CESARE CONCI
Museo Civico di Storia Naturale di Milano
LIVIO TAMANINI
Museo Civico di Rovereto (Trento)

The nymph of *Phylloplecta trisignata* (Löw) and new data on the morphology and the life history of the species (Homoptera Psylloidea Triozidae) (1)

1. Introduction

The Authors in a former work (Conci & Tamanini, 1984) redescribed *Trioza trisignata* Löw, 1886, an interesting species from South Europe and East Mediterranean Basin, living on *Rubus*; this species was attributed by us to North American genus *Phylloplecta* for the morphology of adult and egg and for the life history.

Subsequently we have collected some nymphs, till now unknown. Here we describe the last instar nymph, which has peculiar characters, and we specify some other details of the morphology of the adult parameres and of the life history of the species.

The nymph of *Phylloplecta* is not considered in the very recent synthesis of White & Hodkinson (1985).

2. Description of the last instar nymph

Terminology and symbols follow White & Hodkinson (1982).

Morphology. Body (fig. 1) of regular oval form, of typic triozine aspect.

Antennae (fig. 2) shorter than the breadth of the head; five segments are distinguishable, which correspond to segments I, II, II-IV, V-VI and VII-X of the adult; the rhinaria are four, one for each apex of

(1) The AA are very pleased and honoured of publish this work in the volume dedicated to the 100th anniversary of the birth of the illustrious Prof. Guido Grandi, the Master of the Italian Entomologists.

antennal segments III and IV and two on the segment V; the apex of antenna has a simple sensorial hair, with near the sensorial groove, and a second stronger sensorial hair.

Forewing-pads surpass forward, as a humeral lobe, the posterior level of the eye. Hyalin, triangular arolium (figs. 3-4).

Abdomen roundish, with four stigms for each side; sclerified plates not distinguishable. Anal opening and circumanal pore ring (fig. 5) on lower surface of abdomen, without reaching its posterior margin. The perianal glands constitute a ring of complex form, laterally with many glands of indefinite form; anteriorly and posteriorly, near the anus, there is a single row of normal large, almost rectangular, longitudinal pores. This glandular pore ring is distinctly different from those of all other European Triozidae; it is slightly similar to the one of *Lauritrozia alacris,* which however has other distinctive characters, of generic level.

Chaetotaxy includes normal hairs and marginal truncate ringed sectasetae. Normal hairs of dorsal surface of the body are numerous, very short (about 15 micron) and placed enough uniformly. The lower surface of the body and the legs have few hairs, of length between 30 and 90 microns. The marginal setae are only truncate ringed sectasetae (figs. 6, 7, 8), disposed not only exactly on the margin, but also a little above or below, above all on the abdomen, where they tend to be arranged in a double row. The number of the truncate ringed sectasetae is the following, for each half body: head 21-23; forewing-pad 60-63; hindwing-pad 3-4; abdomen 85-95. The length of the truncate ringed sectasetae is the following, in microns: head 29-30; forewing-pad 35-40; hindwing-pad 40; abdomen 28-31.

Coloration. Clear green is dominant; some specimens have on the upperparts a clear brown, elongated spot, on the middle of the thorax. Also the other preimaginal stages are clear green. This very clear coloration caused difficulty in the identification of some morphological particularities.

Measurements, in mm. Antennal length (AL) 0.41-0.50; circumanal ring breadth (ARB) 0.51-0.53; body breadth (BB) 1.3-1.6; body length (BL) 1.87-2.33; abdominal breadth 1.06-1.22; abdominal length 0.77-1.07; forewing-pad length (WL) 1.12-1.23. *Ratios.* Antennal length/forewing-pad length (AWL) 0.37-0.40; body breadth/length (BBBL) 0.68-0.69; abdominal breadth/length 1.14-1.37.

Material. The present description is made on about twenty mature nymphs, collected, with about thirthy specimens of other instars, by Conci, Rapisarda and Tamanini in Italy, Trentino, Commune Terragnolo, between the localities Castello and Rovri, along the road Rovereto-Serrada, m 900, the 29.VIII.85, on *Rubus* sp., in a sheltered and damp

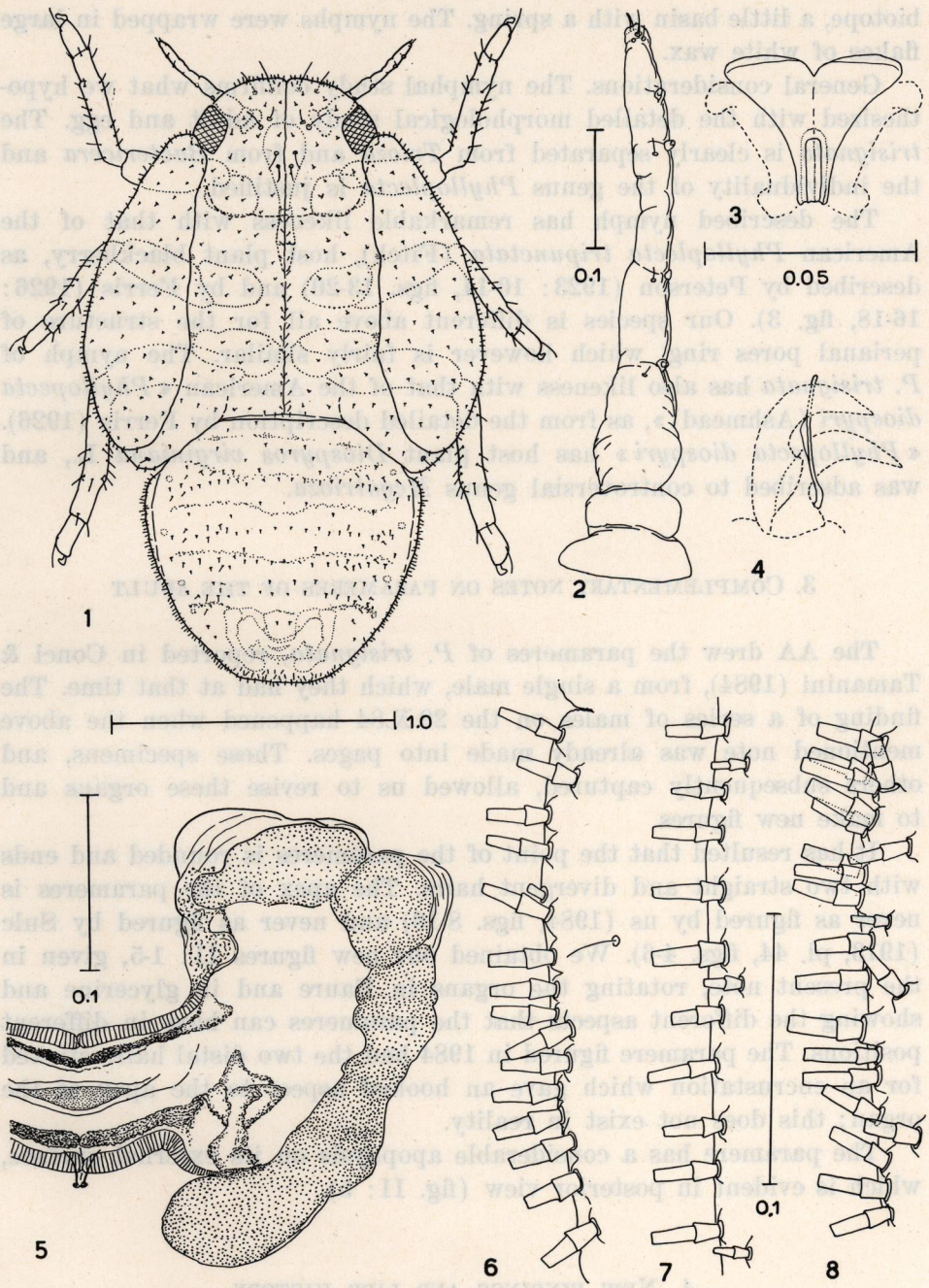

FIG. I

Phylloplecta trisignata (Löw). - Last instar nymph, specimens from Terragnolo (Trentino). - 1. Whole nymph, dorsal. - 2. Antenna. - 3. Arolium, ventral. - Arolium, lateral. - 5. Circumanal pore field. - 6. Cephalic sectasetae. - 7. Forewing-pad sectasetae. - 8. Abdominal sectasetae, at about half of the margin.

biotope, a little basin with a spring. The nymphs were wrapped in large flakes of white wax.

General considerations. The nymphal study confirms what we hypothesized with the detailed morphological study of adult and egg. The *trisignata* is clearly separated from *Trioza* and from *Bactericera* and the individuality of the genus *Phylloplecta* is justified.

The described nymph has remarkable likeness with that of the American *Phylloplecta tripunctata* (Fitch), host plant blackberry, as described by Peterson (1923: 10-14, figs. 13-20) and by Ferris (1926: 16-18, fig. 3). Our species is different above all for the structure of perianal pores ring, which however is fairly similar. The nymph of *P. trisignata* has also likeness with that of the American « *Phyllopecta diospyri* (Ashmead) », as from the detailed description by Ferris (1926). « *Phyllopecta diospyri* » has host plant *Diospyros virginiana* L., and was adscribed to controversial genus *Megatrioza.*

3. Complementary notes on parameres of the adult

The AA drew the parameres of *P. trisignata,* reported in Conci & Tamanini (1984), from a single male, which they had at that time. The finding of a series of males on the 29.X.84 happened when the above mentioned note was already made into pages. These specimens, and others subsequently captured, allowed us to revise these organs and to make new figures.

It has resulted that the point of the parameres is rounded and ends with two straight and divergent hairs. The apex of the parameres is never as figured by us (1984, figs. 8-10) and never as figured by Sulc (1913, pl. 44, figs. 4-6). We obtained our new figures II: 1-5, given in the present note, rotating the organs in Faure and in glycerine and showing the different aspects that the parameres can have in different positions. The paramere figured in 1984 had the two distal hairs sticked for an encrustation which gave an hooked aspect to the apex of the organ; this does not exist in reality.

The paramere has a considerable apophysis on its external surface, which is evident in posterior view (fig. II: 5).

4. New findings and life history

After the findings reported in Conci & Tamanini (1984: 257-258) we have the following findings, all of which in North Italy:

T r e n t i n o , Province Trento, Rovereto, m 270, 4.X.84, 1 ♂; Ro-

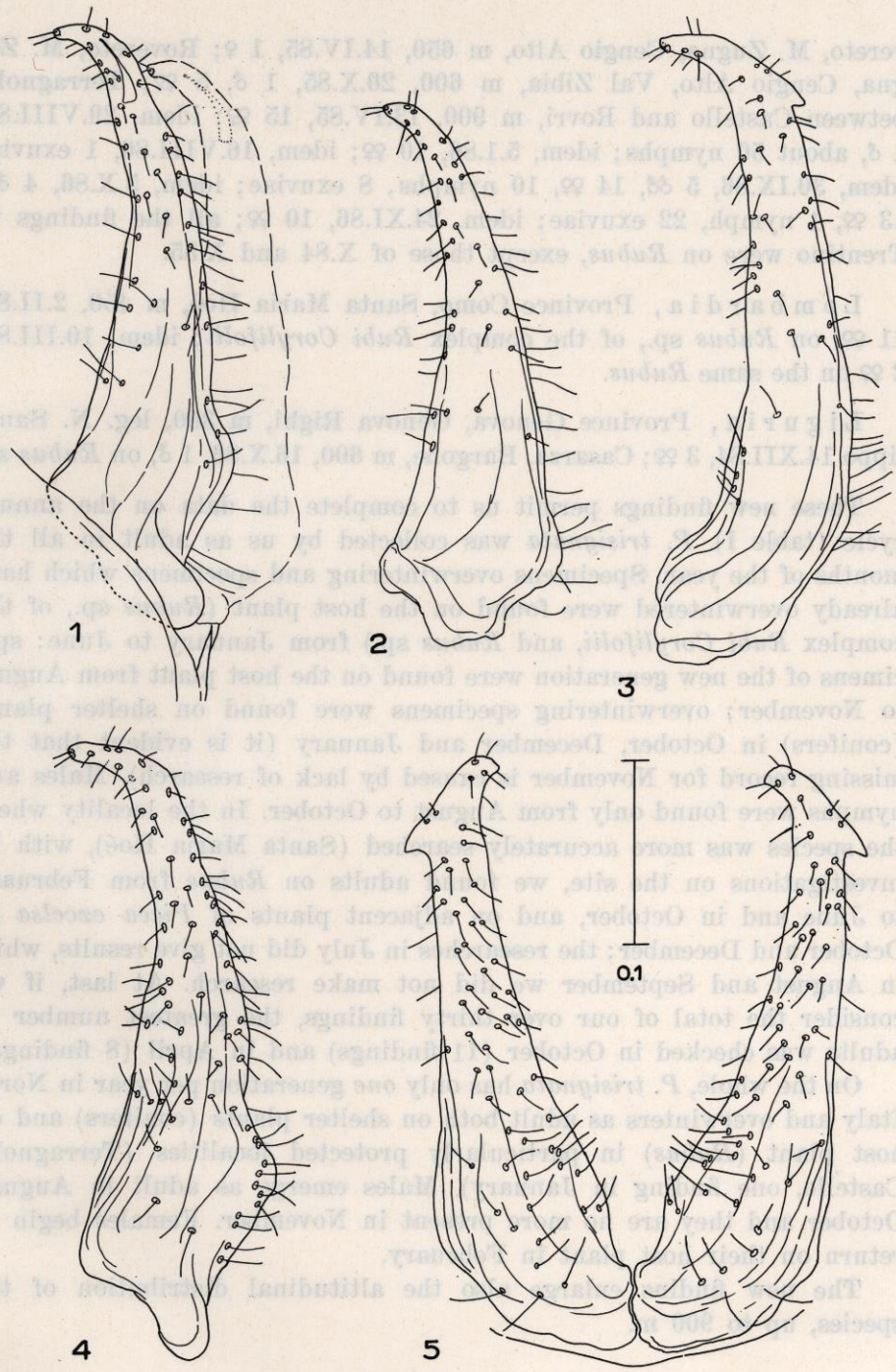

Fig. II

Phylloplecta trisignata (Löw). - Parameres, specimens from S. Maria Hoé (Lombardia). - 1. Left paramere, outer; the right paramere is dashed. - 2. Left paramere, outer, with different visual angles. - 3. Idem, a little diagonally. - 4. Right paramere, inner. - 5. The parameres connected, posteriorly.

vereto, M. Zugna, Cengio Alto, m 650, 14.IV.85, 1 ♀; Rovereto, M. Zugna, Cengio Alto, Val Zibia, m 600, 20.X.85, 1 ♂, 5 ♀♀; Terragnolo, between Castello and Rovri, m 900, 13.IV.85, 15 ♀♀; idem, 29.VIII.85, 1 ♂, about 50 nymphs; idem, 5.1.86, 10 ♀♀; idem, 16.VIII.86, 1 exuvia; idem, 30.IX.86, 5 ♂♂, 14 ♀♀, 10 nymphs, 8 exuviae; idem, 5.X.86, 4 ♂♂, 13 ♀♀, 1 nymph, 22 exuviae; idem, 24.XI.86, 10 ♀♀; all the findings in Trentino were on *Rubus,* except those of X.84 and X.85.

Lombardia, Province Como, Santa Maria Hoè, m 450, 2.II.85, 11 ♀♀, on *Rubus* sp., of the complex *Rubi Corylifolii*; idem, 10.III.85, 2 ♀♀ on the same *Rubus.*

Liguria, Province Genova, Genova Righi, m 300, leg. N. Sanfilippo 14.XII.84, 3 ♀♀; Casarza, Bargone, m 600, 16.X.86, 1 ♂, on *Rubus* sp.

These new findings permit us to complete the data on the annual cycle (table I). *P. trisignata* was collected by us as adult in all the months of the year. Specimens overwintering and specimens which have already overwintered were found on the host plant (*Rubus* sp., of the complex *Rubi Corylifolii,* and *Rubus* sp.) from January to June; specimens of the new generation were found on the host plant from August to November; overwintering specimens were found on shelter plants (conifers) in October, December and January (it is evident that the missing record for November is caused by lack of research). Males and nymphs were found only from August to October. In the locality where the species was more accurately searched (Santa Maria Hoé), with 12 investigations on the site, we found adults on *Rubus* from February to June and in October, and on adjacent plants of *Picea excelsa* in October and December; the researches in July did not give results, while in August and September we did not make research. At last, if we consider the total of our over thirty findings, the greatest number of adults was checked in October (11 findings) and in April (8 findings).

On the whole, *P. trisignata* has only *one* generation per year in North Italy and overwinters as adult both on shelter plants (conifers) and on host plant (*Rubus*) in particularly protected localities (Terragnolo, Castello, one finding in January). Males emerge as adult in August-October and they are no more present in November. Females begin to return on their host plant in February.

The new findins enlarge also the altitudinal distribution of the species, up to 900 m.

TABLE I: Life history cycle of *P. trisignata* in North Italy.

Findings

Month	Jan	F	M	A	M	J	J	A	S	O	N	Dec
Adults females	+	—	—	—	—	—	○	—	—	+	—	|
Only adults at S. Maria Hoé		—	—	—	—	—				+		|
Males								—	—	—		
Nymphs								n	n	n		

— = findings of adults on host plant (*Rubus*)
| = findings of adults on shelter plants (conifers)
+ = findings of adults both on host plants and on shelter plants
○ = findings of adults without a specification of the plant
n = findings of nymphs.

ABSTRACT

The AA describe, with 8 figures, the last instar nymph of *Phylloplecta trisignata*, till now unpublished. The peculiar structure of the perianal glands of the nymph confirm the separated position of *Phylloplecta* in comparison with *Bactericera* and *Trioza*. Life history of the species in here better specified owing to new findings in North Italy (Trentino, Lombardia and Liguria); *P. trisignata* has one generation per year and overwinters as adult both on shelter plants (conifers) and on host plants (*Rubus*). Finally, 5 figures of the parameres of the adult are given, in order to specify better their morphology.

La ninfa della *Phyllopecta trisignata* (Löw) ed ulteriori notizie sulla morfologia e la biologia della specie (Homoptera Psylloidea Triozidae).

RIASSUNTO

Viene descritta la ninfa all'ultimo stadio della *Phylloplecta trisignata*, finora ignota. La struttura peculiare delle ghiandole perianali della ninfa conferma la posizione separata di *Phylloplecta* rispetto a *Bactericera* ed a *Trioza*. Viene ulteriormente specificato, in base a nuovi rinvenimenti in Trentino, Lombardia e Liguria, il ciclo vitale della specie nel Nord Italia: *P. trisignata* ha una sola generazione annuale e sverna come adulto sia su piante di rifugio (conifere) sia sulla pianta nutrice primaria (*Rubus*). Sono riportate infine 5 figure dei parameri dell'adulto, per meglio specificarne la morfologia.

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