

## Oeneis alberta daura (Daura Alberta Arctic)

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Ken Kertell,

### Taxonomy

- **Class:** INSECTA
- **Order:** LEPIDOPTERA
- **Family:** NYMPHALIDAE
- **Genus:** Oeneis
- **Scientific Name:** *Oeneis alberta daura* (Strecker, 1894)
- **Common Name:** Daura Alberta Arctic
- **Synonyms:** Chionobas daura Strecker, 1894  
Strecker, 1894
- **Taxonomic Name Source:** Pelham, J. P. 2008. A catalogue of the butterflies of the United States and Canada with a complete bibliography of the descriptive and systematic literature. The Journal of Research on the Lepidoptera. Volume 40. 658 pp. Revised 14 February, 2012.

### Agency Status

- **NMDGF:**
- **Federal Status:**
- **BLM Sensitive:**
- **USFS:**
- **IUCN Red List:** [Not Evaluated](#)
- **Nature Serve Global:** [T2](#)
- **NHNM State:** S1
- **NM Endemic:** NO

### Description

Ferris and Brown (1980) accurately described this species as “reminiscent of a pale, much grayed, miniature edition of *O. chryxus*.” **Comments.** A disjunct colony of Alberta may persist in the Mogollon Mountains (Ca); if so, it would belong to subspecies *Oeneis alberta daura* (Strecker 1894). Arizona’s Whites Mountains (Apache County) are a reliable place to see this critter.

Description courtesy of Steven J. Cary, [Butterflies of New Mexico](#), 2024

### Habitat and Ecology

Little is known about the life history of this subspecies and more research is needed however, it is known that the taxa

flies around late may to early June (Bailowitz and Brock 2022). It is also known that due to climate warming now the taxa has extirpated in southeastern Arizona and is currently only found on the highest slopes or in the highest cienegas in the white mountains of Arizona (Bailowitz and Brock 2022).

However, it can somewhat be expected that this taxa's life history will be similar to its parent species which seems to feed exclusively on bunchgrasses especially *Festuca* (Scott 1986; 1992, Cary and Toliver 2024). This species also likely overwinters as a mature larvae however, it may overwinter as a pupae (Scott 1986; 1992, Cary and Toliver 2024). Some Arctic species also complete two year life cycles and this taxa may also do that; however, there is currently no information to support or disprove this (Scott 1986, Cary and Toliver 2024). Ultimately we need a lot more information about this taxa's life history and ecology.

## Geographic Range:

The White Mountains Alberta Arctic is an isolated subspecies, residing in the White Mountains and San Francisco Peaks of central Arizona (Bailowitz and Brock 2022, Cary and Toliver 2024). As an Arctic, this species is cold adapted. As temperatures warmed in the region since the end of the Pleistocene, the butterfly was abandoned to the higher peaks of the White Mountains and San Francisco Peaks. It is also historically known from the Mogollon Mountains in Catron County, New Mexico. This area is remote and not regularly surveyed (Cary and Toliver 2024), so the species has not been observed there in some time. Therefore, it is unclear if it remains extant in the area. This taxa was described from the Pinaleno Mountains of southeastern Arizona. However, despite several survey attempts, it has not been seen there in over forty five years. It is now thought to be extirpated from the area (Bailowitz and Brock 2022).

## Conservation Considerations:

Due to the large threat posed by climate change its continued existence until 2100 is very unlikely without conservation intervention (Holland 2010). Firstly steps should be taken to conserve all known populations and to try to seek out any more extant populations. From here more research is needed on the taxa's life history and ecology as well as on the threats to it especially with respect to habitat and inbreeding depression. Additionally, monitoring of population size and trends will be crucial to identify extinction risk and properly conserve this butterfly. If conservation actions are warranted they will also need to be researched however, habitat restoration targeting already known populations in order to increase patch size is a logical first step as it will make populations more resilient and reduce the threat of inbreeding depression.

## Threats:

More research is needed on the threats to this butterfly however, it has several significant threats which put its continued survival in jeopardy. Firstly, as an arctic this taxa is highly adapted to cold weather conditions with most of its distribution occurring in Canada and the northern United States and just a few mountain top populations remaining southward (GBIF.org 2024). This subspecies specifically is at the southern extreme of its range and is the most threatened by climate change. Many butterflies respond to climate change by moving to higher elevations or latitudes however, this is not an option for this taxa where there are no higher elevation habitats to shift to and as a result just a small amount of warming could push this taxa into thin air driving it to extinction (Forister *et al.* 2010, Holland 2010, RÅdder *et al.* 2021). This seems to have already occurred with the populations just further south in the Pinaleno Mountains (Bailowitz and Brock 2022). As such the likelihood that this butterfly survives until 2100 is very poor as the western United States is expected to continue to get hotter and drier over the next century (Cook *et al.* 2009, Cook *et al.* 2015, Williams *et al.* 2022). Phenological mismatch with the host plant or nectar sources is also a potential consequence of climate warming which could easily extirpate one of the two known populations (Singer and Parmesan 2010, Patterson *et al.* 2019). Although at this time the specific host plants for this taxa are unknown so it's hard to estimate how much of a threat this actually may pose.

Additionally wildfire may pose a serious threat to this species both the absence of it and catastrophic wildfires. As catastrophic wildfires could result in large amounts of direct mortality whereas fire suppression could choke out the bunch grasses this taxa relies on as more shrubs and trees move in. Additionally, invasive grass species may alter the fire regimes of these meadows and otherwise be able to outcompete the native bunch grasses this taxa relies on. This butterfly is also likely threatened by inbreeding depression as this subspecies is very isolated from any other Alberta Arctic (*Oeneis alberta*) (Cary and Toliver 2024, GBIF.org 2024). Inbreeding depression can result in these isolated populations when slightly deleterious alleles accumulate in small populations, reducing the likelihood of population persistence (Hedrick 1994, Lynch *et al.* 1995). The accumulation of deleterious alleles and reduction in heterozygosity have been shown to reduce survival rates at several important life stages in butterflies, including those that have an effect on population stability and persistence, even after just one generation of mating between full-siblings (Saccheri *et al.* 1998, Nieminen *et al.* 2001). A reduction in fitness resulting from the loss of genetic diversity significantly increases the risk of extinction when populations are subject to environmental stress. Saccheri *et al.* (1998) found that microclimatic conditions combined with inbreeding caused the extinction of a checkerspot population in Finland, while Singer and Ehrlich (1979) found a combination of drought, fragmented habitat, and low dispersal rates contributed to the extinction of several butterfly populations in California. However, more research is needed on this subject as the current genetic health of this subspecies is unknown.

This taxa also has a single host plant and host specificity has been shown to be a key indicator of extinction risk in butterflies as with only one host plant any declines or threats facing the host plant will also result in butterfly declines (Kotiaho *et al.* 2005, Palash *et al.* 2022, Forister *et al.* 2023). On top of that this subspecies is univoltine which puts it at a higher risk of extinction as it reduces the subspecies dispersal range and increases its risk of phenological mismatch making the taxa less adaptable to and more threatened by climate change (Eskildsen *et al.* 2015, Patterson *et al.* 2019, Forister *et al.* 2023).

## Population:

The population size and trend are not known for this species. Determination of population size and monitoring of population trends is necessary to ensure the population is stable. Especially as several widespread, relatively common species of butterfly are in decline across the American west (Forister *et al.* 2021).

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## More Information

