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A NEW SUBSPECIES OF *BOLORIA EUNOMIA* (NYMPHALIDAE) FROM WYOMING¹

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SIX SUBSPECIES of *Boloria eunomia* (Esper) are currently recognized (dos Passos, 1964). Based upon appearance (dorsal dark markings and ground color), these six subspecies can be broadly separated into three groups: a light group in which the dark markings are reduced and the ground color is tawny or yellow-brown; a dark group in which the dark markings are extensive, frequently giving a dark dusted aspect, and the ground color is orange-brown; and a single subspecies *denali* (Klots) which is quite pale and distinct. The light group consists of *caelestis* (Hemming), and *triclalis* (Hubner); the dark group is composed of *dawsoni* (Barnes and McDunnough), *laddi* (Klots) and *nichollae* (Barnes and Benjamin). There is considerable evidence, based upon unpublished reports from collectors, that *nichollae* is simply a melanic high altitude form of *dawsoni*. Results of collecting by Ferris in Alberta in 1970 bears this out. A cline was observed with altitude when *eunomia* were collected along a slope which ranged from a river bottom willow bog (elevation 6000' approx.) to barren ridges above timber line (elevation 8000' approx.). The higher altitude specimens are very dark and distinct.

The type localities and publication dates for the taxa cited are shown below:

caelestis T. L. Hall Valley, Park Co., Colorado, Hemming, 1933.

denali T. L. Mt. McKinley National Park, Alaska, Klots, 1940. (1940a).

triclalis T. L. probably Labrador, Hubner, 1821.

dawsoni T. L. Hymers, Ontario, Canada, Barnes and McDunnough, 1916.

laddi T. L. Lewis Lake, Albany Co., Wyoming, Klots, 1940. (1940b).

nichollae T. L. "Rocky Mtns." [Alberta implied], Barnes and Benjamin, 1926.

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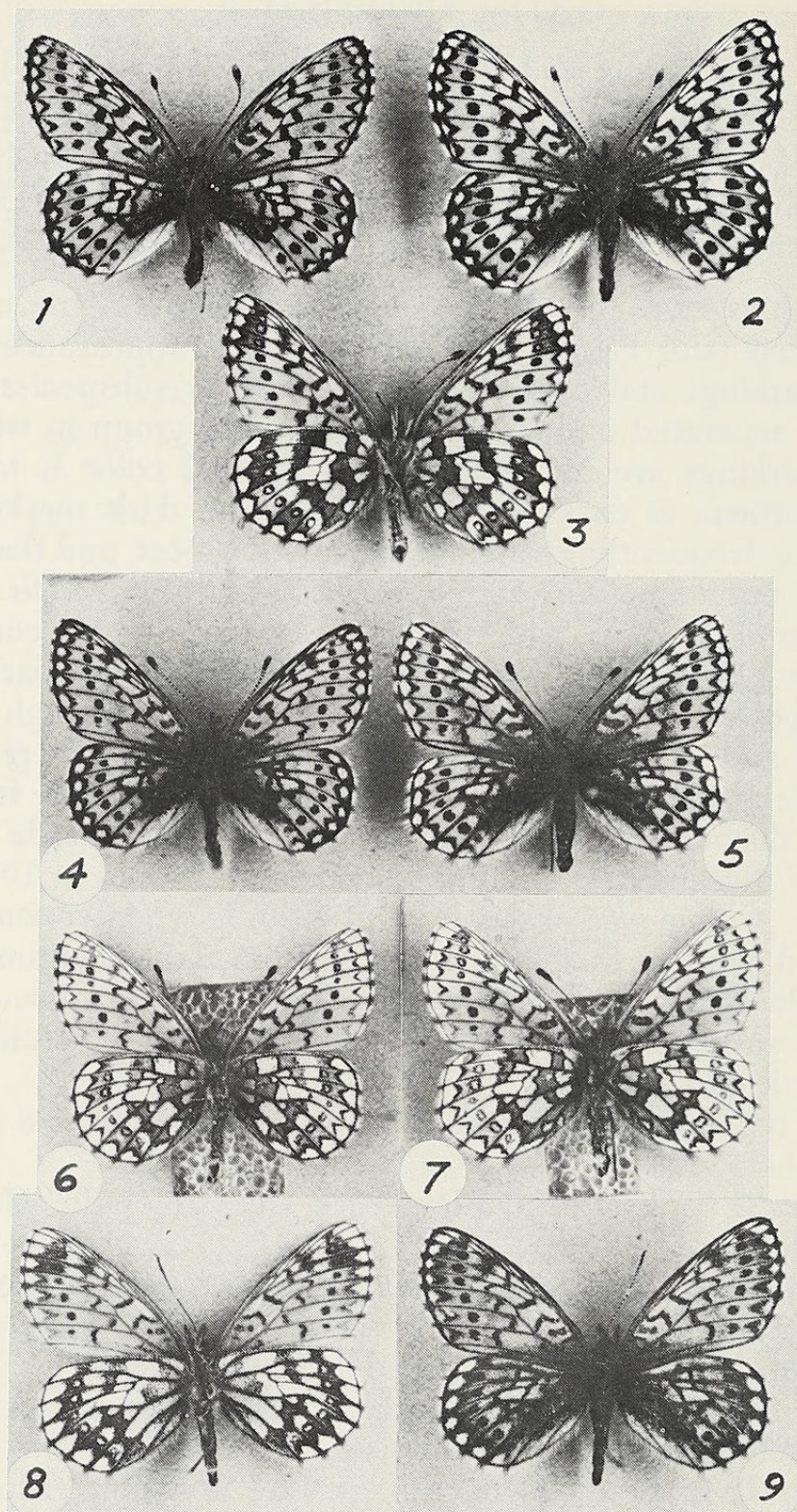


Fig. 1.—*Boloria eunomia laddi* (Klots). Topotypes from Lewis Lake, Snowy Range, Albany Co., Wyoming. Fig. 1, ♂ upper side, Fig. 2, ♀ upper side, Fig. 3, ♂ under side.

Boloria eunomia ursadentis Ferris and Groothuis. Paratypes from Beartooth Pass, Park Co., Wyoming. Fig. 4, ♂ upper side, Fig. 5, ♀ upper side, Fig. 6, ♂ under side, Fig. 7, ♀ under side, Fig. 8, aberrant ♀ under side, Fig. 9, aberrant ♀ upper side.

Three distinct forms of *Boloria eunomia* have been observed in Wyoming. In the southeastern part of the state, *laddi* flies and is restricted to alpine willow bogs in the Hudsonian Zone. A second form is represented by a small series of specimens from the Big Horn Mountains in the north-central portion of the state and appear to be intergrades between *laddi* and *dawsoni*. These specimens, collected by Dr. John S. Nordin in the Cloud Peak Wilderness Area in Johnson Co., are dorsally similar to *laddi*. Ventrally the overall color is intermediate between *laddi* and *caelestis*. The marginal chevrons on the secondaries are very pearly as in *dawsoni* rather than opaque as in *laddi*. The light flush in cells M_2 and M_3 is less pronounced than in *laddi* but not so obscure as in *dawsoni*. The third form is discussed below.

To date, *Boloria eunomia* has not been recorded from the Wind River Mountains or the western border of Wyoming. A very distinct form, however, has been taken on the Beartooth Plateau, Park Co., Wyoming and is the subject of the remainder of this paper.

While we are somewhat reluctant to add another subspecific name to the already long list under *eunomia*, we feel that the new subspecies is sufficiently distinct to warrant nomenclatural recognition. This insect belongs to the light group and in some respects is close to *denali*. While a few specimens have been taken in Hudsonian Zone wet willow bogs, the habitat of this subspecies appears to be the relatively dry gently sloping hillsides of the Arctic-Alpine Zone. In the Beartooth Mountains, this ecological zone contains a few areas in which dwarf willows grow along the run-off areas from the snow fields. The slopes generally face to the southeast. Here, in these isolated locations, is where the new subspecies appears to be most abundant.

We propose as the name of this subspecies *ursadentis* which is derived from the name of the type locality.

***Boloria eunomia ursadentis* Ferris and Groothuis**

New Subspecies

The new subspecies is separated from the other members of the light *caelestis-triclaris* group in a general way because dorsally the color is a more distinct yellow-brown or ochre than is found in its cogeners. This is especially true of the females. Description of new subspecies:

Males. Dorsal ground color ochraceous yellow brown with suggestion of orange, dark markings very finely penciled, dusting of dark scales basally on primaries and basally and along the

inner margin of the secondaries. Dorsal surface frequently appears faded and lightly dusted with dark scales. Ventral surface generally pale and lightly marked. Black markings on primaries very fine and light. Ventral secondary orange-brown patches reduced. Compared with other subspecies in the group, the discal area light bars in cells $Sc + R_1$ and Cu_2 are elongated; the pale color is virtually continuous from the cell and throughout cell M_2 being only slightly interrupted by a fine dark line at the cell end and in the median area, and slightly orange flushed just basad of the marginal chevron. Marginal spots distad of the black chevrons are very pale with only a slight suggestion of luminosity.

Females. Dorsally similar to the males but more tawny in appearance and with heavier dusting of dark scales. Marginal light spots quite pale and distinct. Ventrally as in male but paler. The light areas are almost white, being a pale buff, and do not show the orange flush characteristic of other members of the *eunomia* complex.

There is considerable variation in size of the specimens. The maximum and minimum lengths of the costal margins of the primaries for both sexes are:

male 1.5 - 1.7 cm.

female 1.7 - 1.8 cm.

Type Series. The type series consists of 24 ♂♂ and 8 ♀♀ of which 1 ♂ and 1 ♀ are strongly aberrant and several of the females appear atypical in the arrangement of markings. 10 ♂♂, 4 ♀♀ (1 of which is strongly aberrant) Beartooth Pass, ½ mile S. of Montana-Wyoming border, Park Co., Wyoming 24-vii-69, D. R. Groothuis collector; 13 ♂♂ (1 of which is aberrant), 3 ♀♀ Beartooth Pass, hillside north side of west slope of pass at summit (about 11,000'), Park Co., Wyoming 24-vii-70, C. D. Ferris collector; 1 ♂ and 1 ♀ Beartooth Pass, west slope, Highway 212, Shoshone N.F. (10,800'), Park Co., Wyoming 11-viii-65, E. M. Perkins, Jr. collector.

Holotype ♂. The holotype bears a red label handlettered in black ink: *Boloria eunomia ursadentis* Ferris/ & Groothuis/ Det: C. D. Ferris and a white label handlettered in black ink: Beartooth Pass/ Park Co. Wyo. ½ mi./ S. Mont.-Wyo./ Border. 24-vii-69/ Leg: D. R. Groothuis.

Allotype ♀. The allotype bears a green label handlettered in black ink: *Boloria eunomia ursadentis* Ferris/ & Groothuis/ Det:

C. D. Ferris and a white label machine printed in black ink: Beartooth Pass, W./ slope, H. 212, Shoshone/ N.F., Park Co., Wyo./ 10800' 11-viii-65/ leg. B. ["B:" in red ink, handlettered] Perkins. A smaller white label in machine printed black ink reads: A. C. Allyn/ Acc. 1970-2. B. stands for "Bud", the nickname of E. M. Perkins, Jr.

Paratypes. The 30 paratypes have been indicated above in the description of the type series.

The holotype, allotype, and one male paratype (the other Perkins specimen) are placed in the collection of the Allyn Museum of Entomology, Sarasota, Florida. Four paratypes are in the collection of J. H. Shepard, Berkeley, California. Additional paratypes will be distributed to various museum collections. Specimens from the type series will be retained in the C. D. Ferris collection and the D. R. Groothuis collection.

The plate shows specimens of *Boloria eunomia laddi* (topotypes) [Figs. 1, 2, 3] and *Boloria eunomia ursadentis* (paratypes) [Figs. 4-9]. An aberrant female of *ursadentis* is also figured [Figs. 8, 9].

In making this study, specimens of *Boloria eunomia* from Alberta, Colorado, Wyoming, Minnesota, Quebec, and the Yukon were examined as well as specimens of *denali* from Alaska. The original descriptions were consulted.

It is interesting to note that in Alberta two distinct forms of *eunomia* fly: a light form and a dark form. The dark form, to which the name *nichollae* has been applied appears to be found only above timber line in the regions north of Banff. Some discussion that *nichollae* may be only an altitudinal form appeared above. Specimens from southern Alberta, even those taken above timber line on Plateau Mountain (elevation 8200'), are much paler than *nichollae* and resemble the *laddi-dawsoni* intergrade from the Big Horn Mountains in Wyoming.

The possibility that *ursadentis* is an altitudinal form has been considered. This has been ruled out for the present for two reasons. The first is that *laddi* flies at the same altitude and is a dark subspecies; *nichollae* is also a dark subspecies. The second is that in other Nymphalidae in Wyoming, the facies become darker with increasing altitude as a general rule. The new subspecies *ursadentis* is pale by comparison with *laddi* and the more northern *dawsoni*. There are a few specimens in the type series of *ursadentis* which tend toward *laddi*. The majority of the specimens are pale by comparison with some tending toward *denali*.

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