

# STUDIES IN PACIFIC COAST LEPIDOPTERA

(Continued)

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## THIRTEEN NEW SPECIES OR ABERRATIONS OF CALIFORNIA BUTTERFLIES

The members of the *chalcedona* group of *Euphydryas* are subject to a wide range of variation and aberration. Most of our California collectors possess one or more of these peculiar forms, and inquiries are numerous concerning their cause and designation.

Some of these have received names, and others are in danger of being described without much thought for the direction in which the variation runs or the extent to which this variation is carried, unless some effort is made to reduce the matter to systematic order.

The direction in which this group varies is—

1. A tendency toward complete obscuring of primaries, or secondaries, or both,=complete or hemi-melanism.
2. A tendency toward accentuation or fusion of the yellow spots into elongate bands, on primaries, or secondaries, or both,=complete or hemi-fusion.
3. A tendency toward the lightening of the yellow spots, and the elimination of the red, or its reduction to a brownish shade on primaries, or secondaries, or both,=complete or hemi-albinism.

It is obvious that great confusion will arise if an attempt is made to name aberrant forms that are intermediate in the extent or degree of this variation,—in fact there is serious doubt as to the advisability of applying names to any aberrant forms whatsoever. Since, however, authorities continue to include such aberrations in their lists, it seems advisable to confine such naming within reasonable limits, and relegate to the synonymy all aberrant forms that do not carry a given tendency to its ultimate degree of expression.

In the group under consideration we have two names that are generally accepted,—i. e. *E. chalcedona* ab. *mariana* Barnes, representing complete melanism, and *E. chalcedona* ab. *fusimacula* Barnes, representing complete fusion of yellow maculations. In addition Mr. Jean Gunder has proposed two names to cover partial or complete albinism, (*hemiluteofuscus* and *omniluteofuscus*).

In this paper we shall leave out of consideration the albinic tendency, and confine our analysis to the melanic and fused types.

The confusing element with which we have to deal here is that the tendency toward these aberrant patterns may occur in the primaries only, or be confined to the secondaries, and be in combination with the normal maculation on those wings which are not involved,—or there may be a fusion on one pair and an obscuration of the other.

We thus have a long list of possible combinations. The scheme of these possible variants is expressed in the following diagram,—and I have appended the names which I propose as new, in this formula.



|              |         |   |                                     |
|--------------|---------|---|-------------------------------------|
| Primaries.   | Normal  | = | chalcedona chalcedona Dbldy. & Hew. |
| Secondaries. | Normal  |   |                                     |
|              | Fused   | = | ab. fusimacula Barnes.              |
|              | Fused   |   |                                     |
|              | Melanic | = | ab. mariana Barnes.                 |
|              | Melanic |   |                                     |
|              | Fused   | = | ab. nov. suprafusa.                 |
|              | Normal  |   |                                     |
|              | Melanic | = | ab. nov. supranigrella.             |
|              | Normal  |   |                                     |
|              | Fused   | = | ab. nov. hemimelanica.              |
|              | Melanic |   |                                     |
|              | Normal  | = | ab. nov. fusisecunda.               |
|              | Fused   |   |                                     |
|              | Normal  | = | ab. (none yet observed.)            |
|              | Melanic |   |                                     |
|              | Melanic | = | ab. (none yet observed.)            |
|              | Fused   |   |                                     |

The color plates of these new aberrations were published and distributed some time ago. They serve far better to describe the types than could a lengthy technical analysis. In order to designate type, locality, collector, and repository of type, etc., the following brief notes are appended.

**Euphydryas chalcedona ab. suprafusa aberr. nov.**

♀ Superior surface illustrated on Plate 32, figure 9.

Inferior surface normal except for the elongation and fusion of the yellow spots in the limbal area of primaries, which is more complete at the costo-apical end, and becomes less marked toward the posterior margin.

Holotype ♀. Los Angeles, Calif., April 10, 1924. In the collection of the Southwest Museum.

Allotype ♂. Tehachapi, Kern Co., Calif., June 27, 1922. Collection of Jean Gunder, Pasadena.

Paratype ♂. Diamond Canyon, Alameda Co., Calif., May 30, 1916. In the collection of Jean Gunder, Pasadena, Calif.

**Euphydryas chalcedona ab. supranigrella aberr. nov.**

Superior surface illustrated on Plate 32, figure 8.

Inferior surface, primaries devoid of all yellow spots. The brick-red shade is complete over the entire wing except for a delicate striping of black on the nervules and a small amount of black scaling irregularly distributed over the apical area. Secondaries normal.

Holotype ♂ Mt. Wilson, Calif., June 22, 1920. In the collection of the Southwest Museum.

Allotype ♀ Camp Baldy, San Gabriel Mountains, Calif., June 23, 1919. In the collection of Jean Gunder.



***Euphydryas chalcedona* ab. *hemimelanica* aberr. nov.**

Illustrated on Plate 32, superior surface of holotype ♂ figure 11, inferior surface of allotype ♀ figure 10.

The colored figures serve as sufficient description.

Holotype, Sulphur Mountain Springs, Ventura County, Calif., July 4, 1920. In the collection of Mr. Jean Gunder.

Allotype, Los Angeles, Calif., April 1, 1919. In the collection of Mr. Jean Gunder.

***Euphydryas chalcedona* ab. *fusisecunda* aberr. nov.**

Superior surface illustrated on Plate 32, figure 12.

The inferior surface is characterized by a partial fusion of the two bands of yellow spots on the secondaries. Probably this fusion would be more complete in specimens showing the ideal pattern to fit into the scheme which we have outlined. The primaries are normal.

**Type.** ♀ Mt. Wilson, Calif., June 22, 1920. In the collection of the Southwest Museum.

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While collecting in the Lake Tahoe region, where *Euphydryas sierra* abounds, we were fortunate in capturing a remarkable example of an aberrant form of this species which is worthy of designation. We published a figure of this some months ago, so that the detailed description seems hardly necessary at this time. It is named *umbrobasana*, and is shown as figure 5 of our color Plate 35. The distinguishing feature of the superior aspect is the heavy suffusion of the basal areas, particularly of the secondaries, with black,—and the tendency toward suffusion and extension of the yellow maculation in the limbal area.

The inferior surface is not figured, and is therefore dealt with in greater detail.

Primaries, fringes and marginal area as in the normal form. The submarginal double rows of yellow spots are blended into a single wide band, separated into oblongate spots by narrow black nervules, and becoming obsolescent toward the lower third of wing. Four blurred yellow dashes occur lateral to the cell. The black lines crossing the cell are blurred and suffused with black.

The secondaries are very striking in appearance, due to the fact that the submarginal row of yellow crescents and the extra-discal row of yellow spots have extended toward each other and fused, thus eliminating the usual interposed red and black-margined area, and forming a continuous wide yellow band extending almost across the wing. A few red scales slightly invade this at the costal and anal edges, which is all that remains of the normal central red row of spots. The nervules, however, are narrowly defined in black.

The basal area is a clear field of red, except for one small black circle at outer end of each cell, pupillated in yellow.

Holotype ♂ Lake Tahoe region, July, 1922.

This name was mentioned, after I had distributed my colored plates, by Mr. Jean Gunder (Entomological News, July, 1925, Vol. XXXVI) where he states that "*umbrobasana*, as its name indicates, is a more melanic aberration of *sierra*, and several degrees opposite to *magdalenae*."

We have received from Mr. Jean Gunder a number of aberrant examples of *Euphydryas colon* which were captured by our good friend Otto Huellemann of Wallace, Idaho, for whom I name this interesting variant.



**Euphydryas colon ab. huellemanni aberr. nov.**

♂ Superior surface, ground color black. Marginal row of red spots on primaries and secondaries practically suppressed. Submarginal rows of yellow spots on primaries present but slightly blurred. Extra-discal area occupied by three long yellow dashes, which are powdered laterally by a few red scales. Basal area solid black. The double row of yellow spots normally occurring on secondaries are obsolescent except for a few minute points. The basal half of secondaries, a rich black.

Inferior surface, much as in normal *colon* except for a partial, (or in one case a complete) suppression of the yellow spots in the basal area of secondaries, and their replacement with black. There is also a tendency toward extension and blurring of the yellow maculations.

♀ Much as in male, although our allotype shows some tendency toward the retention of the marginal row of red spots on the superior surface. Further description seems unnecessary in view of our publication of colored figures some months ago.

Holotype ♂ Wallace, Idaho, June 12, 1921. Illustrated on Plate 33, figure 5.

Allotype ♀ Wallace, Idaho, June 15, 1919. Illustrated on Plate 33, figure 4.

Paratype No. 1 ♂ Wallace, Idaho, June 14, 1925.

Paratype No. 2 ♀ Wallace, Idaho, July 4, 1925.

All collected by Mr. Otto Huellemann, and in the collection of Mr. Jean Gunder of Pasadena, Calif.

**Euphydryas rubicunda ab. rubrosuffusa aberr. nov.**

Superior surface illustrated on plate 34, figure 15.

The inferior surface differs from the typical insect only in the partial suppression of the black lines on the secondaries. These are entirely absent in the area between the submarginal crescents and the extra discal row of yellow spots, and this area is wider than normal. It is a field of clear brick red, except for a delicate dentate stripe of yellow running through it at about the centre.

Type. ♀ Mammoth, Mono Co., Calif., July 28, 1921. Loaned from the collection of Mr. George Malcolm.

The females of *Melitaea palla* show a tendency toward the production of a dark form, one phase of which was named *eremita* by W. G. Wright. The example which he chose for his type does not, however, represent the extreme to which this melanism (if such it is) may be carried. On our color plate 36, figure 19, we picture an example which is probably the ultimate extent to which this "darkening" is carried. We have called this—

**Melitaea palla ab. stygiana aberr. nov.**

The superior surface is so accurately pictured on our plate as to render a description superfluous. The inferior surface shows little variation from that of usual maculation of *eremita*, and our figure 18 on this same plate may serve to illustrate this.

Type. ♀ Willow Ranch, Modoc County, Calif., June 9, 1924.

Paratype No. 1. ♀ Fairfax, Marin Co., Calif., June 30, 1918.

Paratype No. 2. ♀ Carrville, Trinity Co., Calif., June 13, 1913.

Paratype No. 3. ♀ Walker, Siskiyou Co., Calif., June 3, 1920.

Paratypes Nos. 4 to 7. ♀♀ Willow Ranch, Modoc Co., Calif., May 30 to June 8, 1924.

Type and paratypes in the collection of Mr. Jean Gunder, Pasadena, Calif.

A remarkable aberration of *Melitaea gabbii* is illustrated on Plate 36, figure 6, which demonstrates the same tendency in this species that we have noted in the case of *palla* with its dimorphic females *eremita* and *stygiana*. We propose for this the name—



**Melitaea gabbii ab. gunderi aberr. nov.**

The illustration pictures accurately the superior surface of this butterfly. It will be noted that it compares to *stygiana* in the *palla* series, although it is probably of much rarer occurrence.

On the inferior surface we have the usual lustrous white spots, with the remaining portions of the wing heavily suffused with black scales. These have entirely replaced the normal orange-yellow areas and spots of the secondaries, and on the primaries have caused a darkening of the entire wing and a blurring, but not an entire eradication of the maculations.

**Type.** ♀ San Fernando, Calif., April 6, 1919. In the collection of the Southwest Museum.

Named for Mr. Jean Gunder.

**Melitaea gabbii ab. newcombi aberr. nov.**

Superior surface accurately pictured on our Plate 36, figure 5. This corresponds to *eremita* in the *palla* series.

The inferior surface is practically that of normal *gabbii* except that there is a tendency toward an increase of the black scales and their invasion of the orange areas. This is more marked on the primaries.

**Type.** ♀ Pasadena, Calif., April 7, 1917. In the collection of the Southwest Museum. Named for our friend Mr. Hal Newcomb.

**Melitaea malcolmi sp. nov.**

This is illustrated on our color plate 36, figures 10, 11 and 12, with sufficient accuracy to render a lengthy description unnecessary. It will be noted that it differs from *gabbii* in having a uniform ground color of a duller shade, with a heavier powdering of black in the basal area. The ground color of the female is of a considerably lighter shade than the male. On the inferior surface, the lustrous spots of secondaries are less pearly than those of *gabbii* but more so than in *palla*.

Holotype ♂ (Figure 10 of Plate 36). Near Mammoth Camp, Mono County, Calif., July 27, 1921.

Allotype ♀ (Figure 12 of Plate 36). Same locality and date.

Paratype No. 1. ♂ (Figure 11 of Plate 36.) Same locality and date.

All collected by Mr. George Malcolm, for whom I take pleasure in naming the species.

This is very close to *Melitaea flavula* B. & McD. and may prove to be a local race of this species.

Our color plate 37, figure 13, depicts an interesting aberrant of *Melitaea chara* which we have called—

**Melitaea chara ab. nitela aberr. nov.**, which is characterized by a lustrous white ground color on the underside of secondaries, crossed in the limbal area by a band of connected quadrate yellow spots, with fine black margins. Four small squares also occur in the basal area, two of which are in relation to the cell,—and a few irregular yellow spots are grouped close to the basal junction of the wing.

The under side of primaries is more uniformly yellow than in typical specimens, on account of the suppression of most of the black lines.

The superior surface differs from typical *chara* in the reduction of black lines throughout the discal area of both pairs of wings, and a lessened amount of black scaling throughout, which gives the suggestion of a lighter form.

**Type.** ♂ Near Palm Springs, Coachella Valley, Calif., April 5, 1921. In the collection of the Southwest Museum.



*Tharsalea arota* r. *nubila* race nov.

♂ Superior surface; primaries; differs from typical *arota* in the darker shading, which is of a brownish coppery hue with no suggestion of the violet over-tint characteristic of both *arota* and *virginiensis*, and in the greater width and clearer definition of the dark margin.

Secondaries of the same shade and with equally wide dark margins, which are continued along the costal edge and into the basal area. The tails average slightly shorter, and there is an almost complete eradication of the orange stripe and submarginal lunules in this area, except for a slight suggestion on the tail itself.

Fringes brown, except toward the anal angle where they become gray to whitish.

Inferior surface; practically as in typical *arota* except for the almost complete suppression of the red line in centre of tail and the red submarginal lunules connecting with it, which are a constant feature of both *arota* and *virginiensis*.

♀ Superior surface; primaries; much darker than in the typical insect, and with a reduction of the orange maculations to about half the area of the corresponding markings in *arota*. There are no orange scalings near the posterior angle of wing, which makes the wide dark marginal area (nearly  $\frac{1}{8}$  inch in width) continuous from apex to posterior angle. No orange scaling occurs posterior to the submedian vein.

Secondaries; clear dark brown, except for four or five narrow orange lunules, beginning at the anal angle,—a line of orange extended onto the tail, and three small orange patches lateral and inferior to the cell.

Inferior surface; much as in male, except for a slight suffusion of orange medial to the submarginal white lunules of primaries, shading to yellow in the limbal area.

Thorax and abdomen as in *arota*.

We have examined *arota* from central and northern California, and compared Oberthur's figure of the type. A series of *virginiensis* from Virginia City, Nevada, have also been used in this comparison. *Nubila* shows much greater divergence from the typical insect than does *virginiensis*.

Types. Holotype ♂ Griffith Park, Los Angeles, California, July 2, 1922. Allotype ♀ same locality and date. The holotype and allotype figured on our Plate 51, figures 2 and 3. Paratypes, 21 ♂♂ 20 ♀♀ all from the above locality, June 7 to July 15, 1922. In the collection of the Southwest Museum. Paratypes will be placed in the Barnes collection, in the National Museum, and in the Canadian National collection at Ottawa, and in the collection of Jean Gunder, Pasadena.

We take this to be a dark southern race of *arota*, but it is more deserving of rank as a distinct species than is *virginiensis*.



1926. "Studies in Pacific Coast Lepidoptera." *Bulletin of the Southern California Academy of Sciences* 25, 29–34.

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