PSYCHE

FURTHER BREEDING EXPERIMENTS WITH HAPLOAS

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In the Entomological News for March, 1901, the writer gave some account of breeding experiments with Haploas. Experiments were continued during the four following seasons with a view to determining the limits of variation in the race of *Haploa confusa* occurring near Claremont and to working out more thoroughly the life histories of the other forms of the genus and their mutual relations. Efforts to breed successive generations from the same stock have been but partly successful owing to the difficulty of carrying the larvae in sufficient numbers through the hibernation.

Haploa confusa

From moths bred from wild larvae taken at Claremont in May, 1901, three successful pairings were obtained, viz:

Pair No. 1. Pl. II, Fig. 1 and Fig. 2 parents.

24 ♂ — 14 ♀ (See Pl. II, Figs. 3 to 18 for selected series of progeny)

Pair No. 2. Pl. II, Fig. 19 and Fig. 20 parents.

45 ♂ — 16 ♀ (See Pl. II, Figs. 21 to 36 for selected series of progeny)

Pair No. 3. Pl. II, Fig. 37 and Fig. 38 parents.

20 ♂ — 16 ♀ (See Pl. II, Figs. 39 to 54 for selected series of progeny)

A new supply of larvae was obtained in 1903 and three successful pairings were obtained from which were reared

from Pair No. 1 13 ♂ 6 ♀

" " No. 2 11 ♂ 4 ♀

" " No. 3 10 ♂ 8 ♀

These 1902 broods present no character materially different from the three 1901 series illustrated on plate.

Examination of the several hundred moths reared from our local race warrants the following conclusions.

1. The *confusa* type like figs. 1 and 2, Pl. I is the dominate form in this locality.
2. While in any given brood the progeny vary considerably among themselves, striking departures from typical *confusa* are very infrequent.
3. The greatest divergence is in disappearance in occasional specimens of the brown cross-bands on primaries, this tendency being stronger in the females.
4. Some degree of sexual dimorphism exists, the males tending to show a greater extent of brown and the females a greater extent of white.
5. Occasional specimens occur conforming closely to Boisduval's type of *lecontei*. (Compare Pl. II, Figs. 45 and 49 with figure of type here reproduced.)

In the broods above referred to no instance of yellow in the ground color of the wings occurred, from which I conclude that the brood illustrated in Mar. 1901 Ent. News, which contained both yellow winged and white winged forms, contained a mixture of *clymene* blood due to some antecedent crossing. That such crossing sometimes occurs admits of little doubt. Strecker has reported taking *clymene* and *lecontei* in coitu from which resulted progeny like *lecontei* with yellow ground color. (See Proc. Davenport Academy of Nat Sci. V. II p. 275) and several aberrant individuals reared from wild larvae taken at Claremont can be best accounted for on the theory that they are mongrels. (See figs. 1, 2, 5 and 6 Pl. III). *Clymene* inhabits the same immediate locality from which most of the *confusa* material has been obtained.

Efforts have been made to obtain a *clymene* x *confusa* cross but six attempted pairings were unsuccessful.

H. lecontei var. confinis

In 1901, through the kindness of Mr. G. M. Dodge of Louisiana, Mo., I received eggs laid by a captured ♀ Var. *confinis*. From these were reared seven moths, two ♂ and five ♀, all of the fully marked *confinis* pattern and quite uniform.

H. colona var. reversa

In 1904 Mr. Dodge sent me two females of Var. *reversa* one of which is shown on Pl. II at fig. 55. These laid eggs from which were bred in all 21

♂ 14 ♀ fairly uniform in markings and showing no marked departure from the parents. Figs. 56 to 61, Pl. II show the range of variation in the series.

A wider variation than this occurs among these moths as shown by a selected series of captured specimens sent me by Mr. Dodge in which several specimens are immaculate white (*var fulvicosta*) and others intergrading between *fulvicosta* and *reversa*.

In this species and in *lecontei* both of which have immaculate forms, the examples I have examined indicate that the immaculate specimens are more common than those that can be really classed as intergrades. This suggests the theory that the immaculate forms are really "mutations" in the sense in which De Vries uses the word. This is further supported by the following case.

H. *lecontei* var. *vestalis*

A captured ♀ *vestalis* (fig. 69 Pl. II) sent me by Mr. Dodge in 1904 laid fertile eggs from which were reared 16 ♂ and 10 ♀. Of these 10 ♂ and 8 ♀ were like the mother, immaculate. (See fig. 70, Pl. II). 6 ♂ and 2 ♀ were marked with brown, showing patterns referable to var. *militaris* (fig. 74) var. *confinis* (fig. 75) and var. *harrisii* (fig. 72).

H. *lecontei* var. *harrisii* Dyar

A captured ♀ *harrisii* (Pl. I, fig. 62) sent me in 1904 by Mr. H. D. Merrick from New Brighton, Pa., laid eggs from which were bred 3 ♂ and 3 ♀ (see Pl. II, figs. 63-68). These showed quite a range for so small a series, containing forms referable to vars. *harrisii*, *confinis* and *militaris*.

Typical *lecontei* Boisduval

It seems unfortunate that the type of a species having so many varieties should have been based upon one of the least common of its forms. (See accompanying figure which is a reproduction of Boisduval's illustration of his type.) This form is very rare among collections I have examined. Only two or three moths of those obtained in this locality come very close to it. Figs. 3 and 4 Pl. II bred from larvae taken near Claremont are nearest to the type of any in my collection.

Type of *H. Lecontei* Boisd.
(Reproduction of Boisduval's figure.)

H. clymene

A small series of *clymene* bred from a captured ♀ sent by Mr. Merrick showed no noteworthy variations. *Clymene* appears to be the most constant of any of the species of the genus.

Larval Characters

The larval differences in the genus are not wide and do not appear until after the first or second moult. The following table shows the main points of contrast in the mature larvae:

	DORSAL STRIPE	LATERAL STRIPE	HAIRS
<i>colona</i>	deep red	deep yellow	black or gray
<i>clymene</i>	dull yellow	dull yellow	yellow brown
<i>contigua</i>	dull black	pale yellow	whitish gray
<i>lecontei</i>	yellow orange	yellow	yellowish
<i>var. confinis</i>	black	yellow	black
<i>var. vestalis</i>	dull yellow	dull yellow	black and gray
<i>confusa</i>	bright yellow	dull yellow	black
	sometimes orange		

Studies of the ♀ genitalia have not revealed any constant specific characters in this genus. Differences in form of these organs occur between individuals of the same species and as wide as between those of different species.

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FOSTER: HAPLOAS.