

BUTTERFLY USE AND POLLINATION OF COLORADO *ERIOGONUM* SPECIES

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Background

- Buckwheats – Eriogonum species
- Endemic to North America, mostly arid Western.
- 250 species in 8 subgenera.
- 40 species occur in Colorado.
- Perennial species are reliable resources in drought years.
- Most occur in disclimax habitats – burns, slides, dunes, barren soils, etc.
- Follows names in Reveal – many references
- Butterflies found in two families, in five genera have adapted to buckwheats at several past geological eras.
- Some butterfly groups are examples of convergent evolution.
- Survival is assured by reliance on dependable hosts.
- Role as pollinators requires further study.

Eriogonum species used as caterpillar host-plants in Colorado

- ▣ *Eriogonum arcuatum* var. *xanthum* (1)
- ▣ *Eriogonum brevicaule* (2)
- ▣ *Eriogonum corymbosum* (2)
- ▣ *Eriogonum effusum* (2)
- ▣ *Eriogonum jamesii* (2)
- ▣ *Eriogonum ovalifolium* (1)
- ▣ *Eriogonum racemosum* (1)
- ▣ *Eriogonum umbellatum* (5), incl. *subalpinum*

Niches of Butterflies that use buckwheats as caterpillar hosts in Colorado

Euphilotes species – adults nectar primarily on host flowers, some may be pollinators, Xerces Society – ‘endangered pollinators’
Adult’s emergence and flight closely timed with host floral anthesis;
Only one adult generation annually; Larvae eat only flower buds, flowers, and developing seeds of hosts.

Plebejus acmon complex – adults nectar primarily on host flowers, some may be pollinators; larvae feed on host flowers and/or leaves – have complex life cycle

Callophrys sheridanii complex – adults rarely nectar on host flowers and have only a single spring flight; larvae feed on host leaves.

Lycaena heteronea – adults usually visit host flowers; larvae eat host leaves.

Apodemia mormo complex – adults may nectar on host flowers, but also may nectar on other flowers such as yellow-flowered Asteraceae; larvae feed on host leaves.

What is a pollinator??

- ▣ Eriogonums have diverse reproductive systems.
- ▣ Dioecious {=unisexual} – separate plants for staminate and pistillate flowers. If animal pollinated, any insects that moves pollen from anthers of one plant to stigma of another would be an *effective pollinator*.

Reproductive systems continued

- ▣ Plants bisexual, most species. Some species with dimorphic flowers in same inflorescence.
- ▣ Question: is it known if *Eriogonum* species are self-compatible, self-incompatible {obligate out-crossers}, or even apomictic??
- ▣ Need for controlled pollination experiments

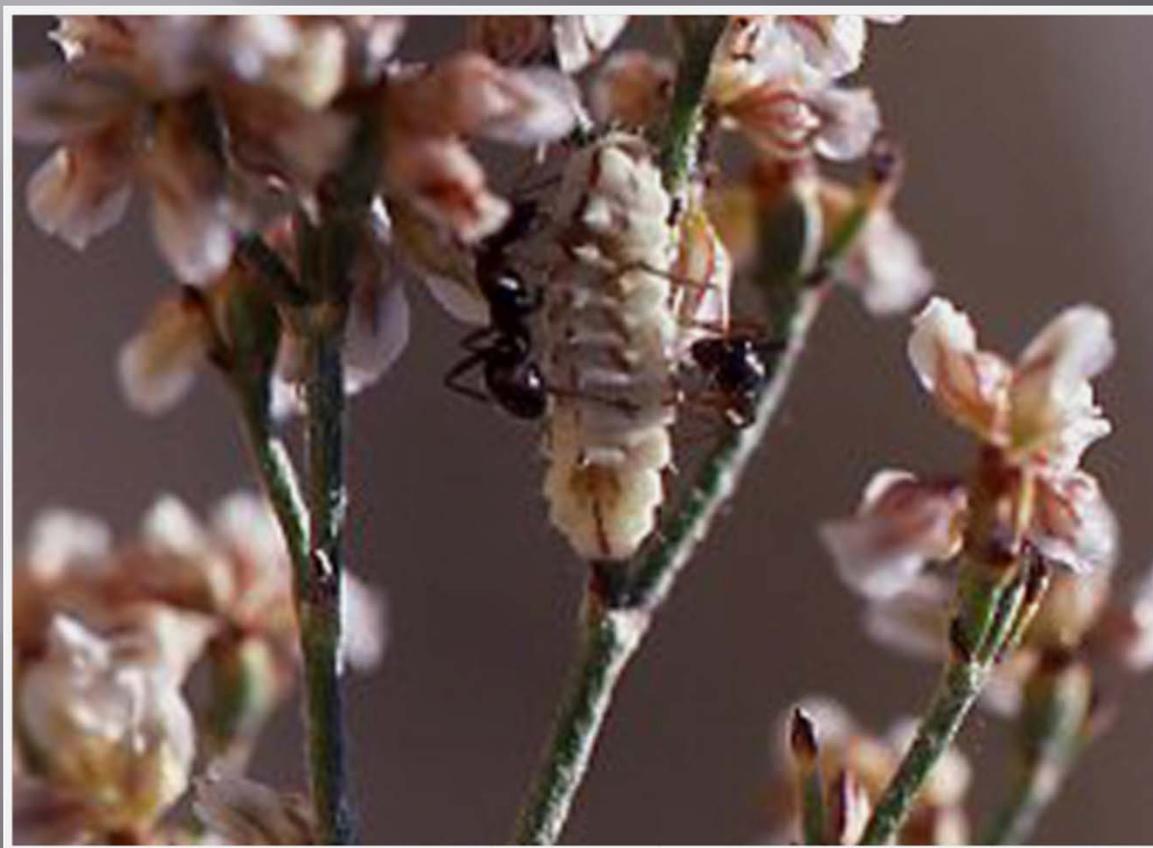
So, then are any of these species pollinators of buckwheats??

- ▣ Maybe if butterfly adults move pollen between anthers and stigma on one plant (if self compatible) or two plants (if self-incompatible).
- ▣ Butterflies could indirectly increase pollination by consuming nectar and forcing other pollinators to move more between plants.

Caterpillar of *Euphilotes rita coloradensis*

Eriogonum effusum

Tended by *Formica* ants – Little Bear, Laramie County, Wyoming



**Euphilotes rita coloradensis –
Eriogonum effusum**

At moisture, Pine Bluff, Wyoming



**Euphilotes rita coloradensis –
Eriogonum effusum**

Eriogonum effusum -- north of Wellington, Larimer County,
Colorado



Euphilotes spaldingi – Eriogonum racemosum

Only host is Eriogonum racemosum -- Photo by Jim P. Brock



Euphilotes centralis – Eriogonum jamesii

Eriogonum jamesii, Walsenburg, Huerfano County, Colorado



Eriogonum jamesii

Walsenburg, Huerfano County, Colorado



Euphilotes ellisi – Eriogonum corymbosum

Eriogonum corymbosum, -- Unaweep Canyon, Mesa County,
Colorado



**Euphilotes ancilla browni –
Eriogonum umbellatum**

Eriogonum umbellatum -- Terry Ranch, Weld County, Colorado



**Euphilotes stanfordorum –
Eriogonum ovalifolium**

West of Mack, Mesa County ,Colorado, May 2014



**Plebejus lupini lutzi –
Eriogonum heracleoides**

Eriogonum heracleoides, Bear River County, Idaho
Uses Eriogonum umbellatum widely in Colorado



**Plebejus cotundra –
Eriogonum arcuatum var. xanthum**

Hall Valley Cirque, Park County, Colorado



Eriogonum arcuatum var. xanthum

Host of *Plebejus cotundra*, endemic species to Colorado



**Plebejus acmon ssp near texanus –
Eriogonum effusum**

Eriogonum effusum, Larimer County, Colorado

Also uses Eriogonum umbellatum, legumes in Colorado



Lycaena heteronea – *Eriogonum umbellatum*



**Callophrys sheridani –
Eriogonum umbellatum**

Eriogonum umbellatum, Red Rocks Park, Jefferson County, Colo



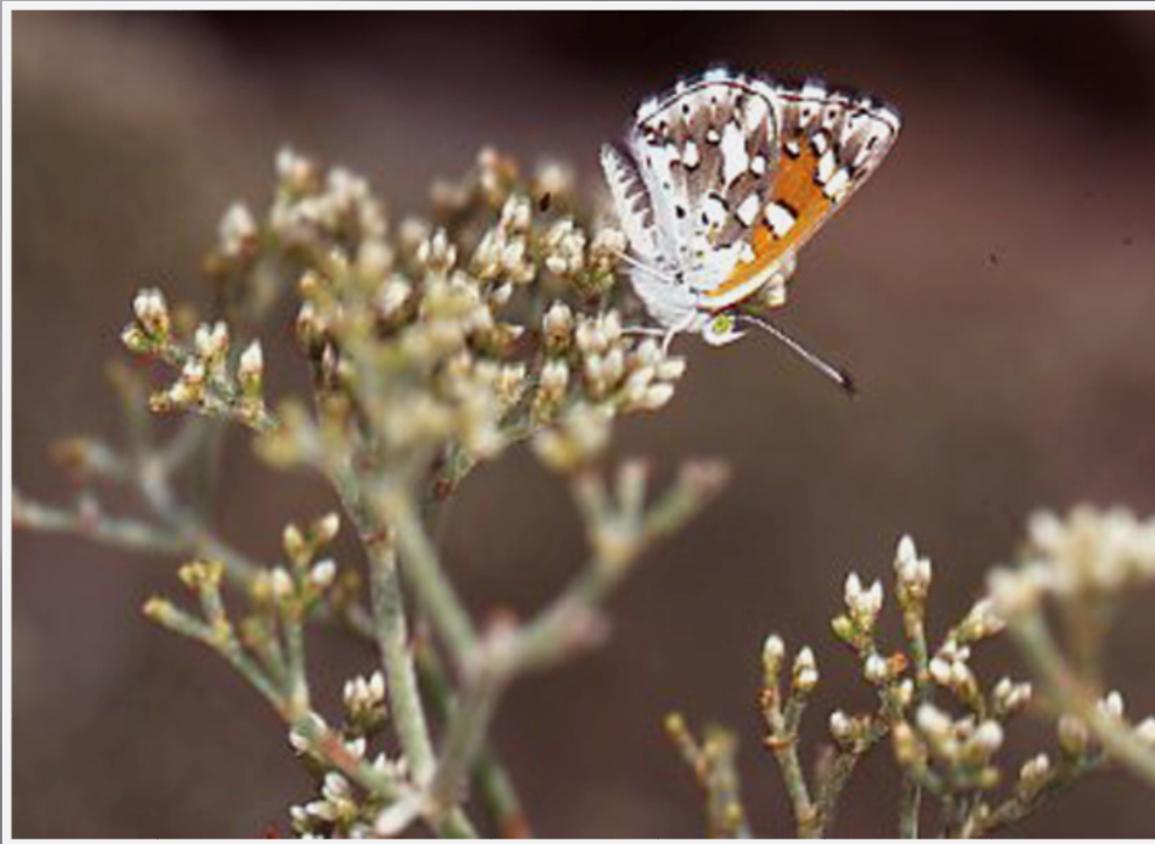
Strymon melinus
Eriogonum, mallows, legumes, etc.

'Polyphagous'



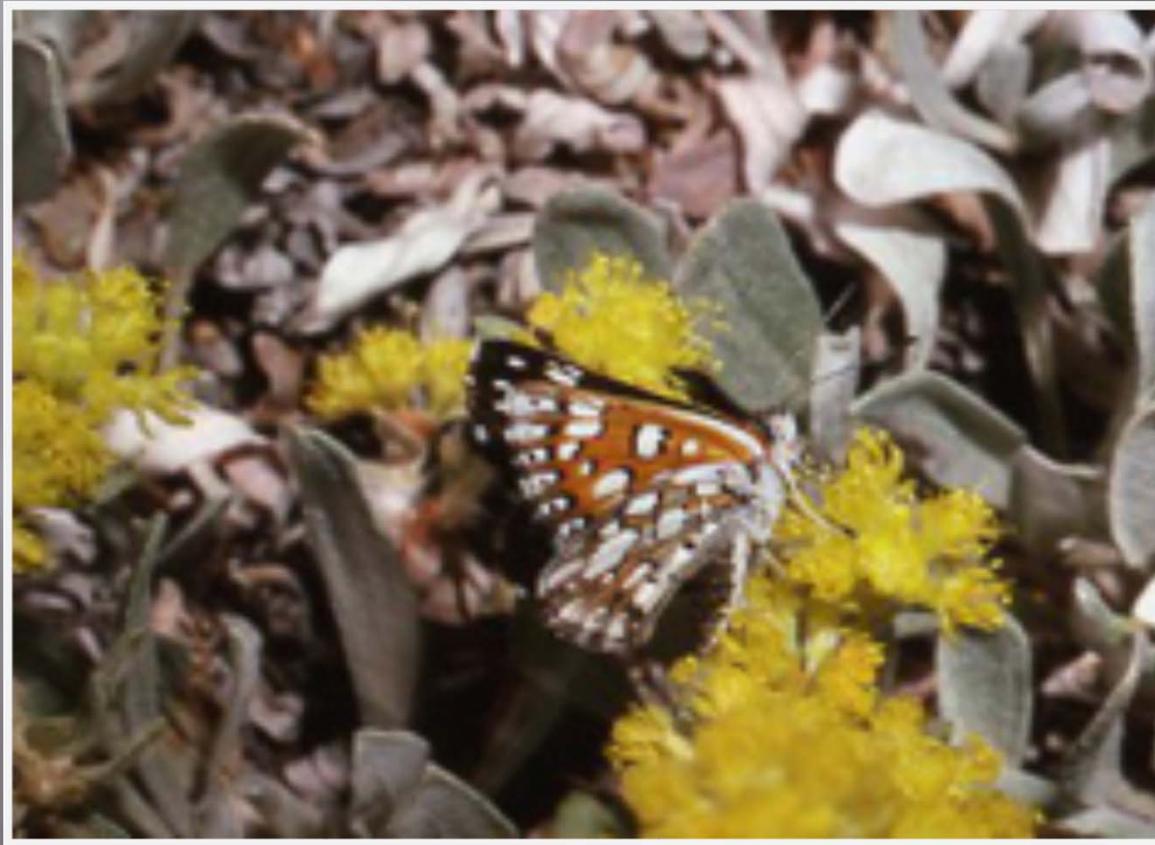
Apodemia mormo mormo
Eriogonum corymbosum

Eriogonum corymbosum, Unaweep Canyon, Colorado



Apodemia 'mormo' pueblo
Eriogonum umbellatum

Eriogonum umbellatum, Horsetooth Mountain Park,
Larimer County, Colorado
Also uses Eriogonum jamesii in Colorado



Other butterfly flower visitors and potential pollinators of *Eriogonum* species in Colorado

- ▣ *Parnassius smintheus* – *E. umbellatum*
- ▣ *Lycaena nivalis* – *E. subalpinum*
- ▣ *Callophrys gryneus* – *E. umbellatum*
- ▣ *C. spinetorum* – *E. subalpinum*
- ▣ *C. affinis* – *E. flavum*
- ▣ *Satyrium californicum* – *E. umbellatum*
- ▣ *S. titus* – *E. umbellatum*
- ▣ *S. behrii* – *E. umbellatum*
- ▣ *S. saepium* – *E. umbellatum*

Eriogonum flower visitors -- continued

- ▣ Plebejus shasta – Eriogonum ovalifolium
- ▣ Plebejus icarioides – Eriogonum umbellatum
- ▣ Plebejus rustica – Eriogonum umbellatum
- ▣ Speyeria edwardsii – Eriogonum flavum
- ▣ Speyeria coronis – Eriogonum umbellatum
- ▣ Hesperia colorado – Eriogonum umbellatum

Parnassius smintheus nectaring at
Eriogonum umbellatum



Plebejus shasta nectaring at
Eriogonum ovalifolium



Speyeria edwardsii nectaring at
Eriogonum flavum

