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Biotaxonomic experiments proving *Zygina pruni* Edwards 1924 is a synonym of *Zygina (Flammigeroidia) flammigera* (Fourcroy 1785) (Hom. Auch. Cicadellidae, Typhlocybinae)<sup>1</sup>

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Breedings from females of *Zygina (F.) flammigera* FOURCROY, one from northern Switzerland (410 m) and one from the mountain region (1240 m), were started on young cherry and apple trees in a growth chamber. The age in days of the direct offspring of these two females was recorded and it was proved that the characteristics of an approximately 3-day old specimen of *F. flammigera* correspond to those of *Zygina (F.) pruni* EDWARDS. From the 4th to 5th day all the checked characteristics – such as colour of pronotum and forewings, colour of the hind tarsi of the male and shape of the apophyses of the second abdominal sternite of the male – reach the stage where they are identical to those of *F. flammigera*.

In EDWARDS' (1924) description of *Zygina (Flammigeroidia) pruni* it is mentioned that this leafhopper is common on the domestic cherry tree *Prunus avium*. The orange rather than carmine red zig-zag stripe on the forewings of *F. pruni* allows to differentiate *Z. pruni* from *Flammigeroidia flammigera* (FOURCROY 1785, see also EDWARDS 1896), and represents the only characteristic which can be used to separate both species. RIBAUT (1936) adds to the description the observation that the hind tarsi of the males are pale and not smoky as in other species of *Flammigeroidia*.

To date, in spite of intensive efforts (GÜNTHART, 1971), I have not been able to find a single unambiguous specimen of *F. pruni*. Various specimens seen in the museums of Prague, Budapest, London and Lausanne have always given rise to the suspicion that we are dealing with very young *F. flammigera* and not with a different species.

In recent years I have bred 8 species of *Flammigeroidia* (*angusta* LETHIERRY 1874; *flammigera* Fourcroy, 1785; *ordinaria* RIBAUT, 1936; *rosincola* CERUTTI, 1939; *rhamnocola* HORVATH, 1903; *rhamnocola forma inconstans* RIBAUT, 1936; *schneideri* GÜNTHART, 1974; and *tiliae* FALLÉN, 1806) for a number of generations or years and observed that the insect colouring as well as the apophyses of the second abdominal sternite change for at least three days after ecdysis of the adult (GÜNTHART, 1977).

On June 15, 1978 I started a new breeding of *F. flammigera* with one open air female from a cherry tree in northern Switzerland (Rüdlingen SH, 410 m) in a growth chamber using a daily 17 h light period (Philips fluorescent tubes, light colour 29 and 33, 188 W m<sup>-2</sup>, light intensity 80 micro-einsteins m<sup>-2</sup>sec<sup>-1</sup> between wavelengths 400–700 nm); on July 19 a second breeding of one female from a plum tree in the mountain region (Scuol GR, 1240 m). From the direct offspring of these two females, colouring of the pronotum and forewings and of the hind-tarsi as well as the apophyses of the second abdominal sternite were investigated

<sup>1</sup>This paper was presented at the Third Auchenorrhyncha Meeting in Wageningen, Netherlands, September 1978.

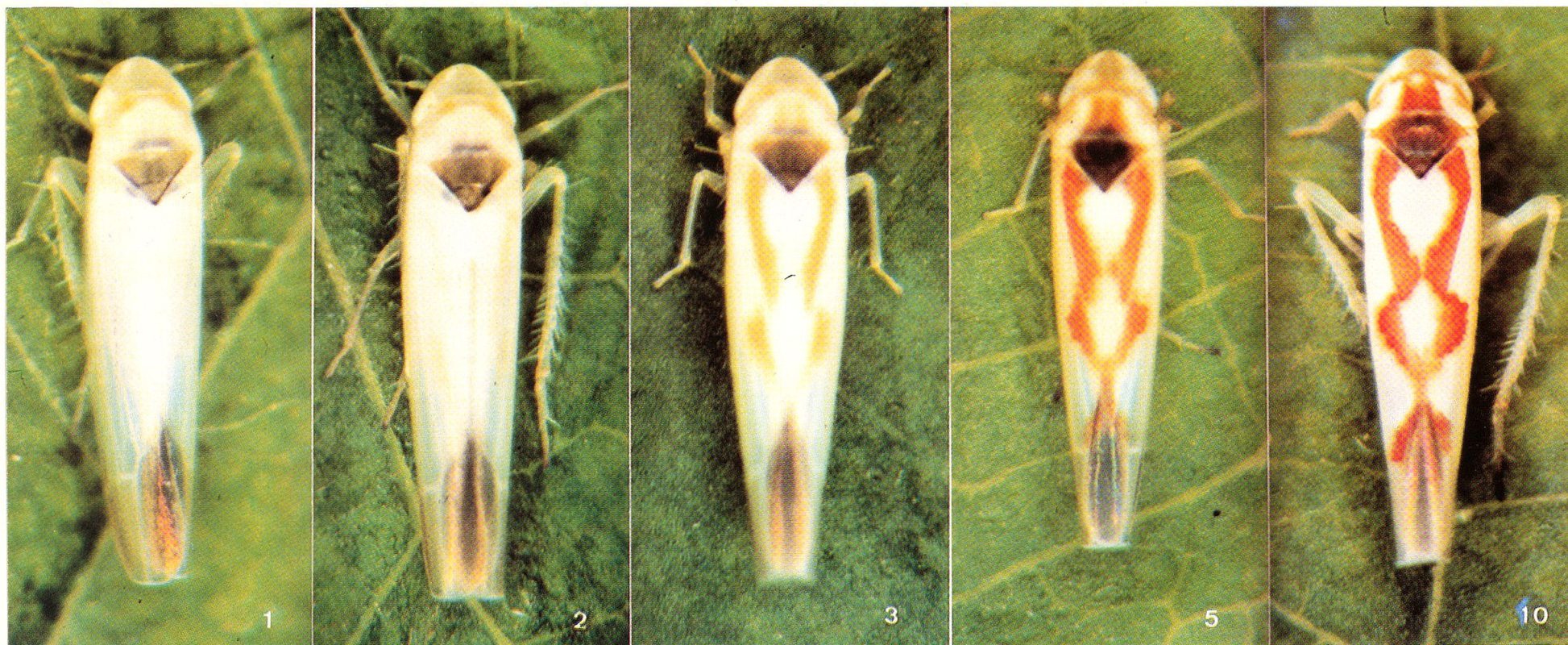


Fig. 1: *Flammigeroidia flammigera*, a developing male specimen feeding on an apple leaf. From left to right: 0-1 day old male, 1-2 days old male, 2-3 days old male (the colour of the pronotum and forewings at this age corresponds to the description of *Zygina pruni*), 4-5 days old male, and 9-10 days old male (after 4-5 days the specimens correspond to typical *F. flammigera*).

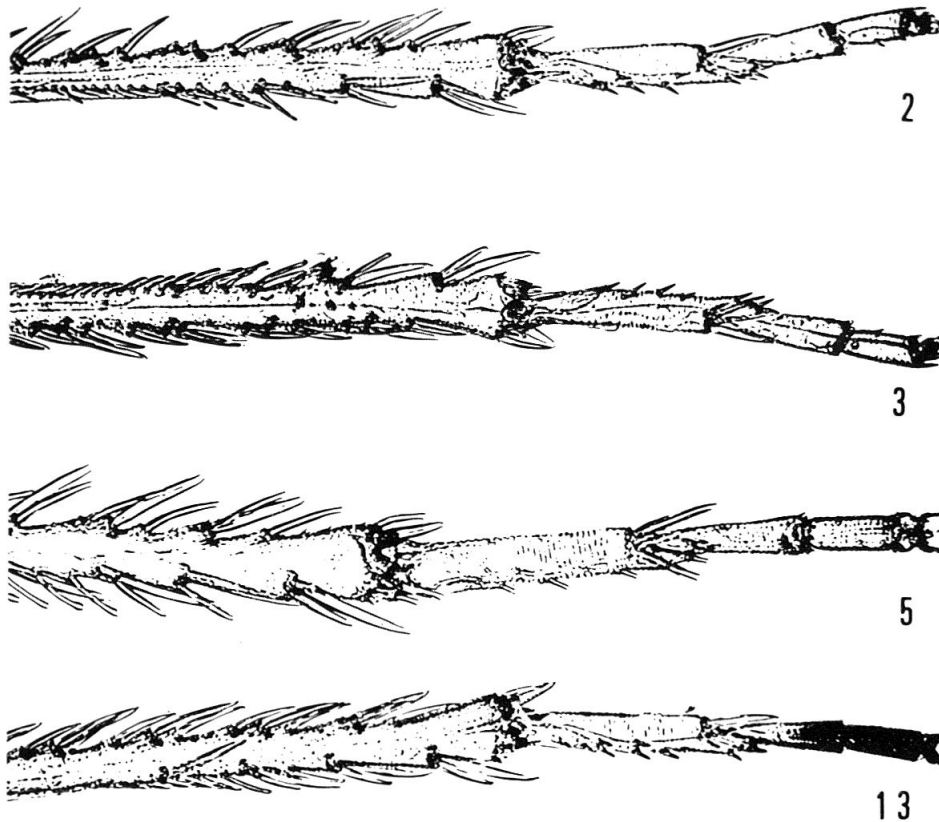


Fig. 2: *Flammigeroidia flammigera*, hind tarsi of males. From top to bottom: 2-day old male, 3-day old male, 5-day old male, and 13-day old male. Up to the 5th day, the hind tarsi are still pale to brownish in colour as in the description of *Z. pruni*; later the last 1½ tarsi become darker, then blackish as for *F. flammigera*.

at various stages of known age after adult ecdysis. To determine the age, each nymph was kept isolated on a cherry or apple seedling and checked every day. Both breedings gave exactly the same results.

*The change of colour of the pronotum and forewings* after ecdysis are shown at the various ages of the same male feeding on apple-leaves in the colour plate (fig. 1). On the first day only the smoky colour of the scutellum and inner apical cell of the forewing are striking in appearance; no yellow or orange zig-zag is visible.

On the second and even more pronounced on the third day, an almost straight yellow line in the basal part of the cubitus can be discerned, while the vertex and the pronotum still have no orange pattern; that would correspond to *F. pruni* EDWARDS. On the fifth to tenth day we can follow the typical colouration of *F. flammigera*. The original description of EDWARDS (1924) on *Zygina pruni* mentions some observations made in the open air:

«Common on *Prunus avium* at Colesborne, but specimens which will retain in the cabinet the distinctive characteristics are scarce. In a teneral state the species may be found in swarms and the dark scutellum and cell Cu 1a give it a very striking appearance; but by the time that the red elytral stripes are acquired by those specimens which are to possess them (a very small percentage of the whole), the population has so much diminished that specimens are difficult to obtain.»

This is fully explained by our experiment in the growth chamber. («Teneral» = relating to a state of the imago of an insect immediately after molting, during which it is soft and immature in colouring; WEBSTER, 1957/1966)

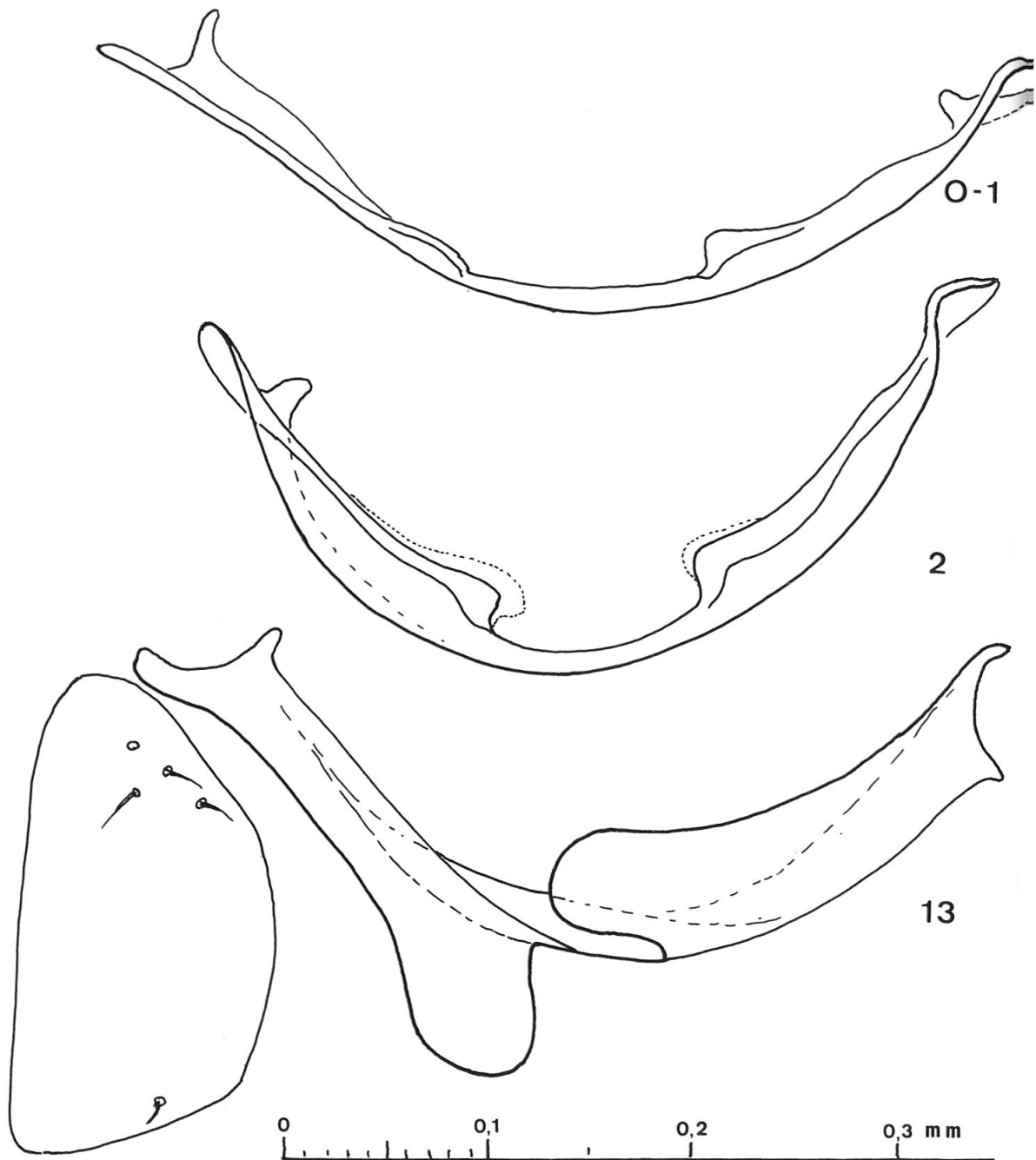


Fig. 3: *Flammigeroidia flammigera*, apophyses of the second abdominal sternite (projection). From top to bottom: 0-1 day old male, 1-2 days old male, and 13-day old male.

*The colour of the hind tarsus of the male is not mentioned in EDWARDS' original description; however RIBAUT (1936) states that the *F. pruni* hind tarsi are pale, and in exceptional cases the last segment is brownish.*

*The hind tarsi of our 1-3 day old *F. flammigera* are still pale, but develop successively from greyish to brownish and later the last and half of the second last segment of the hind tarsi from dark brown to blackish (fig. 2).*

*The shape of the apophyses of the second abdominal sternite shows the same increasing length as described for other leafhoppers in GÜNTHART (1977). The apophyses of a 0 to 1-day old *F. flammigera* are still so short that it is difficult to*

mount them on a flat surface; on the second day they have grown a little, but are still short; after about 5 days they have reached their maximum length (figs. 3 & 4).

If we consider all the characteristics mentioned for *F. pruni* by EDWARDS and RIBAUT, additional remarks by WAGNER (1939) - «on *Prunus spinosa* together with *F. flammigera*» - and DLABOLA (1954) - «hind tarsi of male mostly pale» - an approximately 3-day old *F. flammigera* is identical with *F. pruni*.

*Zygina pruni* EDWARDS (1924) is therefore a synonym of *Zygina (Flammigeroidia) flammigera* FOURCROY (1785).

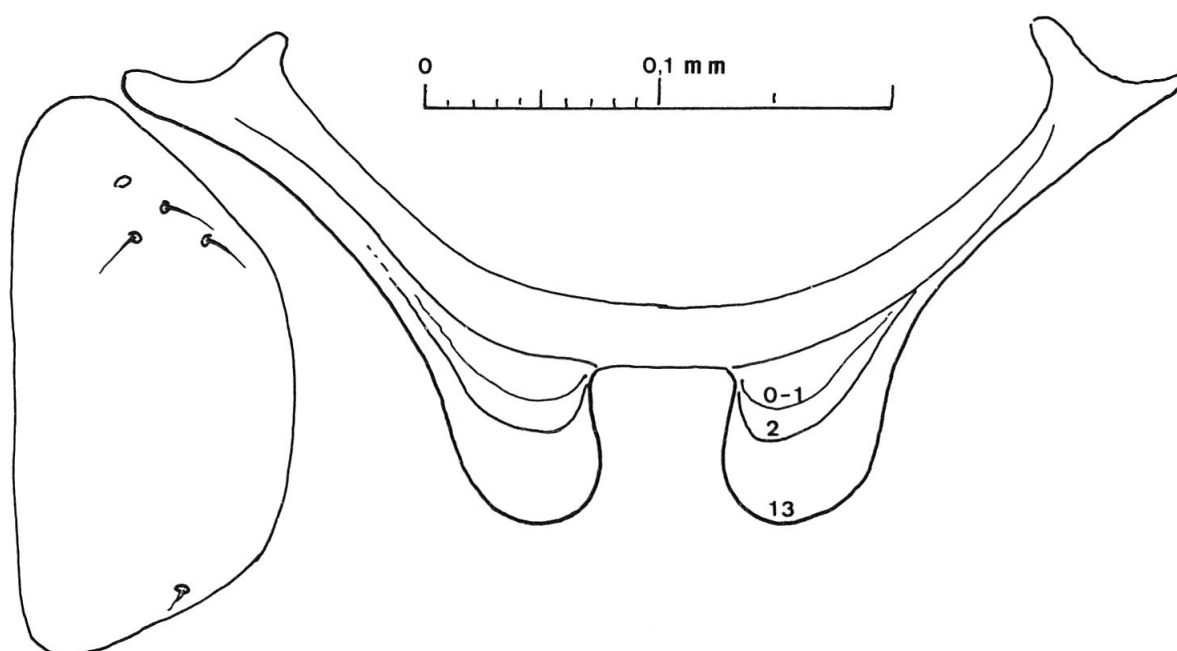


Fig. 4: *Flammigeroidia flammigera*. Drawing of the apophyses of the second abdominal sternite lying flat to show the real dimensions (see also fig. 3).

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