



The Taxonomic Report

OF THE INTERNATIONAL LEPIDOPTERA SURVEY



A new subspecies of *Colias gigantea* from arctic Alaska (Pieridae)

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Abstract: A new subspecies of *Colias gigantea* Strecker from the 'north slope' of Alaska is described.

Additional key words: *inupiat*, *philodice*

INTRODUCTION

Field work in northern Alaska, United States of America has revealed that northern populations of *Colias gigantea* along the Dalton Highway are sufficiently distinct from the more southerly populations to merit recognition as a named subspecies.

Colias gigantea inupiat Harry, new subspecies

Description

Males: Forewing length is 20 to 25 mm. Dorsal surfaces: Black border is medium to wide, black spot at end of forewing cell is reduced to absent. The hind wing discal cell spot is white to light orange. Basal dark overscaling is more extensive than *C. g. gigantea*. Ventral surfaces: The inner marginal area of forewing is yellow, occasionally becoming slightly lighter yellow. Hind wing with more greenish over-scaling and not as yellow as interior Alaska *C. gigantea*. Discal spot is red or white with red ring. Satellite spot is present or absent. No submarginal brown spots on hind wing.

Females: Forewing length 23 to 26.5 mm. Dorsal surfaces: Ground color is creamy yellow to yellow. There is no border to a slight border, rarely a somewhat extensive border. Hind wing discal spot is orange. Basal area overscaling is more extensive than interior Alaska *C. gigantea*. Ventral surfaces are as in males.

Type Specimens

Holotype male: Alaska, Mile 323 Dalton Hwy, 68°59.01'N 148°49.94'W, 365 meters elevation, 28 June 2003 (Plate 1). Paratype (allotype) female: same location as holotype, 12 July 2006 (Plate 1). Paratypes: Mile 323 Dalton Hwy, (1M2F) 28 June and 2 July 1999; (2M) 2-3 July 2001; (1M) 28 June 2002; (18M6F) 28 June-3 July 2003; (5M3F) 28 June-1 August 2005; (1M) 3 July 2006. Mile 353 and Mile 356 Dalton Hwy, Sagwon Hills, 305 meters elevation, (1M) 4 July 1999; (7M1F) 3-9 July 2006. Mile 381 Dalton Hwy, 34 miles south of Deadhorse, 90 meters elevation, (1M1F) 10 July 1999; (3M) 24 June-15 July 2005; (2M) 9 July 2006.

The holotype, allotype, and 5 males will be deposited in the Florida State Collection of Arthropods, Gainesville, Florida, USA. Ten males and 5 females will be retained in the collection of the author. Ten males and 4 females are in the collection of Robert Worthy, Caterham, Sussex, England. Two males and 1 female are in the Sagamihara City

Museum, Sagami-hara, Kanagawa, Japan. Four males and 2 females will be deposited in the Monte Bean Museum, Brigham Young University, Provo, Utah, USA. Four males and 2 females will be deposited in the Smithsonian Institution, Washington, D.C. USA. Four males and 2 females will be deposited in the California Academy of Sciences, San Francisco, California, USA.

Plate 1. Holotype male and allotype female of *Colias gigantea inupiat* Harry, 2007 with comparison images of *C. philodice*. Scale is life size. J. Harry photographs

Holotype male



Allotype female



Female *C. philodice* dorsum



Male *C. philodice* venter



Etymology

This subspecies is given the name *inupiat* in honor of the native people that inhabit the north slope of Alaska (Langdon, 2002). The suggested common name is Inupiat Sulphur.

Diagnosis

Colias gigantea inupiat is primarily distinguished from the nominate subspecies by its smaller size, more greenish ventral hindwing and yellow females. The males are 15 percent smaller than the *gigantea* of interior Alaska. The largest *inupiat* males are equal in size to the smallest interior Alaska *gigantea*. The females are 12 percent smaller than the *gigantea* of interior Alaska. None of the females of *inupiat* are equal in size to the smallest interior Alaska *gigantea* females. Ferris (1987) mentions this small *gigantea* from the north slope of Alaska.

DISCUSSION

C. gigantea inupiat is known from the vicinity of the Dalton Highway in an area commonly known as the 'north slope' of Alaska. This refers to an area of northernmost Alaska between the Brooks Range and the Arctic Ocean (Figure 2, page 4).

The Mile 323 site is the primary location accessible by road for *inupiat* (Figure 1). This site is a 4 mile stretch along the Dalton Highway, the Trans-Alaska Pipeline, and valley bottom of the Sagavanirktok River. The pipeline is above ground throughout this stretch. The pipeline berm provides access through the wet areas that *inupiat* prefers and also provides nectar source flowers for adults. This taxon is much easier to obtain at this site than any other along the Dalton Hwy. It has been collected at various locations from Mile 323 north to about Mile 381 and there is probably a continuous colony of *inupiat* along the Sagavanirktok River from Mile 320 to Mile 385. The location at Mile 353 is not along the Sagavanirktok River. It is in bogs along small streams in the Sagwon Hills.

Figure 1. Habitat of *Colias gigantea inupiat* at Mile 323 Dalton Highway. J. Harry photograph

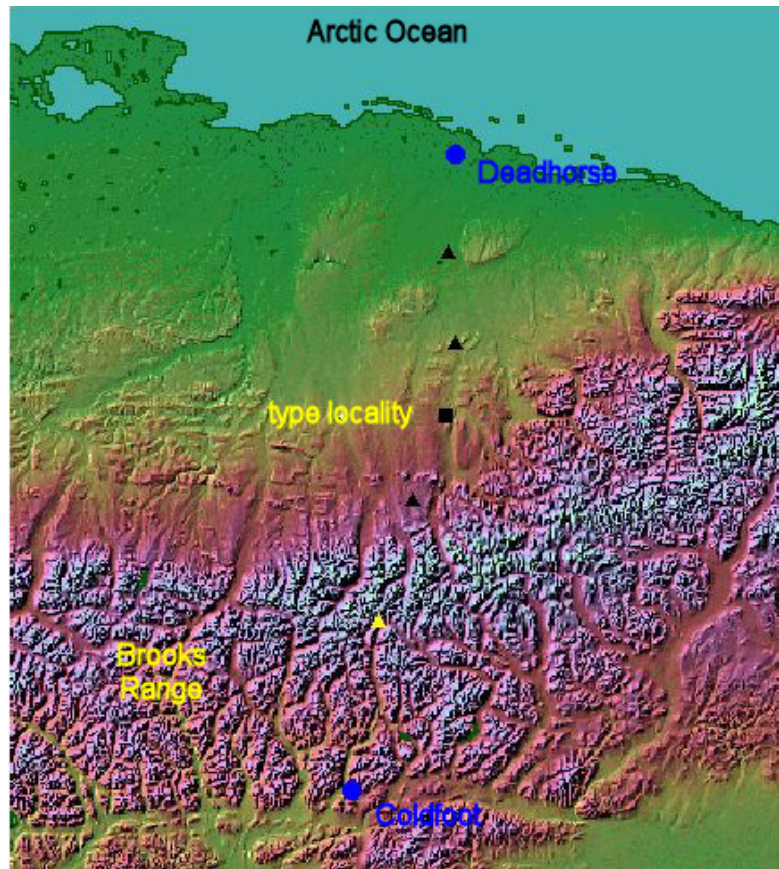


The area from Pump Station 2 (Mile 359) northward certainly contains *inupiat* but it is not as common as at Mile 323. This author has collected on the north slope during 10 different years and some years for one to two months so is quite familiar with the butterfly fauna. *C. g. inupiat* has also been found west of Mile 274 which is in the Galbraith Lake area. Populations probably inhabit most of the boggy areas of the entire north slope.

Colias gigantea inupiat females have been observed to oviposit on *Salix lanata* L. Larvae have been reared to diapause on this *Salix*. This taxon probably also uses other brushy *Salix* species. There is a colony of *gigantea* from Mile 222 to 227 of the Dalton Hwy (yellow triangle in Figure 2). This location is 50 miles north of Coldfoot along the Koyukuk River in the Brooks Range. This is a southward drainage taiga location that is directly connected to the interior. The climate here is more like the interior than the north slope, being warmer in the summer and with a

longer growing season. Also, the butterfly fauna in the Coldfoot and Wiseman area is similar to Fairbanks. The *gigantea* at this location are more similar to *inupiat* than the interior *gigantea*. The males average only 1.2 mm larger in forewing length than *inupiat*. The females average only 0.4 mm larger than *inupiat*, but there are two that are of interior Alaska size. This is surprising since it was expected that they would be similar to the interior *gigantea*. All of the females in the authors collection are white, so this population is different than *inupiat*.

Figure 2. Satellite image (Landsat 7 false color) of Alaska ‘north slope’ showing topography, major ecosystems and some known locations (triangles) of *Colias gigantea inupiat* including the type locality (square)



Colias philodice Godart is sympatric with *inupiat* along the Dalton Highway. Some of the *philodice* males are similar to *inupiat* males. Many of the *philodice* on the north slope do not have the ventral hind wing submarginal brown spots, some of the males have medium wide borders and the ventral hind wing is green like *inupiat*. The ventral forewing area at the inner margin of *philodice* males is white or very light yellow. They can be distinguished from *inupiat* by this feature. The females of *philodice* are white so are easily distinguished from *inupiat*. However, there is rarely a very light yellow female *philodice*, but they are still easily distinguished from *inupiat*.

ACKNOWLEDGMENTS

Thanks are extended to Dr. David Murray, Herbarium at University of Alaska Museum, Fairbanks, Alaska for determination of *Salix lanata*. Thanks also to Robert Worthy and Norbert Kondla for reviewing the manuscript and providing helpful suggestions.

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Zeitschrift/Journal: [The Taxonomic Report](#)

Jahr/Year: 2007

Band/Volume: [6-7](#)

Autor(en)/Author(s): Harry Jack

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