Phyciodes cocyta apache (Apache Northern Crescent)

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Taxonomy

- **Class**: INSECTA
- **Order**: LEPIDOPTERA
- **Family**: NYMPHALIDAE
- **Genus**: Phyciodes
- **Scientific Name**: *Phyciodes cocyta apache* J. Scott & Opler, 2017
- **Common Name**: Apache Northern Crescent
- **Synonyms**:
- **Taxonomic Name Source**:Scott, J.A. and P.A. Opler. 2017. Another endemic butterfly in the Sacramento Mountains of Southern New Mexico, with a review of those endemics. Pages 18-22 In: Scott, J. A., K. E. Davenport, N. G. Kondla, P. A. Opler, and M. S. Fisher. New taxa and geographic variation of western North American butterflies: based on specimens in the C.P. Gillette Museum of Arthropod Diversity, Colorado State University. Papilio (New Series) #26:1-54.

Agency Status

- **NMDGF**:
- **Federal Status**:
- **BLM Sensitive**:
- **USFS**:
- **IUCN Red List**: Not Evaluated
- **Nature Serve Global**: TNR
- **NHNM State**: S1
- **NM Endemic**:YES

Description

Northern Crescent is very similar to Pearl Crescent, but upper surfaces have the median orange patches more intact and less interrupted by dark transverse lines. Females are quite dark. Because Northern Crescents frequently have orange antennae, they can also be difficult to separate from the Great Plains Crescent (P. orantain). Perhaps “tharos complex” will have to do for most observers! **Comments.** Subspecies *Phyciodes cocyta selenis* (W. Kirby) was mentioned by Scott (1998) in his revision of Phyciodes as coming from the mountains of Colfax, Rio Arriba, Sandoval, and Union Counties. Populations from the middle and western counties may be that subspecies or something else. The unique population in the Sacramento Mountains (Li,Ot) was recently described as *Phyciodes cocyta apache* J. Scott &

Opler 2017.

Description courtesy of Steven J. Cary, Butterflies of New Mexico, 2024

Habitat and Ecology

This butterfly utilizes cold and wet montane meadow habitats (Cary and Toliver 2024). Very little biological or ecological information is known about this subspecies. However, the original description stated that the larvae likely feed on a species of Aster which â€œgrows on north-facing slopes and along mostly-semi-shaded gulches/creek banksâ€•. The species of plant this may refer to remains unknown (Scott *et al.* 2017). In Colorado, larvae of the parent species utilize various Aster species, including *A. laevis* and *A. foliaceus* (Scott *et al.* 2017). There are eight species recorded from the Sacramento Mountains and could be potential host plants; these are *A. chilensis, A. ericoides, A. falcatus, A. fendleri, A. hesperius, A. laevis, A. novae-angliae,* and *A. wootonii* (SEINET 2023). The Northern Crescent is univoltine with extreme flight dates ranging from May 12th to August 26th (Cary and Toliver 2024). Adults regularly visit flowers in meadows, including Dogbane (*Apocynum spp.*), Fleabane (*Erigeron spp.*), and White Clover (*Trifolium repens*)(Lotts and Naberhaus 2023).

Geographic Range:

This butterfly is endemic to the Sacramento Mountains Complex in southern New Mexico; this also represents the southern extreme of the distribution of the parent species (Scott *et al.* 2017, Cary and Toliver 2024). The Sacramento Mountain Complex includes three adjacent mountain ranges; the Sacramento, Sierra Blanca, and Capitan Mountains. This species is found in all three. In New Mexico, the parent species, the Northern Crescent (*Phyciodes cocyta*), typically lives between 2,225 and 2,805 m (7,300 to 9,200 ft)(Cary and Toliver 2024).

Conservation Considerations:

There are no known conservation actions being taken for this butterfly and no known prior conservation assessments of this butterfly either. The most pressing conservation action needed for this taxa is undoubtedly more research. Figuring out the specific species of host plant used by this taxa as well as rounding out other life history information will be crucial for its effective conservation. Additionally, determining the number and extent of colonies as well as population size and trend will be extremely useful for preserving this butterfly. Otherwise protecting meadow habitats in the Sacramento Mountains and trying to restore healthy natural forest cycles will be the most beneficial conservation action for this taxa. With small isolated populations there may need to be more direct conservation in terms of crossing genetic lines from other populations in order to combat inbreeding depression and keep these populations viable.

Threats:

As a montane meadow specialist, endemic to the Sacramento Mountains in southern New Mexico, the main threat to this butterfly is climate change. The Sacramento Mountains sit at the southern extreme of the parent species range and thus the warmest portion of its range. It has been documented that many butterfly species respond to climate change by moving to higher elevations or higher latitudes. However, as this butterfly is isolated in the Sacramento, Sierra Blanca and Capitan Mountains this is not an option and climate change threatens to push this taxa into thin air (Forister *et al.* 2010, Holland 2010, Rodder *et al.* 2021). As the western United States is expected to continue to get hotter and drier over the next century things are looking dire for this mountaintop resident (Cook *et al.* 2009, Cook *et al.* 2015, Williams *et al.* 2022). Climate change also threatens this subspecies with phenological mismatch with both host and nectar sources which could result in steady declines in population numbers or in the event of an extreme phenological mismatch the extirpation of entire populations (Singer and Parmesan 2010, Patterson *et al.* 2019).

Another credible threat to this subspecies is fire, both the absence of and presence of it. Fire suppression has been a key component of forest management in this area since the early 1900s this has severely reduced the meadow habitat that this butterfly relies on as these meadows were historically maintained by small fires (USFWS 2023). However, this fire suppression has now resulted in dense conifer growth and increased fuel loads (Kaufmann *et al.* 1998). This has resulted in at least nine large catastrophic wildfires in the last fifty years burning over 34,000 acres of land in the Sacramento Mountains (Kaufmann *et al.* 1998). These large fires could easily knock out this subspecies' host plant causing mass mortality, in adults, larvae, or eggs and easily extirpating the remaining colonies (Holland 2010).

Pesticide use has also likely adversely impacted this subspecies across its known range (Holland 2010). In 1983 and 1984 during June and July when this taxa is active and overlapping with its flight period carbaryl pesticides were sprayed using aerial application over 240,900 acres of the Sacramento Mountains at elevations between 1828 and 3353 meters (6,000 and 11,000 feet), to control an outbreak of Western Spruce Budworm (*Choristoneura freemani*)(Bennett and Linnea 1985). Most of the inhabited areas and waterways were instead sprayed with *Bacillus thuringiensis* (*Bt*). In another example, in 2007, the Village of Cloudcroft again sprayed *Bt var. kurstaki*, which targets lepidopterans, to control a Janet Fir Looper (*Nepytia janetae*) outbreak (Holland 2007).

This subspecies is also potentially quite threatened by inbreeding depression although little is known about the specific population level dynamics of this butterfly. However, the Sacramento mountains have been isolated from the Sangre de Cristos which represent the closest population of Northern Crescent for around 8,000 to 10,000 years and at this point there is likely very little to no genetic exchange between these two populations (Holland 2010). Additionally, the meadow habitats that this taxa relies on have been quite separated now due to fire suppression and as a result this butterfly is likely existing in a metapopulation dynamic with larger meadows being the sources and smaller meadows serving as sinks although likely many of these meadows are now completely isolated from one another due to fire suppression and localized extirpations. In these isolated populations inbreeding depression can start to arise where slightly deleterious alleles can accumulate in these 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). Nieminen *et al.* (2001) also suggests that inbreeding depression may pose an even greater problem in populations currently experiencing rapid habitat fragmentation but with minimal inbreeding in the past. 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.

Recreational disturbances are also a potential threat to this taxa. As the Sacramento Mountains are the site of many recreational activities including camping, hunting, hiking, mountain biking, and off-highway vehicle (OHV) use. Additionally, grazing by cattle historically and now by elk and feral horses may also be a threat to this butterfly as elk and feral horses are rampant in the Sacramento Mountains however, currently the effect of grazing on this subspecies is unknown and requires further research (USFWS 2004)

Population:

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

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More Information