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NOTES ON THE GENUS CLISIOCAMPA, CURTIS.

With description of New Species.

BY R. H. STRETCH.

Probably there is no group of Bombycidæ inhabiting this country more worthy of earnest study than the one now under consideration. In an economical point of view, the agriculturist and the pomologist are liable to their attacks, while many of our ornamental trees and shrubs are marked by the depredations of the caterpillars. Their great abundance in certain seasons, and their extremely interesting habits, also serve to draw attention to these insects, while the difficulty which exists in clearly defining the various species, offers another incentive to the investigations of entomologists.

In studying the genus, we must depend chiefly on the transformations for the separation of species, and where these are unknown, not so much on color as on the structure and proportion of the markings, as the species are very variable and approach each other closely in the imagines.

The descriptions of some of the earlier stages are now, I believe, given for the first time. The genus has, undoubtedly been very properly separated from *Gastropacha* and from *Bombyx*, which latter included insects of different structure and of extremely different habits. *Clisiocampa* is thus well defined by Stainton:

IMAGO.

“Antennæ pectinated in the ♂, ciliated in the ♀; abdomen of ♀ rather stout and pointed; wings densely clothed with scales. Larva gregarious when young, dispersing before becoming full fed. Pupa enclosed in a cocoon of moderately fine texture, not transparent, because intermixed with a sulphur colored powder.”

CLISIOCAMPA, CURTIS, Brit. Ent., Vol. 5.

C. CALIFORNICA, Packard, Proc. Ent. Soc., Phil., vol. 3, p. 387, (1864). *Bombyx pseudoneustria*, Boisduval, Ann. Soc. Ent., Belg., vol. 12, p. 82, (1868-9).

Larva. Head black, legs black; feet on abdominal legs pale testaceous. Body black, faintly dusted with rusty, which forms an exceedingly broken and indistinct lateral line, and a more complete double dorsal line. Each segment carries a lateral, transverse, very faint linear dot, above the lateral line. The dorsal and lateral hairs are all tawny. The general appearance of the larva is tawny brown. Length about 1.40 inches.

Cocoon. The cocoon is constructed in the crevices of bark or in the angles of masonry where accessible, and consists of a loose, white web, in which is suspended the long ovate cocoon of dense papery consistency, thickened with a yellowish powdery gum.

This species is exceedingly abundant in the neighborhood of San Francisco, and is probably widely distributed. In this vicinity its favorite food plant is a species of scrubby oak (*Q. agrifolia*), but it is sometimes found on the blackberry (*Rubus*) and other shrubby plants. Its depredations do not seem to have extended to the orchards. The nests may be seen in warm localities as early as the middle of March, while in those more exposed they are not seen till the middle of April; but both these dates are sufficiently early to protect the orchards. The larvæ pupate in about six weeks from the egg, and the imago appears in about a fortnight.

The peculiar actions of these larvæ would appear to indicate the possession of organs of hearing. It is most amusing to stand near one of the nests on which the larvæ are clustered, and call out loudly and sharply. The larvæ begin to twitch convulsively, throwing the head from side to side as if annoyed by the sound; and if the sound is repeated, not unfrequently losing their foothold and falling to the ground. I do not remember to have seen any note of this peculiarity as common to the species found in the Atlantic States, and mention it to draw attention to what may prove an easy means of collecting the larvæ in orchards when they become troublesome.

C. FRAGILIS, n. sp.

♂ General color, soft chocolate brown. The primaries have a deep shade of this color at the base. The lines are whitish, and in strong contrast with the ground color of the wing. The inner band reaches the inner margin very near to the base, and curves slightly inward on the costa. The outer band is nearly parallel with the inner, the space between them being slightly increased at the costa. Fringes whitish, with dark dashes at the termina-

tion of subcostal and median nervules. Secondaries wholly pale chocolate brown, with no indication of band. Underside pale brown with a reddish tinge, and with very faint trace of median band on both wings. Thorax and abdomen somewhat paler than the base of the primaries. Antennæ, dark chocolate brown. Exp. wings, 0.80 inch.

♀ Lighter in color, and less opaque than the ♂. Head, thorax, legs and abdomen pale whitish brown; abdomen palest; prothorax and tegulæ darkest. Anterior wings pale, lustrous whitish brown, crossed by a broad dark band of the same color, but of a deeper shade. The inner edge of this band originates on the inner edge near the base, and curves round to the costa, which is reached at the basal two-fifths. The outer edge of the band is parallel with the outer edge of the wing, and curves outward as it reaches the costa, being followed outwardly by a narrow pale line. The band is palest centrally, and broader than the terminal space, and both its margins are toothed inwardly on the nervules.

Posterior wings concolorous with the band on the primaries, crossed by a pale median band.

Beneath, the wings are concolorous with the band on the primaries above, and the only markings are the pale whitish line outside the band on the primaries, and the median line on the secondaries, which are both more prominent than above.

3 ♂, 4 ♀

Expanse of wings, 1.10 to 1.40 inches, *Length of body*, 0.40 to 0.50 inches.

Habitat, Virginia City, Nevada (Henry Edwards).

This species is very strongly marked, and readily distinguishable from all its congeners by its delicate, fragile appearance, and the thin lustrous squamation of the wings.

Taken by Mr. Henry Edwards in the early part of July. Mr. Edwards found, during the same visit to the locality mentioned, a single larva belonging to this genus feeding on a large species of sunflower (*Helianthus* —), which I have little doubt belongs to this species. It was smaller than those of *C. californica*, and more like that of *C. constricta*, but abundantly distinct from either. It came to my hands through the mail in such a condition as not to admit of a careful description. The only trees growing in the region from which this species was received, are various species of willows or conifers.

C. CONSTRICTA, n. sp.

Larva. Head blueish, mottled with black. Body with a moderately broad, irregular, but continuous bright ochreous dorsal stripe bordered with black. Sides blueish white, faintly mottled with black, this color being concentrated into a diffuse lateral stripe just above the lateral bunches of hairs. From the dorsal stripe spring dark tawny hairs, directed upwards, with a few black

hairs in the black margin of the stripe. Each segment on its anterior edge has a lateral bunch of white hairs directed downwards, and above the feet there is a continuous line of depressed white hairs. Beneath, the body is smoky. Abdominal legs smoky, testaceous at tips. Length, 1.25 to 1.50 inches.

Varies in the brilliancy of the dorsal stripe and the intensity of the color in the lateral black stripe. Beneath the black stripe there is in strongly marked individuals (usually small ♂?) a faint, pale whitish ochre, broken, slender stripe, and the fold above the feet is of the same color.

The larvæ from which the foregoing description was drawn were late specimens, mostly ichneumonized. They were found May 27, at which time many cocoons were found empty. The cocoon is whiter than that of *C. californica*.

Imago ♂. Entire insect dark cream color with a faint tinge of reddish brown; the front of the head, and thorax beneath, round the head, of a deeper shade.

Anterior wings with a faint, narrow, transverse band, seldom completely defined, but most clearly seen on the costal margin, and consisting of two dark lines, the inner one straight, the outer one diverging from the inner as it approaches the costa, where it is bent sharply inward towards the base of the wing. Space between the lines scarcely darker than the rest of the wing, and about half the width of the terminal space; fringes with faint traces of dark scales at the end of the nervules. Secondaries immaculate.

Beneath, same as above in color, but the primaries have a more decided reddish tinge, and the basal half of the wings, as far as the outer line above, is uniform reddish brown.

♀. Reddish brown above and beneath; primaries above sprinkled with pale scales. Band of primaries more distinct, rather broader, and rather darker than the rest of the wing. Fringes paler.

Expanse of wings, ♂ 1.00 to 1.10 inches. ♀ 1.40 inches; *length of body* ♂ 0.50. ♀ 0.55 inch.

Habitat. Mountainous districts round the bay of San Francisco.

This species is abundant on the black oak (*Quercus Sonomensis*), the larva being full fed about the middle of May. Mr. H. Edwards has raised the species frequently, and it appears to be more constant in its coloration than *C. californica*, which varies quite as much as *C. neustria*, and to be at the same time confined to the mountainous regions where *Q. Sonomensis* is common. It has never been found, so far as I know, close to San Francisco, although *Quercus agrifolia*, the food plant of *C. californica*, is common in that vicinity, from which we may conclude that its range of food is limited, more so indeed than that of the latter species.

C. STRIGOSA. n. s.

♂. Entire insect dark cream color, with a tinge of yellow ochre.

Anterior wings with a moderately wide band, concolorous with the rest of the wing, defined by two rusty lines, straight, somewhat wider apart on the costa than on the inner margin, and both strongly bent towards the base of the wing on the costa. Terminal space about one and a half times the width of the band. Fringes of both wings distinctly interrupted with rusty scales at the nervules.

Beneath, the primaries are suffused with pale rusty scales, and all the wings are crossed by a distinct sinuous reddish brown line, that on the primaries corresponding to the outer dark line above. ♀ unknown.

Expanse of wings ♂. 1.25 inches; *length of body* 0.60 inch.

Habitat. Yosemite Valley, California. Hy. Edwards.

This may possibly be a variety of *C. constricta*, but I have given it here as specifically distinct because there is no difficulty in separating the imagines, though they resemble each other closely. The question cannot be considered settled, however, until we know the transformations of this species. It differs from *constricta* in the tint of the wings, which is unimportant perhaps, but constant so far as we know (5 ♂ of each examined); also in the proportionate width of the band and terminal space, but chiefly by its uniformly larger size and different coloration beneath.

C. EROSA. n. s.

♀. Entire insect pale, lustrous chestnut brown, with a tinge of ochre on the primaries and thorax. Secondaries rather darker than primaries.

Anterior wings crossed by two very oblique, nearly parallel darker lines; the inner one straight; the outer one somewhat bent towards the base of the wing as it approaches the inner margin. The space enclosed by these lines is wider than the terminal area. Fringes of all the wings dark, same color as the transverse lines. Outer margin of primaries distinctly concave at termination of 4th median nervule.

Beneath, uniform pale lustrous red-brown, fringes darker. The outer line on the primaries above faintly visible.

♂. Similar to ♀ but smaller.

Expanse of wings ♂ 0.95, ♀ 1.40 inches; *Length of body* ♂ 0.40, ♀ 0.65 inch.

I ♂ 4 ♀ examined. Collected by Mr. Henry Edwards in Oregon. These were raised from larvæ which had been feeding on *Robinia pseudo-acacia*, and which had spun up in a number of leaves drawn together. The larva is yet unknown, but the male of this species is abundantly distinct from the male of *C. distria*, the only species with which it could be confounded.

In addition to the foregoing five species, all of which are undoubtedly specifically distinct, if we except *C. strigosa*, I have before me two other unique specimens which cannot be referred to any of the species herein described. That one of them is specifically distinct, is more than probable from the fact that I am acquainted with a willow-feeding larva belonging to this genus, which is found in California and is different from any species of which the transformations have been recorded, but which appears to be very difficult to raise, and from which I have hitherto been unable to rear the imago. One of these specimens I describe below, under the name of *C. thoracica*; while the other, being less strongly marked, is retained for future determination. I have also presumptive evidence, founded on dead larvæ, taken from aborted cocoons found in Oregon, of the occurrence of another species, the transformations of which still await elucidation.

C. THORACICA, n. s. (?)

♂.—Entire insect dull red-brown, the primaries rather redder than the secondaries, which are the same color as all the wings beneath. Primaries with exceedingly faint traces of a broad band. Head, thorax and abdomen rather grayer than primaries. Thorax very stout and very hairy, being disproportionately large; abdomen very short and conical.

Expanse of wings 0.90 inch; *Length of body* 0.40 inch.

Habitat: Congress Springs, San Mateo County, California. (H. Edwards.)

Differs widely from all our other species in the structure of thorax and abdomen, and probably belongs to the larva alluded to above.

C. AMERICANA, Harris, Ins. Inj. Veg., p. 267, (1841).

C. decipiens, Walker; *Phalæna castrensis*, Smith-Abbot.

Bombyx frutetorum, Boisduval, Ann., Soc. Ent. Belg., vol. 12, p. 82, (1868-9).

Habitat, Eastern States from Maine, (Packard) to Texas. (Belfrage). California (Boisduval).

Boisduval says of this species that "it is common in Canada and of infrequent occurrence in California." So far as I know it has never occurred on this coast.

C. DISSTRIA, Hübner.

Malacosoma disstria, Hübner, Verg. (teste Grote).

Phalæna neustria, Smith-Abbot; *C. sylvatica*, Harris.

Bombyx drupacearum, Boisduval, Ann. Soc. Ent. Belg., vol. 12 p. 72, (1868-9).

Habitat.—Atlantic States from Maine southward (Packard). California (Boisduval).

Boisduval says of this species "common over a large portion of the United States, much rarer in California." The occur-

rence of this species in California or even on the Pacific coast of North America is unknown to the writer, neither have I heard of a single complaint from the orchardists of this coast, which would lead to the suspicion that any species of *Clisiocampa* occurred in the orchards, or was likely to be a source of trouble. The occurrence of these last two species in California, as stated by Boisduval, I believe to be the result of errors on the part of his correspondents, though, from what we know of the distribution of other common Atlantic forms, it is quite possible that one or both may occur in British Columbia and Washington Territory, or even as far south as Oregon.

ON SOME SPECIES OF NISONIADES.

By J. A. LINTNER.

Mr. Wm. H. Edwards has submitted to me for examination some examples of Nisoniades, which prove to be undescribed species. They are the following:

NISONIADES NÆVIUS, n. sp.

Size somewhat less than *N. Juvenalis*, and *N. funeralis*. Wings fuscous, almost black, with a purple reflection.

Primaries with four minute, subquadrangular, white, costapical, hyaline spots, of which the fourth (from costa) may be obsolete; a similar spot in cell 3, and none in the discal cell. An irregular umber-brown spot centres on the discal cross-vein, and at about the middle of cell 1 b (the submedian interspace) is another, showing more distinctly in the ♀. The subterminal row of obscure, rounded, intranervular fuscous spots rest on a dark umber-brown ground. All the markings are nearly lost in the dark ground; those best defined are two confluent trapezoidal spots in cell 1 b, forming the inner termination of the transverse row of spots, and defined without and within by a W in umber-brown. The spots of the transverse row are not of the ordinary sagittate form.

Secondaries dark brown, showing faintly the two rows of intranervular paler brown spots, more distinct in the ♀. Cilia dark brown, lighter upon their outer half in one ♂, and quite pale, approaching whitish in the ♀.

Beneath, paler brown, and showing more or less distinctly the two ordinary lines toward the margin of pale brown spots, and in one ♂ example, a white spot in the discal cell, not seen on the upper surface. Head and palpi concolorous with the thorax abdomen and legs.

Expanse of wings: ♂, 1.45 to 1.65 in.; ♀, 1.65 to 1.70 in.

Described from 3 ♂'s, collected at Indian River, Florida.

This species is allied to *N. funeralis* Scudd.-Burg. Its markings are similar in form and arrangement and nearly as incon-



Stretch, Richard Harper. 1881. "Notes on the genus *Clisiocampa*, Curtis, with description of new species." *Papilio* 1(5), 63–69.

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