

SPECIES FACT SHEET

Common Name: Johnson's Hairstreak, Mistletoe Hairstreak, or Brown Mistletoe Hairstreak

Scientific Name: *Callophrys johnsoni* (Skinner 1904) (formerly *Mitoura johnsoni* or *Loranthomitoura johnsoni*)

Phylum: Arthropoda

Class: Insecta

Order: Lepidoptera

Family: Lycaenidae

OR/WA BLM and FS Region 6 Units where Suspected or Documented:

Oregon

The species is documented from BLM lands: Salem District near Dorm Peak; Eugene District in Coburg Hills; Coos Bay District near Tioga; and Medford District near Moon Prairie. Also found on multiple sites on the: Willamette NF; Deschutes NF; Umpqua NF; Rouge River/Siskiyou NF; Fremont-Winema National Forests; Umatilla NF; and Wallowa-Whitman NF.

Washington

Johnson's hairstreak has been documented from the Olympic National Forest, Mt. Baker-Snoqualmie National Forest, and the Gifford Pinchot National Forest.

Technical Description:

Larval:

Green or yellowish-olive with red, green, yellow, or white markings. Back has strongly raised chevrons creating a sawtooth appearance. Average, full-grown length is $\frac{3}{4}$ inch. Has 5 instars (Allen et al. 2005).

Indistinguishable from Thicket Hairstreak as a caterpillar. Hibernating pupae are dark brown (Scott 1986).

Adult:

1 – 1 $\frac{3}{8}$ " (25-35mm)

Upperside of wing: males are chocolate-brown except orange-brown by tail, females are red-brown or orange except brown on margins and near tail.

Underside of wing: both are brown with a thin white postmedian line bordered with black on the inside edge, hindwing near tail has a few black dots and bluish and orange scales.

Life History:

Eggs are laid on the host plant, conifer mistletoe (genus *Arceuthobium*), caterpillars feed on all exposed parts of the plant. Chrysalids hibernate in the mistletoe mass.

Caterpillars found on leaves of host plants April – October (Allen et al. 2005). Caterpillars secrete a sugary solution which ants utilize. In return the ants help protect the caterpillar from predators.

The host plants are dwarf mistletoes (*Arceuthobium campylopodum*) and other mistletoes (including *Arceuthobium tsugense*).

Adults sip flower nectar (including Oregon grape, Pacific dogwood, ceanothus, pussy paws, and *Rubus* species) and visit mud (Pyle 2002; Pyle 1981).

Males typically perch on treetops or hilltops (observed in California) to await females (Scott 1986).

On the Wing late February to early September, peaks in May and August. One flight in north of range and at high altitude, late May – mid July. Two flights in lowland California, late February – March and July – August (Scott 1986 and Glassberg 2001).

Considered the only old-growth obligate butterfly (Pyle 2002).

Some point to the importance of this species in helping to keep *Arceuthobium* sp. in balance and suggest that the Johnson's Hairstreak is the major herbivore in the forest canopy (McCorkle pers. com. 2005).

Range, Distribution (Current and Historic), and Abundance:

Historic - Southern British Columbia, south through eastern and western Washington, Oregon, and western Idaho to central California.

In British Columbia it has been found on SE Vancouver Island and Lower Fraser Valley east to Hope. In Washington it has been found in Olympic and Mt. Rainer National Parks and at a few other western Washington locations. In Oregon it has been found sparsely in the Cascades, Coast Range, Siskiyou Mountains, Blue Mountains and Wallowa Mountains (Pyle 2002).

It is thought that this butterfly inhabited areas throughout much of old-growth coniferous forests of the Pacific Northwest. Probably occurred throughout much of Western Washington old growth prior to 1900 (Pyle 1989).

There are 42 Washington records for Johnson's hairstreak (Hinchliff 1996). 41 of the 42 WA records are from $\leq 2100'$ elevation - they range from 0-2100' -

and the outlier is from 2700' from southern Skamania County (Potter pers. com. 2005).

There are 52 records in Oregon and most are from >2,000 feet, with the majority from the 3500 +/- foot elevation, and a few from as high as 5 and 6000 feet (Hinchliff 1994; Ross pers. com. 2005).

Current - The current range of this butterfly is uncertain. The species is considered to be very localized and scarce with few "big" years. There is evidence of decline in range. All King County Washington records are from 1891 – 1969, with no sightings since (Pyle 2002). It is believed to be extirpated from Stanly Park BC due to Btk spraying.

Most Washington records are old, they range from 1891 to 1995; however, most are pre-1970 - when there was considerably more low elevation old growth forests. (Hinchliff 1994; Ann Potter pers. com. 2005). Most records for Oregon are pre 1980 (Hinchliff 1994) but there have been some new sightings (Ross pers. com. 2005). Recently a population of Johnson's Hairstreak has been discovered in mostly old growth hemlock near Larch Mountain in eastern Multnomah Co., Oregon.

Habitat Associations:

This butterfly depends on coniferous forests that contain mistletoes of the genus *Arceuthobium*. The mistletoes occur mainly on western hemlock and occasionally true firs (Larsen et al. 1995).

Peak conditions for this butterfly exist in old-growth and late successional second growth forests. Younger forests that contain dwarf mistletoe may also have the potential to support populations of the Johnson's hairstreak.

Elevation ranges from sea level to 6000'. Many sightings have been at lower elevations in Washington and higher elevations in Oregon but all are associated with coniferous forests.

Species typically spends much of its time in the top of the forest canopy and thus may contribute to the rarity of sightings. (Scott 1986; Pyle 2002)

Threats:

Logging of old growth forests - Much old growth forest of the Pacific Northwest has been logged over the last 100 years. The Johnson's hairstreak is a late successional associated species, in part because of their reliance on *Arceuthobium* mistletoes. Timber harvesting practices have regularly been designed to rid areas of this mistletoe.

Btk - Btk (*Bacillus thuringiensis* var. *kurstaki*), a Lepidoptera-specific insecticide, has become the pesticide of choice to treat defoliators in western

forests (Wagner and Miller 1995). Btk is a bacterium, which when ingested, is lethal to butterfly and moth larvae.

In the 1990's Btk was applied in large-scale, aerial treatments to control spruce budworm (*Choristoneura occidentalis*) in the Washington and Oregon Cascades. Continued use of Btk to control spruce budworm and other species could significantly reduce Johnson's hairstreak populations.

Herbicides - Larsen et al. (1995) pointed out that herbicides being applied to flowering plants that adults visit could limit Johnson's hairstreak populations.

Hybridization with the Thicket Hairstreak (*Callophrys spinetorum*) - David McCorkle has done sporadic monitoring over the last 30 years. The monitoring indicates that the Thicket Hairstreak *Callophrys spinetorum* is increasing its frequency in the Oregon Cascades. Thus it seems that a situation similar to that of the spotted owl and barred owl is occurring with the Thicket Hairstreak taking over habitat of the Johnson Hairstreak. There is evidence of limited hybridization (McCorkle pers. com. 2005).

Conservation Considerations:

Late successional and old growth forests are important to the survival of Johnson's hairstreak. Maintain forests composed of varied age classes and conifer species (Larsen et al. 1995). Avoid the use of Btk in forests where this butterfly occurs (Larsen et al. 1995). Do not apply herbicides to flowering plants that may be nectar sources for this butterfly.

Recently an apparently pure population of Johnson's Hairstreak has been discovered in mostly old growth hemlock near Larch Mountain in eastern Multnomah Co., Oregon. It was sampled (adults) extensively by A. Warren in 2004 and McCorkle completed limited follow up monitoring of caterpillars. This site may be isolated from access by the Thicket Hairstreak from the east. This is a prime site for management of the old growth biotic community (McCorkle pers. com. 2005).

Surveys could help determine the extent and status of Johnson's hairstreak especially in areas where management activities may negatively impact this butterfly. However, it is difficult to accurately assess populations of this butterfly as the species resides in the forest canopy and only occasionally comes to the ground to nectar on flowers.

Other pertinent information (includes references to Survey Protocols, etc):

Conservation Status

Global Rank: G3G4

National Rank: Canada (N1N2 – Uncertain status, critically imperiled to imperiled), United States (N3N4 – Uncertain status, imperiled to vulnerable of extirpation)

State Rank: British Columbia (S1S2 - Uncertain status, critically imperiled to imperiled), California (S3S4 - Uncertain status, vulnerable of extirpation to apparently secure), Oregon (S2? - Imperiled). Washington (S2S3 – Uncertain status, imperiled to vulnerable of extirpation)

The Oregon Natural Heritage Program lists the Ochoco, Blue and Willowa Mountains, Coast Range, East Cascades, Klamath Mountains, West Cascades and Crest and Willamette Valley as ecoregions.

BLM Status: Bureau Sensitive Species

USFS Status: No status

Survey protocols

Dave McCorkle, Lepidopterist, Corvallis OR is one of the few people who have surveyed for these butterflies, and could be consulted for further information on survey methodology.

ELECTRONIC ATTACHMENTS:

- (1) Key to Identification of the Species**
- (2) List of References**

Preparer: Scott Hoffman Black and Logan Lauvray of the Xerces Society, Portland OR

Date Completed: September 28, 2005

Key to Identification of the Species

Butterfly field guides (such as Pyle 2002) are probably the best source of pictorial “keys”. It is best to refer to a butterfly guide when trying to identify this species.

1 – 1 3/8” (25-35mm)

Upperside of wing: males are chocolate-brown except orange-brown by tail, females are red-brown or orange except brown on margins and near tail

Underside of wing: both are brown with a thin white postmedian line bordered with black on the inside edge, hindwing near tail has a few black dots and bluish and orange scales.



Similar species:

Thicket Hairstreak (*Callophrys spinetorum*) – is typically smaller than Johnson's Hairstreak. Similar underside, but Thicket's upperside is steel blue. Johnson's Hairstreak lacks black edging on outside of postmedian white line and has fewer postmarginal black points. Also, Johnson's lacks a forward wing cell-end bar. (Glassberg 2001; Opler 1999)

Cedar Hairstreak subspecies (*Callophrys gryneus nelsoni*) – is smaller than Johnson's Hairstreak. *C.g. nelsoni* postmedian line is not complete and it has a lilac tint on the underside. Can also be more redder above and below. (Pyle 1981; Scott 1986)

References

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Warren, Andrew D. 2005. Lepidoptera of North America 6, Butterflies of Oregon: Their Taxonomy, Distribution, and Biology. Department of Zoology, Oregon State University, Corvallis, Oregon.

Idaho State University's Idaho Museum of Natural History website on *Callophrys johnsoni*:
<http://imnh.isu.edu/digitalatlas/bio/insects/butrfly/famlyc/cajof.htm>

NatureServe Explorer:
<http://www.natureserve.org/explorer/servlet/NatureServe?searchName=Callophrys+johnsoni>

United States Department of Agriculture Forest Service / Fremont-Winema National Forests website on bug ecology:
<http://www.fs.fed.us/r6/frewin/ecology/bugs/index.shtml>

United States Geological Survey / Fort Collins Science Center Online website on canopy herbivores:
http://www.fort.usgs.gov/resources/education/arthropods/canopy_herbiv.asp

United States Geological Survey / Fort Collins Science Center Online website on systematic compendium / section on Family Lycaenidae:
http://www.fort.usgs.gov/resources/education/arthropods/systematic_compendium.asp

United States Geological Survey / Northern Prairie Wildlife Research Center website on *Callophrys johnsoni*.
For the United States:
<http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/usa/300.htm>

For California:

<http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/ca/300.htm>

For Idaho:

<http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/id/300.htm>

For Oregon:

<http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/or/300.htm>

For Washington:

<http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/wa/300.htm>

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