sometimes also referred to as "beardtongues." This is Utah's smallest penstemon. |
| <i>Penstemon duchensensis</i> (Duchesne penstemon) | Figwort | Gravelly or silty sand or clay semibarrens | No | |
| <i>Penstemon flowersii</i> (Flowers penstemon) | Figwort | Clay badlands | Yes | Named by Welsh & Neese in 1983 in honor of Dr. Seville Flowers (1900-1968), University of Utah botany professor and expert in mosses, lichens and ferns |
| <i>Penstemon fremontii</i> (Fremont penstemon) | Figwort | Arid benches and slopes | No | Common in the Uinta Basin, also occurs in WY and CO; discovered by John Fremont, earliest known botanical explorer in the region. |
| <i>Penstemon gibbensii</i> (Gibbens penstemon) | Figwort | Green River | Yes | |
| <i>Penstemon goodrichii</i> (Goodrich penstemon) | Figwort | Duchesne River | Yes | |
| <i>Penstemon grahamii</i> (Graham penstemon) | Figwort | Green River | Yes C (1983) | Incredibly beautiful as it is rare; petitioned for listing and a lawsuit is currently pending; its habitat is very much |

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|--|-----------|---|--|--|
| | | | | threatened |
| <i>Penstemon scariosus</i> var. <i>ablifluvis</i> (White River penstemon) | Figwort | Green River | Yes C (1983) | |
| <i>Penstemon uintahensis</i> (Uinta penstemon) | Figwort | Spruce-fir and alpine tundra | No | The correct way to spell Uinta is without an 'h.' |
| <i>Phacelia demissa</i> var. <i>minor</i> (Brittle phacelia) | Waterleaf | Morrison, Duchesne River and Mancos | No | |
| <i>Phlox opalensis</i> (Bridger Basin phlox) | Phlox | Bridger and Green River | Yes | Bridger Basin endemic |
| <i>Schoenocrambe argillacea</i> (Clay schoenocrambe) | Mustard | Green River and Uinta | Yes LT (1992) | |
| <i>Schoenocrambe suffrutescens</i> (Shrubby reed-mustard; Graham's schoenocrambe) | Mustard | Green River | Yes LT (1987) | Also known as <i>Glaucocarpum suffrutescens</i> and federally listed and on URPG under that name |
| <i>Sclerocactus brevispinus</i> (Pariette cactus) | Cactus | Gravels on Uinta formation; clay badlands | Yes LT under <i>S. glaucus</i> | Recognized as <i>S. whipplei</i> var. <i>ilseae</i> by Welsh et al (2003); habitat currently slated for energy development |
| <i>Sclerocactus glaucus</i> (Uinta Basin hookless cactus) | Cactus | Gravelly terraces and benches on Duchesne River, Green River and Mancos | Yes LT (1979) | Recognized as <i>S. whipplei</i> var. <i>glaucus</i> by Welsh et al (2003) |
| <i>Townsendia montana</i> var. <i>caelilinensis</i> (Skyline Townsendia) | Sunflower | Flagstaff limestone and Green River | Yes | |

**A note about endemics and rare plants:*

Endemics are taxa which are typically contained within a confined or restricted area due to topology and/or are restricted to certain soils or geologic substrates. The varied, rugged, and harsh climates and terrains found in Utah and adjoining states have created the stage for these plant specialists.

Rare plants are not necessarily endemics and endemics are not necessarily rare plants. An endemic found within a very limited area may occur with relative abundance within that range and therefore not be considered rare (even though it is nonetheless unusual and unique: rarity does not per se imply importance, except in terms of conservation priority; nor does it imply lack of success). And, a rare plant may occur in different states at disparate locations and may not

therefore be an endemic.

That being said, Utah's rarest plants are primarily endemics. The Utah Rare Plant Guide site focuses on species which are considered "globally rare" rather than just "Utah rare only" (or "state rare") and invariably those tend to be endemics.

Species federally listed under the Endangered Species Act are indicated as **LE** (listed as endangered) or **LT** (listed as threatened) under the "Yes" indication in the "on URPG web site" column. Species which are formal federal candidates and awaiting listing are denoted by a **C**. The year the species was listed (or proposed as a candidate if appropriate) follows its status.

URPG = <http://www.utahrareplants.org>. Click on the Utah Rare Plant Guide link in the lower left hand corner and then click on Rare Plants and you will see the alphabetical list. "Yes" means there is (normally) a line drawing, habitat shot, closeup shot and general information about the taxon. All rare plants which occur in Utah are not necessarily identified on the rare plants web site as indicated above; a "No" in this column can be assumed to mean that the taxon is not rare.

Family names are the common rather than scientific names.

**Counts *Sclerocactus brevispinus* as listed "under" *S. glaucus*.

Acknowledgments and references:

Drawings by Kaye H. Thorne (1939-2004) from the Utah Rare Plant Guide
Cleomella photograph by Sherel Goodrich from the Utah Rare Plant Guide
Other photographs by Tony Frates

Thanks also to Susan Garvin, UNPS President, for arranging the annual meeting and inviting Sherel to speak to us, and in providing helpful comments and encouragement in the course of proofreading this article.

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