

SOME NORTH AMERICAN RELATIVES OF APHALARA
CALTHAE LINNAEUS

(Homoptera: Chermidae)

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Although all published data and records indicate that *Aphalara calthae* Linnaeus occurs in North America, to the best of my knowledge there are no authentic records or data for these conclusions. All members of this genus with an elongate, cylindrical clypeus have been considered to be *calthae* Linn. with the exception of *A. nubifera* Patch recognized as a distinct species by Miss Patch and Mally's *polygoni* recognized as a distinct species by Mr. Mally and the recognition corroborated by Miss Patch; however the *polygoni* of Förster according to European investigators is synonymous with *calthae* Linn. and consequently Mally's *polygoni* has been considered synonymous with *calthae* Linn.

Through the courtesy of Mr. Laing of the British Museum of Natural History the writer has received European specimens of *Aphalara calthae* Linn. determined by Mr. Laing who has based his interpretation upon the determination of Douglas, Eger, and Edwards. Mr. Oman of United States National Museum has also furnished specimens of European *calthae*, determination unknown, along with specimens from continental North America and Cuba. A comparison of European forms with our North American forms reveals that *Aphalara calthae* Linn. is not represented in the collections from this country as yet.

It is impossible to accurately trace the synonymy of our related species without knowing which species various workers have had before them which they called *calthae*, this probably embraces most of our North American species, consequently no synonymy is attempted.

Separation into species is based on the differences in the genitalia, especially the forceps and oedeagus in the male and the circum-anal ring and the general form and proportions of the valves in the female. The shape and the degree of arch in the vein Cu_1 are slightly different in most species and the coloration of either forewing or body are sometimes reliable characters.

The differences in the genitalia are quite apparent and seem to be relatively constant in those species represented by a large series of specimens, in species not represented by a large series and whose characters are not radically differentiated we may only assume that the morphological differences are constant. The writer has made a conscientious attempt to be conservative and base species conception on characters and data that eliminate possible doubt, consequently a few groups arise that are given varietal ranking even though they are readily differentiated from their species by structural characters. The writer has before him three nymphs structurally different but there is no data as to which species these nymphs belong, consequently these cannot be named at present.

Aphalara calthae Linnaeus

(Pls. I and II)

Length to tip of forewing, 2.6 mm.; forewing, 2.2 mm.

General color orange to red-orange; light median stripe present on prescutum; six light stripes on scutum, sometimes with two median stripes fused into one large blaze.

Forewing over two and a half times as long as broad, clear; dark spot present at termination of Cu_2 . Anal vein finely serrate.

Male forceps with cephalic margin relatively straight, caudal margin longer than cephalic and slightly bulged for apical third, apex obliquely truncate with notch apparent between forcep proper and anterior-mesal process in lateral aspect; anterior-mesal process distinct, with rounded apex in lateral aspect.

Female genitalia with dorsum of dorsal valve evenly and gradually arcuate in lateral aspect, pubescence short. Circum-anal ring gradually and gently expanded in width on caudal arc.

Description based on two male and two female specimens bearing the following data: West Coll., Brit. Mus., 1919, 339, No. 5018.

Aphalara simila n. sp.

(Pls. I and II)

Length to tip of forewing, 2.6-3.2 mm.; forewing, 2.2-2.3 mm.

General color similar to *calthae*. Head greatly deflexed; thorax strongly arched. Forewing two and a half times as long as broad, hyaline; Cu_1 more arched than in *calthae*, distance between marginal termination of Cu_1 and Cu_2 greater.

Male forceps very similar to *calthae* in having the sides subparallel with the caudal margin bulged apically in lateral aspect; differing by having the apex less obliquely truncate, the anterior-mesal process projecting more cephalad and less distinctly separated from forcep. Oedeagus less angulate with heavier basal portion.

Female genital segment longer than in *calthae*, apical third of dorsal valve somewhat proboscis-like and slightly bent ventrad. Circum-anal ring of even width for entire circumference. (Two pores).

Male holotype and *female allotype* collected by D. M. DeLong at Shoshone Basin, Idaho, VII-27-30 are in his collection at Ohio State University. A long series of paratypes from California, Colorado, Idaho, Oregon, Utah, Washington, and Wyoming are in the collections of the U. S. National Museum, D. M. DeLong and Herbert Osborn.

***Aphalara persicaria* n. sp.**

(Pls. I and II)

Length to tip of forewing, 2.6-3.2 mm.; forewing, 2.2-2.3 mm.

Colored similar to *calthae*. Forewing at least two and a half times as long as broad, hyaline, sometimes with a suggestion of fumation in apical portion; termination of all veins darkened; Cu_1 highly arched; anal vein finely serrate.

Male forceps short, sides subparallel, apex squarely truncate; anterior-mesal process subrectangular, not quite reaching to apex of forcep. Apical portion (Segment?) of oedeagus longer than forceps; shank rather long and straight, apex strongly hooked.

Female genitalia with dorsum of dorsal valve sinuate caudad to anal-opening; apex of valve rather suddenly narrowed near tip to somewhat nose-like apex. Ventral valve almost equalateral-triangular in lateral aspect. Circum-anal ring greatly expanded caudally, apron-like; caudal margin feebly bilobate.

Studied from a series of 100 specimens from Auglaize Co., Maumee Co., and Pickaway Co., Ohio. *Male holotype*, reared in Pickaway Co., Ohio, VIII-1-36 on small lady's thumb, *Persicaria persicaria* L., and *female allotype*, collected in Pickaway Co., Ohio, VIII-25-35 by the writer, are in his collection. Paratypes are in the Herbert Osborn collection, the DeLong collection, the Ohio Biological Survey collection and the writer's collection at Ohio State University, and the U. S. National Museum at Washington, D. C.

***Aphalara persicaria* var. *cubana* n. var.**

(Pl I)

Length to tip of forewing, 2.4-2.6 mm.; forewing, 1.8-2.2 mm.

Appearing smaller and darker than *persicaria*. Forewing almost three times as long as broad, hyaline with a decided dark spot at the termination of Cu_2 . Arch of vein Cu_1 very similar to the typical *Persicaria persicaria*.

Forceps of the male more obliquely truncate than in *persicaria*. Female genital segment very similar except that the contour of the dorsal valve in lateral aspect has the curve less pronounced, the apex of the valve is heavier, and the caudal expansion of the circum-anal ring is less extensive and lies on a concave plane rather than convex.

Description based on *male holotype* (No. 52216), *female allotype* one other male and two other female specimens from Havana, Cuba, (Baker). *Types* are in the U. S. National Museum.

***Aphalara nigra* n. sp.**

(Pls. I and II)

Length to tip of forewing, 2.5–2.8 mm.; forewing, 2.2 mm.

General color chocolate-brown to black; vertex sometimes margined with gray; two light spots present on pronotum; prescutum with a light median blaze; scutum with four light stripes.

Forewing less than two and a half times as long as broad, slightly rugose, colored brown throughout.

Forceps of male with cephalic margin straight; caudal margin strongly bulged for apical third, apex sinuate and elevated caudad; anterior process apparently entirely fused to forcep.

Dorsum of dorsal female valve strongly indented at mid-length. Circum-anal ring elongate-oval in form, two pores in width for entire circumference except for abruptly expanded caudal area which is four to seven pores in width.

Described from types in a series of 31 specimens collected by Mr. H. E. McClure at Churchill, Manitoba, during July and August.

Male holotype and *female allotype* are in the Ohio State University collection. Paratypes are in the McClure collection at Peru, Ill., and the writer's collection at Ohio State University.

***Aphalara dentata* n. sp.**

(Pls. I and II)

Length to tip of forewing, 2.5–2.9 mm.; forewing, 2.–2.5 mm.

General color darker than *calthae*. Forewing about two and a half times as long as broad; entire membrane yellowish with a subapical brown band tending more toward the commissural margin than costal, brown spot present on commissural margin before termination of Cu_2 . Cu_1 rather arched, making the cubital cell rather broad for its length (about a 1:2 ratio).

Forcep of male with long anterior-mesal process prominently separated from forcep; apex of forcep-proper rather broad and slightly peaked caudad.

Female genitalia with dorsum of dorsal valve greatly lowered caudad to anal-opening; apex of caudal half of valve bent ventrad, very prominently proboscis-like. Circum-anal ring with broadly expanded apron lying in an almost perpendicular position on dorsum of valve.

Described from types in a series of fourteen specimens from Placer Co., Calif., Sept., (A. Koebele), and one specimen from Medicine Bow, Wyoming. *Types* are in the U. S. National Museum. *Holotype* (No. 52217).

***Aphalara maculata* n. sp.**

(Pl. I)

Length to tip of forewing, 2.-2.4 mm.; forewing, 1.6-1.9 mm.

Appearing as dark as *dentata*. Forewing almost two and a half times as long as broad; prominent dark brown band present subapically with heavy brown maculae extending along apical extensions of veins; large brown area present on commissural margin before termination of Cu_2 tending to unite with the base of the subapical band.

Male forceps with anterior-mesal process distinctly but not widely separated from forcep; apex of forcep appearing peaked, more so than in other known males of related species.

Female genitalia short. Dorsum of dorsal valve straight for more than half length then abruptly proceeding ventrad at an obtuse angle. Circum-anal ring two pores in width for entire circumference.

Male holotype (No. 52218), *female holotype*, and one imperfect specimen bearing the following data: Nevada Co., Calif., Castle Rock, Sept., A. Koebele, are in the U. S. National Museum.

*** *Aphalara confusa* n. sp.**

(Pls. I and II)

Length to tip of forewing, 2.5-2.7 mm.; forewing, 2. mm.

General color and markings of *calthae*, possibly lighter. Forewing less than two and a half times as long as broad, hyaline; Cu_1 usually very highly arched, distance between termination of Cu_1 and Cu_2 very short.

Forceps of male relatively broad for length; anterior-mesal process very widely separated from apex of forcep in lateral aspect. Apical portion of oedeagus relatively short, more so than in other known members of this group.

Female genitalia resembling *simila* except that apex of dorsal valve is less extended proboscis-like, in this respect it bears close resemblance to *calthae*. Circum-anal ring of even width for entire circumference.

Described from types in a series of four male and sixteen female specimens from Yellowstone National Park, Wyoming, VII-4-30, DeLong. *Types* are in the DeLong collection at Ohio State University.

***Aphalara curta* n. sp.**

(Pls. I and II)

Length to tip of forewing, 2.6-2.9 mm.; forewing, 2.1-2.2 mm.

General color appearing more red than *calthae*. Forewing less than two and a half times as long as broad; dark areas usually present at terminations of all veins; subapical faint brown cloud usually present.

Forceps of male with sides subparallel to slightly divergent apically in lateral aspect; anterior-mesal process long, widely separated from apex of forcep giving the total apical portion of the forcep a pincer-like appearance in dorso-lateral aspect with the forcep proper the heavier of the two arms.

Lateral aspect of female genitalia resembling *calthae* except for depression in center of dorsum of dorsal valve and longer pubescence. Anal-opening large. Circum-anal ring gently expanded caudad apron-like; apron smaller than in *loca* and larger than in *calthae*, usually slightly larger than anal-opening.

Male holotype from Tomah, Wisconsin; *female allotype*, Sparta, Wisconsin, both taken in April by J. G. Saunders, are in the DeLong collection at Ohio State University. *Paratypes* from Kansas, Nebraska, Colorado, Arizona, Iowa, South Dakota, Utah, Wyoming and Wisconsin are in the U. S. National Museums. DeLong and Herbert Osborn collections, Columbus, Ohio.

***Aphalara curta* var. *californica* n. var.**

Differing from the typical *curta curta* by slightly smaller size and by having the female genitalia with the dorsum straighter in lateral aspect. Circum-anal ring with caudal apron usually less broad and smaller, usually smaller than anal-opening.

This variety is represented by a series of specimens from Alameda, Calif., (Koebele) and from Fish Camp, Calif., (Beery). *Types* are in the U. S. National Museum except two paratypes in the writer's collection. *Holotype* (No. 52219).

***Aphalara loca* n. sp.**

(Pls. I and II)

Length to tip of forewing, 2.-2.6 mm.; forewing, 1.8-2.3 mm.

General color dark, usually with a more red appearance than *calthae*. Forewing almost two and a half times as long as broad, hyaline, sometimes with an indistinct subapical cloudy band; marginal terminations of veins usually darkened, especially Cu_2 ; cubital cell similar in shape and form to *persicaria*.

Male forceps with anterior-mesal process widely separated from forcep, not reaching apex of forcep. Entire apex of forcep appearing pincer-like in dorso-lateral aspect. The male may be confused with *curta* but the forcep is usually smaller proportioned and the anterior-mesal process is usually shorter.

In profile, the female genitalia resembling *curta* but easily distinguished by the small round anal-opening and the caudal extension of the circum-anal ring into a very large apron.

Holotype male from Ft. Collins, Colo., and *female allotype* from Ontario, Calif., are in the Herbert Osborn collection, Ohio State University. *Paratypes* from California, Arizona, Colorado, New Mexico, Illinois, Iowa, Oregon, Tennessee, Washington State and Washington, D. C. are in the U. S. National Museum collection and Herbert Osborn collection, Ohio State University.

***Aphalara nubifera* Patch**

(Pls. I and II)

Length to tip of forewing, 2.9 mm.; forewing, 2.3-2.4 mm.

Specimens on slides, color and markings unknown. Forewing less than two and a half times as long as broad, markings similar to *curta* except that dark area on anal vein mid-way between base and termination of Cu_2 is more prominent, edge of vein along dark area distinctly, minutely serrate.

Forceps of male mounted in balsam so that only cephalic aspect can be noted. Anterior-mesal process much lower than apex of forcep and apparently widely separated.

Female genitalia much longer and larger than in any known related species. Specimen mounted on slide, shape and structure of circum-anal ring undetermined.

One *male logotype* (?) consisting of two forewings, one head, one abdomen, and broken genital segment, with data, Ft. Collins, Colo., VI-13-99, host *Sisymbrium canescens*, is in the Gillette collection at Ft. Collins, Colo.

One whole *female allotype* (?) bearing the same data is in the collection of Miss Patch at Orono, Maine.

With the above mentioned types I associate specimens of the U. S. National Museum from Colorado, Utah, and Washington, but with only the profile of the female genitalia, the cephalic aspect of the male forceps, and the forewing characters to rely upon, the determination is not absolutely reliable. In Plates I and II are views of the circum-anal ring and lateral aspect of the forceps of the associated specimens.

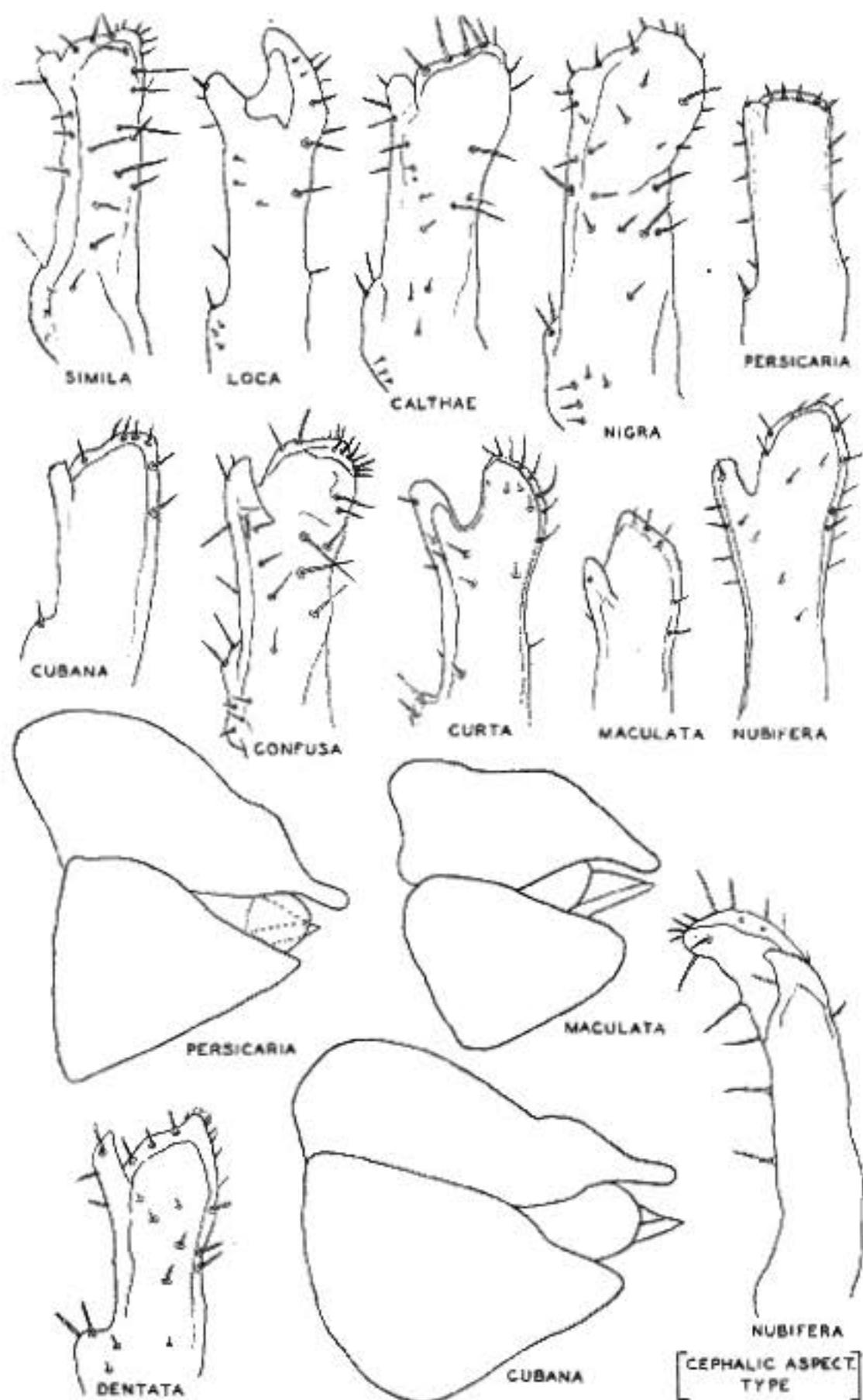
***Aphalara nubifera* Patch var. *reducta* n. var.**

Length to tip of forewing, 2.8 mm.; forewing, 2.3 mm.

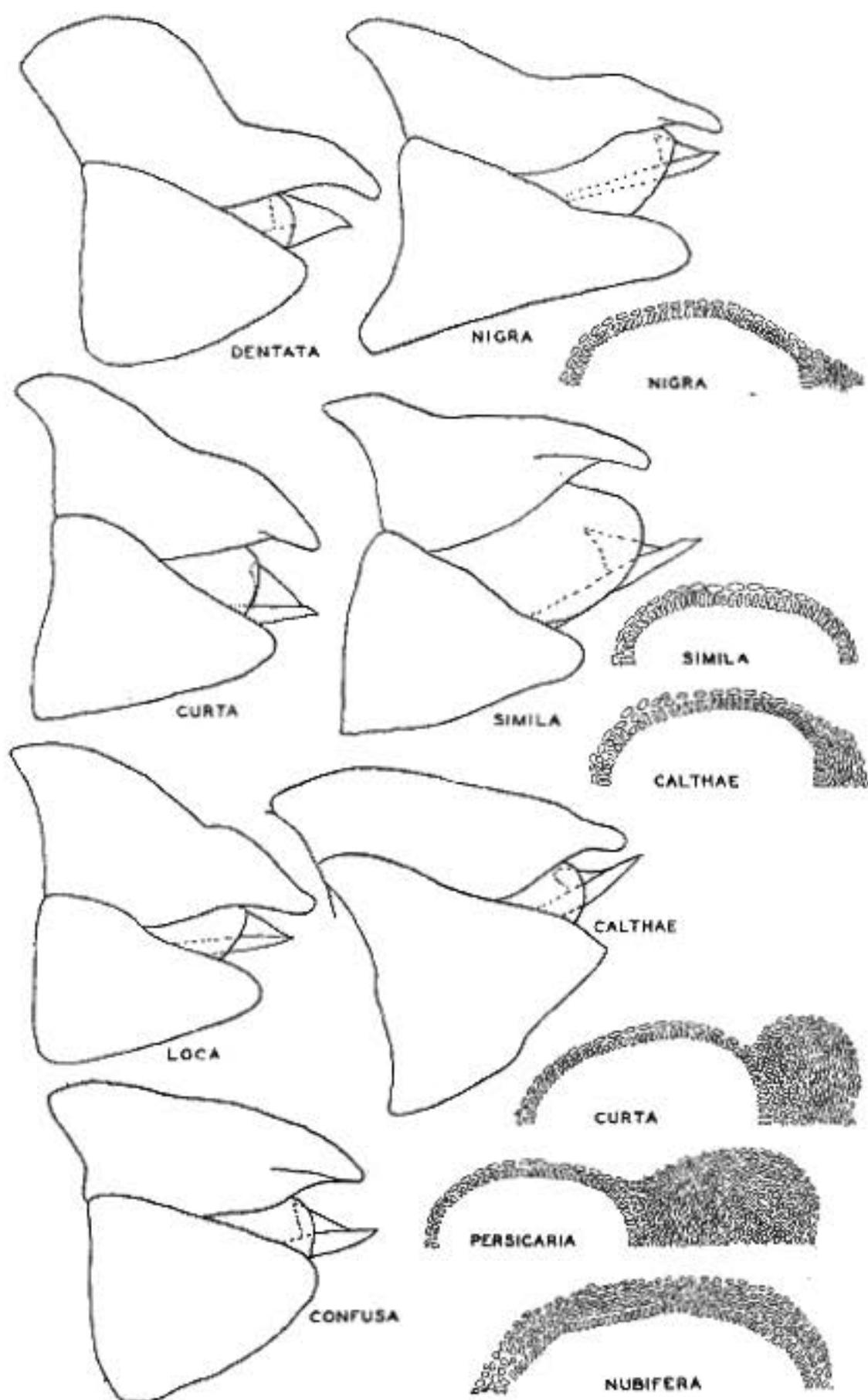
General color light orange. Forewing less than two and a half times as long as broad; markings similar to *nubifera* except much denser; Cu_1 highly arched which is contrary to *nubifera* and associated specimens.

Length of female genitalia approximating that of *nubifera nubifera* (0.44 mm.). Dorsum of dorsal valve straight after lowering from anal-opening. Circum-anal ring two pores in width to caudal half, thence irregularly three and four pores in width.

Holotype female in the Herbert Osborn collection, Ohio State University, with the following data: Me. Ag. Exp. Sta., VI-27-1916.



Species and varieties of *Aphalara*. Lateral aspect of male forceps and female genitalia.



Species of *Aphalara*. Lateral aspect of female genitalia and dorsal aspect of one-half of circum-anal ring.

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RESUMÉ AND CONCLUSIONS TO PAUL MARCHAL'S
EXTENDED PAPER ON THE TRICHOGRAMMAS^{1,2}

Translated into English by

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The egg-eating hymenopterous parasites ordinarily known under the name *Trichogramma evanescens* are composed of numerous biotypes differing especially in their methods of reproduction and in their reactions to the factors of environment or to the attraction exercised by the hosts.

Our attention is principally devoted to one of these biotypes, which we have called *Trichogramma cacaeciae*, and which differs from the typical *T. evanescens* by a remarkable group of biological characteristics.

In nature this form is a parasite of the egg masses of a single-brooded tortricid—*Cacaecia rosana*. The complete annual cycle comprises two generations, both succeeding in developing upon the same egg mass of the *Cacaecia* or in two neighboring and contemporaneous masses.

These two generations present different characters: There is seasonal dimorphism, the post-winter generation being micropterous and relatively pigmented, the summer generation having, on the contrary, normal wings and being of a clear color.

Of the two generations which develop in a single egg mass, only the first has its evolution synchronous with the diapause of the host and has itself a period of diapause; but while for the non-parasitized host it is an embryonic diapause, with the parasite it is a larval diapause.

¹Pages 542-547, *Annales des Epiphyties et de Phytogenetique*, Vol. II, No. 4, 1936.

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