

CESARE CONCI &amp; LIVIO TAMANINI

OBSERVATIONS ON *TRIOZA ROTUNDATA* FLOR  
(Homoptera Psylloidea)

**Abstract** - CESARE CONCI & LIVIO TAMANINI - Observations on *Trioza rotundata* Flor (Homoptera Psylloidea).

*Trioza rotundata* Flor, 1861 is an isolated and interesting species. The aa think that *T. coriacea* is synonym with *T. rotundata*; they report complementary morphological data on the adults and on the V instar nymph and discuss the variability of the adults; they have examined the published data on the host plants, till now restricted to the *Cruciferae* family and they report the detailed geonemy of the species. The aa collected many nymphs on *Stellaria nemorum* ssp. *nemorum* (*Caryophyllaceae*) and on *Saxifraga aizoides* (*Saxifragaceae*); these nymphs, in breeding, hatched many adults. Therefore, *T. rotundata* is a polyphagous species, however lives in preference on *Cardamine* spp. Two nymphs found on *Arabis hirsuta* are probably a new species. The present note gives 46 drawings of details, a photo of a biotope and a distribution map.

**Key words:** *Trioza rotundata*, *Trioza coriacea*, Psylloidea.

**Riassunto** - CESARE CONCI & LIVIO TAMANINI - Osservazioni sulla *Trioza rotundata* Flor (Homoptera Psylloidea).

La *Trioza rotundata* Flor, 1861 è una specie isolata e interessante. Gli AA. ritengono *T. coriacea* sinonimo di *T. rotundata*; riportano dati morfologici complementari su adulti e ninfe al V stadio; discutono sulla variabilità degli adulti; esaminano i dati della letteratura relativi alle piante nutrici primarie, finora limitati alla famiglia *Cruciferae*; riportano infine la dettagliata geonemia della specie. Numerose ninfe rinvenute su *Stellaria nemorum* ssp. *nemorum* (*Caryophyllaceae*) e su *Saxifraga aizoides* (*Saxifragaceae*) e tenute in allevamento, hanno sfarfallato molti adulti. *T. rotundata* va ritenuta quindi specie polifaga, che vive preferibilmente su *Cardamine* spp. Due ninfe raccolte su *Arabis hirsuta* sembrano appartenere ad una specie affine, inedita. Il lavoro è corredato da 46 figure di dettaglio, una foto di ambiente ed una carta di distribuzione.

**Parole chiave:** *Trioza rotundata*, *Trioza coriacea*, Psylloidea.

## INTRODUCTION

*Trioza rotundata* Flor, 1861 is a species well known in Central Europe and it was some time described and figured.

Our recent findings of adults and nymphs allowed us to notice some peculiar morphological characters, so far not recognized, and to remark that the taxon can live also on new host plants. Therefore we think useful to report our observations and our original drawings on this interesting species, which has an isolated position in the genus.

## SYNONYMIES

*Trioza rotundata* Flor, 1861 (description, only of the male: 406-407; in the keys: 380, 394). Type locality: Austria, Steiermark, Aflenz and Seewiesen (near Graz). Host plant: unknown at the time of the original description. Typus, male: Naturhistorisches Museum, Wien.

*Trioza coriacea* Horvath, 1895: 165. Type locality: Rumania, Lotrioara (valley between Sibiu and Pitesti, on the northern slopes of the Southern Carpatians); at the time of the original description it was Hungary, Regio V transylvanica, Lotriora, Siebenbürgen. Host plant: unknown. Typi: perhaps lost. Synonymy fixed by VONDRACEK 1957:347-348, figs. 216-217, as *-Trioza rotundata* var. *coriacea-*; this synonymy was afterwards rejected by KLIMASZEWSKI 1964:44, fig. 6; on the contrary, we consider valid this synonymy <sup>(1)</sup>.

<sup>(1)</sup> *Trioza coriacea* was described by HORVATH 1895 with an inadequate diagnosis, on an undisclosed number of specimens, collected by Dr. Alex. Ormay, 7.IV.1889. Dr. T. Vasarhelyi, Museum Budapest, kindly wrote us (*in litteris* June 1987) that *T. coriacea* is not in Budapest Museum. The types probably remained in the collection of the collector, a coleopterologist, and now perhaps are lost. Paratypes may be in Sulc collection (Brno Museum). VONDRACEK 1957:347-348, figs. 216-217, on the basis of paratypes that Sulc got from Horvath, considered *T. coriacea* synonym of *T. rotundata*, as *Trioza rotundata* var. *coriacea*. DOBREANU & MANOLACHE 1962:300 cited as *Trioza rotundata coriacea* specimens from Rumania, M. Bucegi, which appears to be near to *T. coriacea*. KLIMASZEWSKI 1962:132 agreed with VONDRACEK'S synonymy, but the same Author in 1964 (pag. 44, fig. 6) considered *coriacea* a valid species, on the examen of a small sized female collected by Smreczynsky, 25.IV.1935, on the Polish Tatra (forewing length mm 1.7, antennal length mm 0.42). KLIMASZEWSKI 1967a, 1967b, 1969, 1973, 1975 reported again this opinion, without new elements. In his numerical tables of Polish *Trioza*, KLIMASZEWSKI 1968 did not report differences between *coriacea* and *rotundata*. LAUTERER 1963:151, 163 reported the -var. *coriacea-* from Moravia, but afterwards he did not publish anything on this taxon. GLOWACKA 1979:48 report the finding of two other females of *-T. coriacea-* in Poland, Beskidu Zachodniego, Rajcza-Hutyrow, 743 m, 20.X.77 (forewing length mm 1.77-1.80; antennal length 0.47-0.53).

We examined some specimens which have smaller dimensions (forewing length mm 2.0; antennal length mm 0.51) than the norm and show morphological and chromatic characters (figs. 38-40) different than in the series from Piemonte; we think however that those characters are not sufficient to justify *T. coriacea* as a separated species or subspecies. Besides, in bibliography the Authors agree in retaining *T. rotundata* as a variable taxon. Therefore we think *T. coriacea* synonym of *T. rotundata*.

Dr. P. Lauterer (*in litteris* 6.IV.87) and Dr. D. Burckhardt (which may have seen Cotypes in Brno Museum) (*in litteris* 6.VIII.87) agree with our opinion.

*Psylla coriacea* Horvath, 1895; PUTON 1899:112, n. 56. Synonymized by OSHANIN 1907:380.

*Trioza greisingeri* Horvath, 1987a:642-643, 2 figs. Type locality: Czechoslovakia, West Slovakia, M. Tatra, Kézmárok; at the time of the original description it was Hungary, Regio III septentr.-occid., Késmárok, Kressebrunnen). Host plant: *Nasturtium officinale* [?]. Typi: *Lectotypus* fixed by Dr. T. Vasarhelyi 1987: the male n. 2 from the only pin bearing Horváth's identification label, from Késmárok, 15.9.97, preserved in Zoological Department, Hungarian Natural History Museum, Budapest; 37 Paralectotypi fixed by T. Vasarhelyi 1987, in the same Museum with the same locality and date. All typic specimens are on minutia pins, pinned altogether on 12 insect pins (T. Vasarhelyi *in litteris* June 1987). Synonymy fixed by VONDRACEK 1957:344, 346, after comparison with paratypes and with topotypic specimens, and universally accepted.

*Trioza greisingeri* Horváth. Incorrect subsequent spelling cited by KLIMASZEWSKI 1967b:250, 252.

## COMPLEMENTARY DESCRIPTIVE NOTES: ADULTS

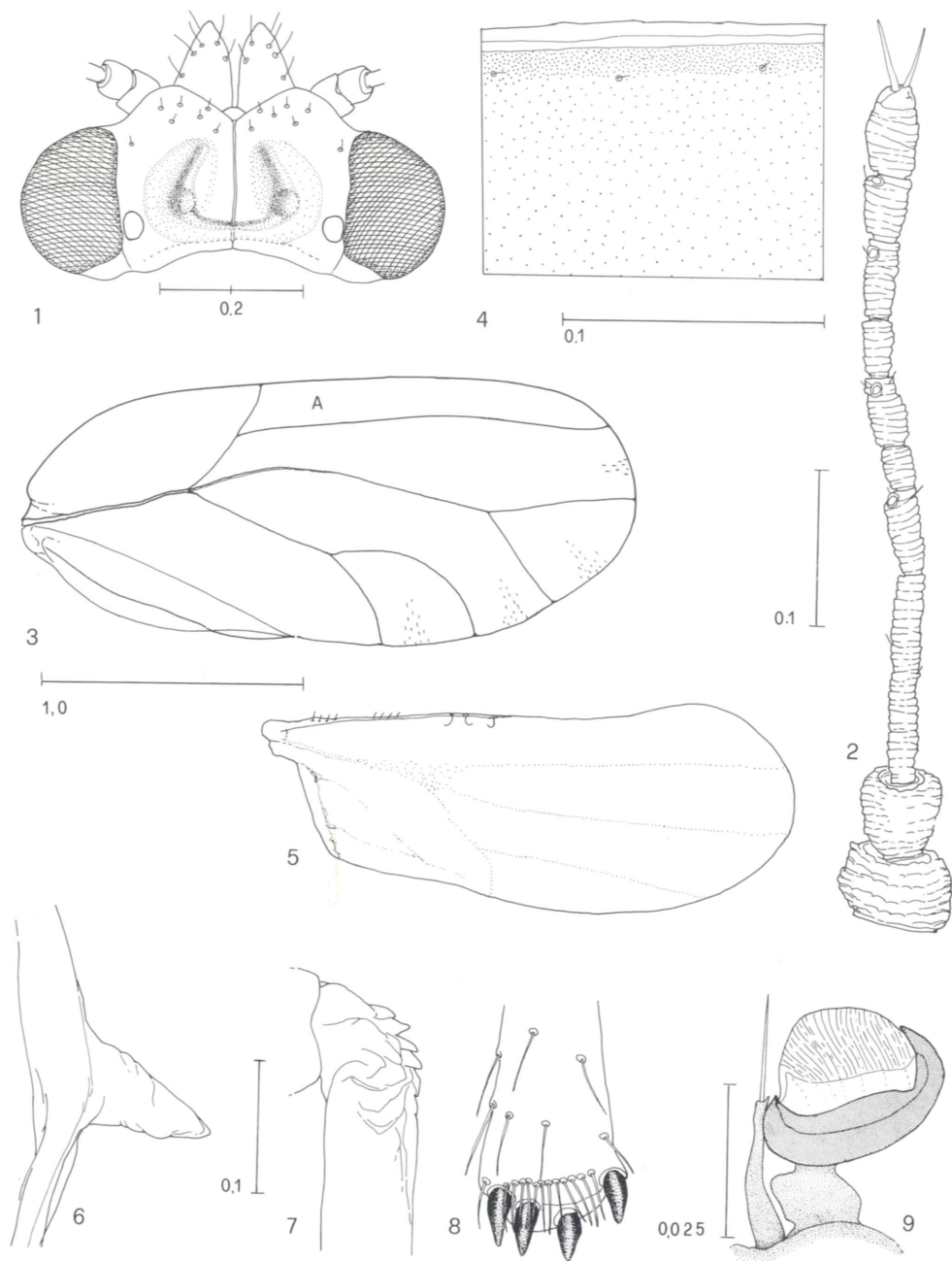
*Trioza rotundata* was described and figured by SULC (1912:60-63, pl. 35:1-8) (only the male), SCHAEFER (1949:61-63, figs. 29-33), VONDRACEK (1957:344-348, figs. 214-217), DOBREANU & MANOLACHE (1962:296-300, figs. 208-211) and KLIMASZEWSKI (1967b:250-253, figs. 25-29; 1969:70, figs. 230-232; 1975: 207-210, figs. 377-380); the best figures are in DOBREANU & MANOLACHE 1962.

*Morphology.* The two sexes differ in size (slightly) and in the structure of the terminalia. Terminology according to HODKINSON & WHITE 1979.

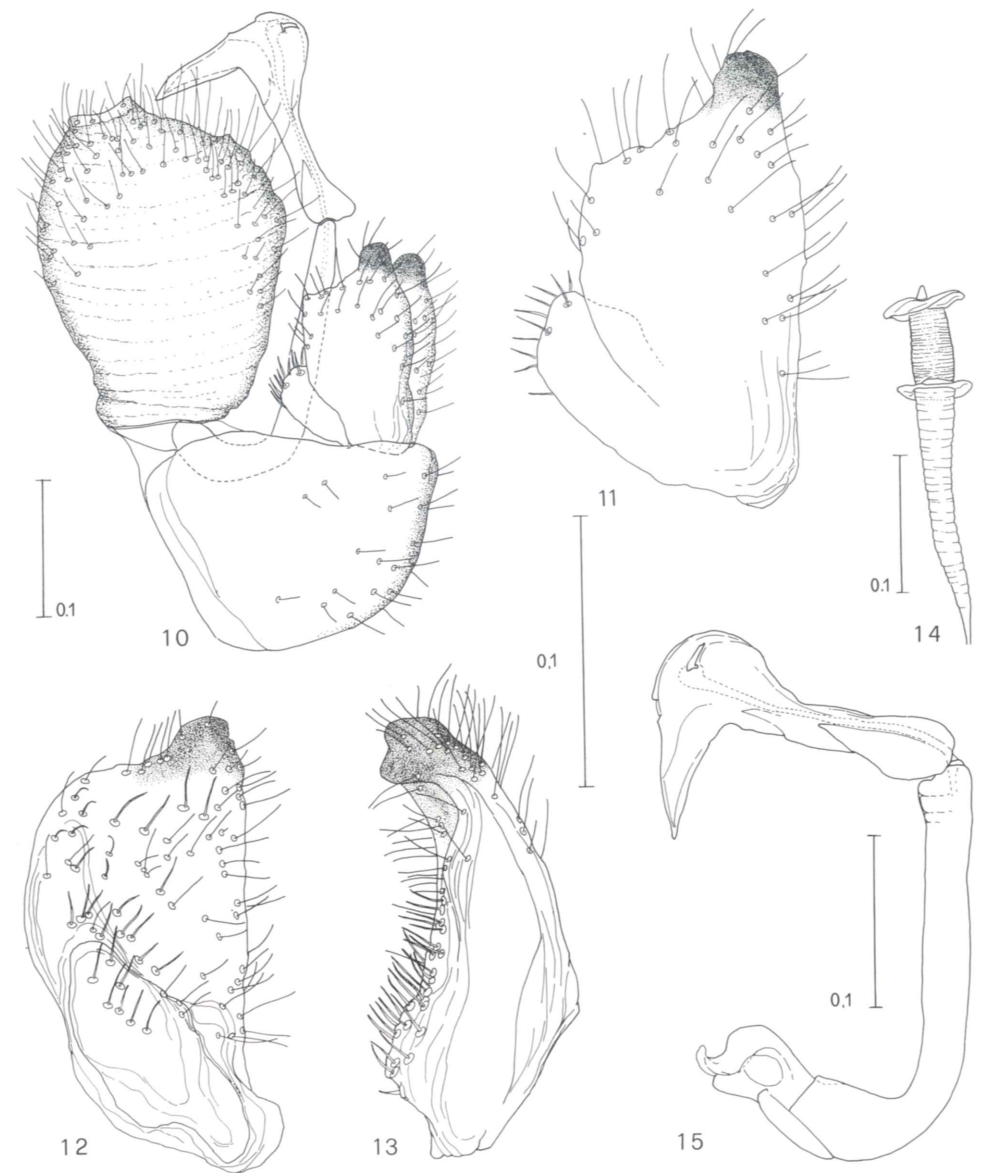
Head as in fig. 1. Vertex with two longitudinal depressions connected at the base and well hollowed. Antennae (fig. 2) with rhinaria on segments IV, VI, VIII and IX.

Pronotum a little less wide than the head. Forewing (fig. 3) rounded apically, brown. Microsculpture punctiform, present on the whole upper surface up to the veins, with the same colour as the veins; spinulae thicker near the vein C + Sc (fig. 4), but in some specimens these have a uniform density also near this vein; radular spinules diaphanous; cell cu<sub>1</sub> as in fig. 25, large. Hind wing large, as in fig. 5. Meracanthus as in figs. 6, 39. Base of metatibia as in fig. 7; apex of metatibia (fig. 8) with 3 + 1 black spurs and in the inner side with 12-13 strong, yellow hairs. Tarsi as in fig. 9.

Male terminalia as in fig. 10. Parameres (figs. 11-13) stumpy, with a strong prominence in the inner-anterior basal third, with strong hairs; this apophysis is more or less or not prominent anteriorly according to the visual position; sometimes this basal apophysis is slightly developed (figs. 40-41). Also the apex of the parameres has a variable aspect according to the visual position: it appears straight (figs. 11-12) or slightly curved backwards (figs. 40-41), as figured by VONDRACEK 1957 (figs. 215:3; 217:3) and as written by KLIMASZEWSKI (1967b:250-



*Trioza rotundata*, adult, specimens from Piemonte. - Fig. 1: head, male. - Fig. 2: antenna, female. - Fig. 3: forewing, female. - Fig. 4: microsculpture of the forewing on upper surface, near the vein C + Sc, in the zone indicated with A in fig. 3. - Fig. 5: hind wing, female. - Fig. 6: meracanthus, female. - Fig. 7: base of metatibia, female. - Fig. 8: apex of metatibia, female. - Fig. 9: apex of tarsus, male.

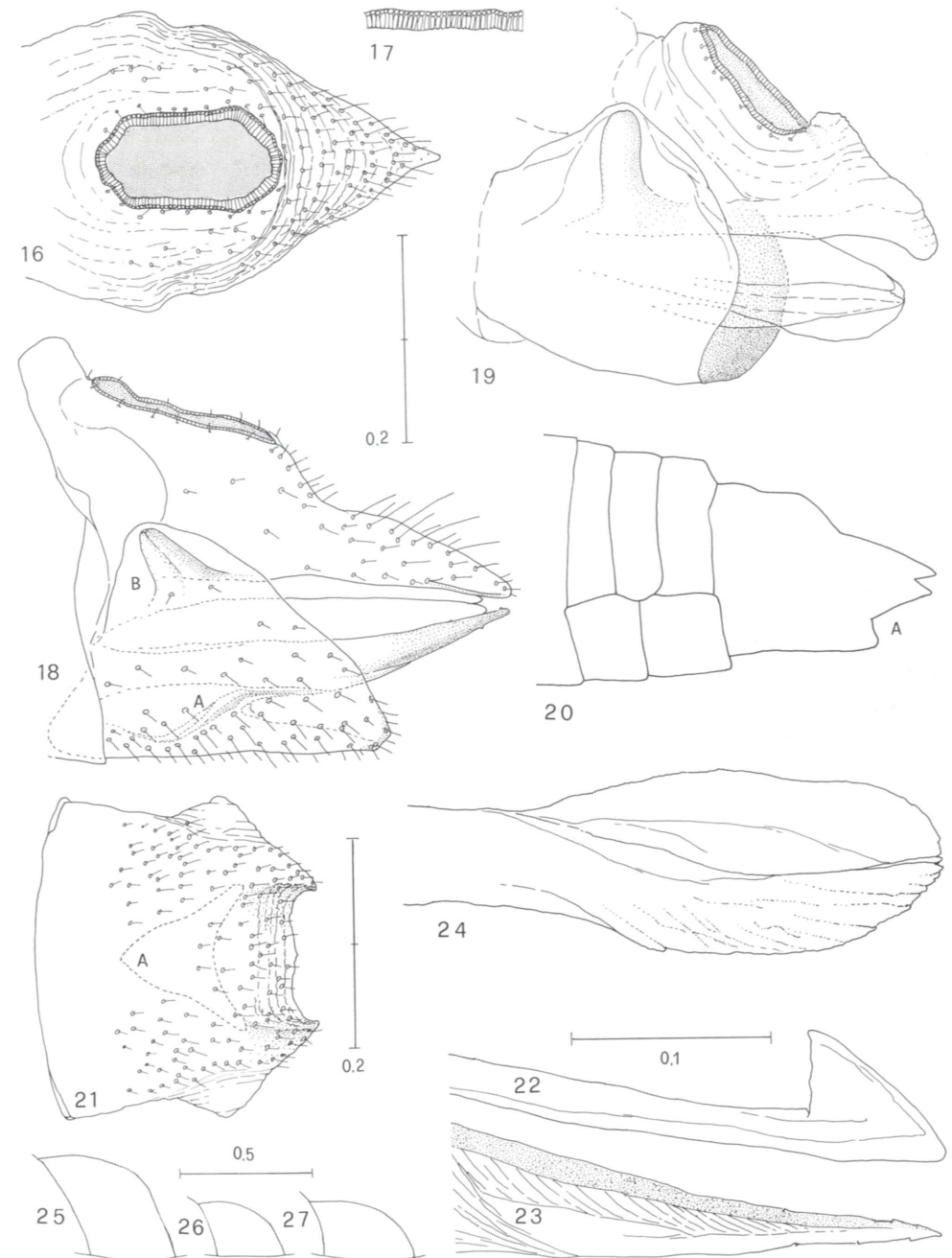


*Trioza rotundata*, adult, male from Piemonte. - Fig. 10: terminalia. - Fig. 11: left paramere, outer surface. - Fig. 12: right paramere, inner surface, slightly rotated as in the fig. 11. - Fig. 13: right paramere, posterior and diagonal view. - Fig. 14: sperm pump. - Fig. 15: penis.

251); the apex in this position is very similar to *Triozia rapisardai*. We do not have explained the figures of the paramere by SCHAEFER (1949, fig. 31) and by KLIMASZEWSKI (1967b, fig. 26; 1969, fig. 231; 1975, fig. 378), which does not correspond to any position examined by us. Apex of sperm pump (fig. 14) with a point; sperm duct enlarged and ringed in its proximal part. Penis as in figs. 15, 42; the apex of the penis has a peculiar form, with a long anterior bill, which has a comparison among European *Triozidae* only with *T. rumicis* and *T. galii*; base of the last segment of the penis with a case.

Female terminalia (figs. 16-24, 43) of peculiar structure. Proctiger with anal opening surrounded with two rows of glands (figs. 16, 17). Anal opening surrounded by a slightly sclerified membrane, which makes difficult the lateral figuration of the proctiger, mostly in the newly hatched specimens (figs. 18-20, 43). Genital segment peculiar, open posteriorly and almost truncated, extended in its middle on the upper part; its length is slightly longer or equals than its height; it has an apophysis on its higher part (figs. 18B, 43), as it is present, for example, in *Bactericera acutipennis*, *Triozia dispar* and *T. foersteri*. The aspect of the genital segment, laterally, is very variable according to the visual position and the maturation of the specimens: it explains the great differences of the figures reported by the bibliography. The genital segment, seen from below (fig. 21), has a very wide apex, a little hollowed. In the inner part of the genital segment, in its central part, there is a triangular thin plate (fig. 18A, 21A), which is a part of the organ which keeps the internal sclerites separated from the genital segment. Ovipositor as in fig. 22; valvula ventralis as in fig. 23; valvula lateralis as in fig. 24, very large. The complex ovipositor-valvulae is in a raised position as regards the genital segment: the female terminalia have therefore a characteristic aspect, as a step (fig. 20A).

**Coloration.** General colour uniform chocolate brown, sometimes reddish. Forewing brown, with clearer basal part; forewing almost hyalin in newly hatched specimens. The coloration resembles, in general, *Triozia* of the *dispar* group; it is neither present the bright red of some specimens of *T. proxima*, nor the dark brown of some *T. tatrensis*.



*Triozia rotundata*, adult female from Piemonte, except fig. 18 from Friuli Venezia Giulia. - Fig. 16: proctiger, dorsal view; some of the anterior part, the softer one, is not figured. - Fig. 17: glands surrounding the anal opening. - Fig. 18: terminalia, lateral view; A, triangular internal plate; B, apophysis of the genital segment. - Fig. 19: idem, in a specimen newly hatched. - Fig. 20: the last segments of the abdomen, lateral view: scheme showing in A the terminal step between the complex proctiger-ovipositor-valvulae and the genital segment. - Fig. 21: genital segment, seen from below; A, triangular internal plate. - Fig. 22: ovipositor. - Fig. 23: valvula ventralis. - Fig. 24: valvula lateralis. - Fig. 25: forewing, cell  $cu_1$ . *Triozia proxima*, adult female from Trentino (Moena). - Fig. 26: forewing, cell  $cu_1$ . *Triozia tatrensis*, adult female from Trentino (M. Baldo). - Fig. 27: forewing, cell  $cu_1$ .

*Measurements*, in mm. Our adults agree with those reported by the bibliography. We note that the measurements of some specimens are like those reported by VONDRACEK and KLIMASZEWSKI for the presumptive *T. coriacea*.

total length (body + wings in resting position: males 2.4-2.7; females 2.5-2.9; head width: males 0.52-0.58; females 0.51-0.54; vertex length: males 0.21-0.23; females 0.21-0.23; vertex width: males 0.30-0.33; females 0.32-0.35; antennal length: males 0.51-0.66; females 0.54-0.67; forewing length: males 2.00-2.19; females 2.04-2.31; forewing width: males 0.78-0.97; females 0.90-1.02;  $cu_1$  length: males 0.31-0.39; females 0.28-0.35;  $cu_1$  height: males 0.35-0.39; females 0.31-0.39;  $m_1$  height: males 0.39-0.49; females 0.46-0.51.

*Ratios:*

total length/head width: males 4.65-4.72; females 4.98-5.31; antennal length/head width: males 0.98-1.13; females 1.05-1.24; forewing length/forewing width: males 2.25-2.56; females 2.26; forewing length/head width: males 3.77-3.84; females 3.92-3.98.

*Variability.* The reported characters are based on the series of Piemonte, Demonte. Some specimens of other localities have differences which we think to be included in the variability of the species (figs. 39-42). We record: meracanthus with distal half clearly thinner (fig. 39); upper microsculpture of the forewing not thicker near vein C + Sc; basal apophysis of the parameres slightly developed (figs. 40-41); terminalia of the female smaller (fig. 43).

COMPLEMENTARY DESCRIPTIVE NOTES: V INSTAR NYMPH (figs. 28-37)

The V instar nymph was shortly described by KLIMASZEWSKI (1962:132-133; figs. 7-9) on specimens of Horvath's collection, determined as *greisigeri*. We have a good series of nymphs, collected with the adults; we report other elements and new figures.

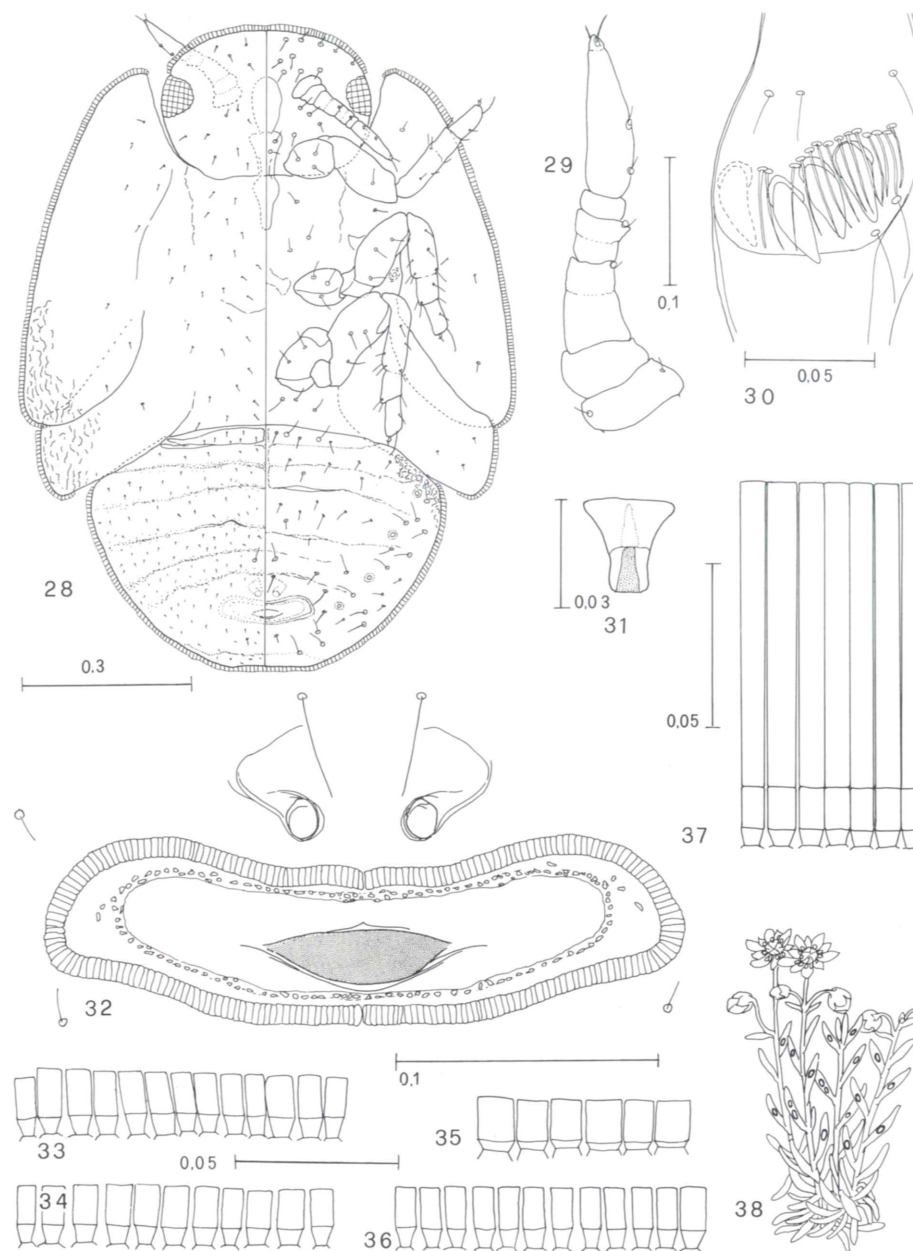
Terminology and symbols follow WHITE & HODKINSON 1982.

*Morphology.* Body (fig. 28) of regular oval form, of typical triozone aspect.

Antennae (fig. 29) shorter than the breadth of the head; six segments are distinguishable, which correspond to segments I, II, III-IV, V-VI, VII, VIII-X of the adult; the separation of other three segments is sketched; the rhinaria are four, one for each apex of antennal segments III ad IV, and two on the segment VI; the apex of antenna has two sensorial hairs.

Forewing-pads surpass shortly the anterior level of the eye, as a humeral lobe. Fig. 30 regards the apex of metatibia of a mature nymph, with already well distinguishable hairs and spurs of the adult. Arolium as in fig. 31.

Abdomen wider than longer, with four stigms for each side; sclerified plates



*Trioza rotundata*, V instar nymph, specimens from Piemonte. - Fig. 28: whole nymph, not yet mature. - Fig. 29: right antenna. - Fig. 30: apex of metatibia, shortly before hatching. - Fig. 31: arolium. - Fig. 32: circumanal pore field. - Fig. 33: head margin sectasetae. - Fig. 34: forewing-pad margin sectasetae. - Fig. 35: forewing-pad margin sectasetae of another specimens. - Fig. 36: abdomen margin sectasetae. - Fig. 37: hindwing-pad margin sectasetae with the wax production. - Fig. 38: position of V instar nymphs on the leaves of *Saxifraga aizoides*.

not distinguishable. Anal opening and circumanal pore rings (fig. 32) on lower surface of abdomen, enough distant from its posterior margin. The perianal glands constitute two rings: the external one is a regular row of about 230 rectangular, close glands; the internal one is formed by much smaller, roundish glands, in a irregular row which is double in some zones.

*Chaetotaxy* includes normal hairs and marginal truncate ringed sectasetae. Normal hairs of dorsal surface are numerous, short and placed as in fig. 28. The lower surface of the body and the legs have longer hairs, in smaller number. The marginal setae are all truncate ringed sectasetae (figs. 33-36) disposed regularly, parallel and close, sometimes contiguous; the sectasetae of the forewing-pad can be fairly long (fig. 34) or short and stumpy (fig. 35). The number of the truncate ringed sectasetae is the following, for each half of the body: head 40-44; forewing-pad 120-124; hindwing-pad 23-24; abdomen 91-94. The length of the sectasetae is enough uniform: 20-26 micron.

Sectasetae of the examined specimens have long wax pipes, of uniform length (fig. 37), which partly remained in the microscopical preparations and resisted to the boiling, for about 30 seconds, in water with 10% of NaOH; we did not observe a similar resistance in any species of psyllids.

The apical, external zone of the wing-pads has irregular, thin, dorsal stripes, which sometimes extend as far as the anterior part of the wing-pads.

The whole body has a diffuse microsculpture, much variable in stoutness and density, more evident near the margins of the wing-pads and on the femura.

*Coloration.* The nymph has a brown, not uniform colour; abdominal margin with a clear stripe, shading at the border; central part of the abdomen clear; shaded, clearer spots are near the eyes and on the internal margin of the wing-pads; apices of wing-pads darker. Soon after the moulting the nymph is clear yellow-green, but after a day it assumes the dark, above mentioned colour.

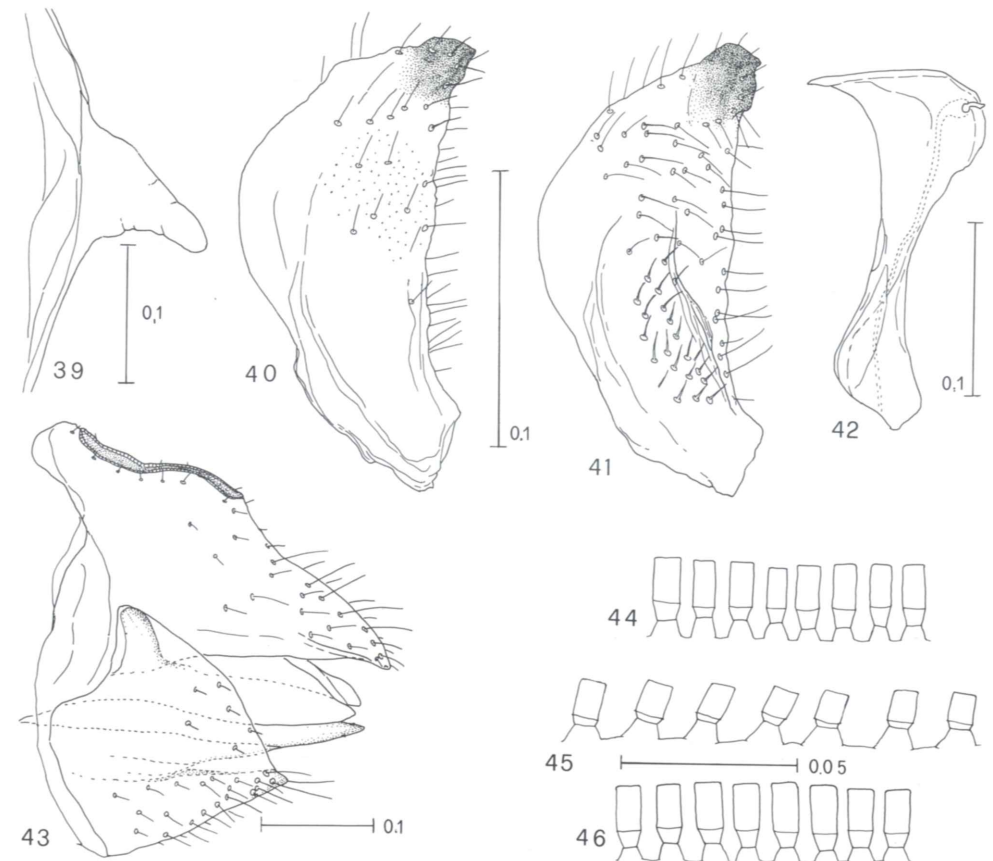
*Measurements*, in mm: antennal length (AL) 0.33-0.34; circumanal ring breadth (ARB) 0.22-0.25; body breadth (BB) 1.39-1.44; body length (BL) 1.74-2.02; abdominal breadth 0.88-1.13; abdominal length 0.71-0.79; forewing-pad length (WL) 0.98-1.07. *Ratios.* Antennal length/forewing-pad length (AWL) 0.30-0.33; body breadth/length (BBBL) 0.71-0.79; abdominal breadth/length 1.22-1.42.

*Material.* The present description is made on 28 nymphs of various instars, collected with adults, 30.VIII.86, as said in paragraph "Distribution".

*Affinities.* On the whole, the nymph of *T. rotundata* does not differ remarkably from the nymphs of typic *Trioza*.

#### *Nymphs from Arabis hirsuta.*

We found on the 29.VII.87 in Piemonte, Province Cuneo, Demonte, Vallone dell'Arma, 1700 m, two V instar nymphs, on *Arabis hirsuta* (L.) Scop. These nymphs are very like to those of *T. rotundata*, but have a smaller number of sectasetae: 28-31 (head), 84-90 (forewing-pad), 15-16 (hindwing-pad), 95-101 (abdomen). Furthermore, in these specimens the sectasetae are spaced (figs. 44-46), above all those of forewing-pad. Therefore, these nymphs seem to be a



*Trioza rotundata*, adult specimens from Trentino (Folgaria), showing the variability of some characters. - Fig. 39: meracanthus. - Fig. 40: left paramere, outer surface. - Fig. 41: right paramere, inner surface. - Fig. 42: penis. - Fig. 43: terminalia of the female, lateral view.

*Trioza* sp., V instar nymph, from Piemonte (Demonte), host plant *Arabis hirsuta*. - Fig. 44: head margin sectasetae. - Fig. 45: forewing-pad margin sectasetae. - Fig. 46: abdomen margin sectasetae.

different species, probably new, that we do not describe, because we have not the adults.

#### HOST PLANTS AND LIFE HISTORY

HORVATH (1897:643) is the first Author who reported informations on the host plant of this species: describing *T. greisigeri*, HORVATH noted the finding of many adults and nymphs on *Nasturtium officinale* R. Br.; nobody found *T.*

*rotundata* on *Nasturtium* again and all bibliographical reports on this plant are only repetitions of the same first notice.

Subsequently the following five species of the genus *Cardamine* (*Cruciferae* family) have been reported:

- *Cardamine amara* L. (VONDRACEK 1957:105, 346); KLIMASZEWSKI 1962:132; LAUTERER 1963:151, 156).
- *Cardamine opizii* Presl. (KLIMASZEWSKI 1964:44).
- *Cardamine impatiens* L. (LAUTERER 1974:138).
- *Cardamine hirsuta* L. and *Cardamine uliginosa* M.B. (GEGECHKORI 1983:137).

All the other reports in the literature regarding *Cardamine* do not specify if they are original or derived.

WAGNER & FRANZ (1961:174-175) reported a single finding of 8 adults of *T. rotundata* on *Petasites officinalis* L. (*Compositae* family).

We recently found adults and nymphs on *Saxifraga aizoides* L., a plant that lives on stony soil, but also on soil drenched with water (fig. 47), and many nymphs and some adults on *Stellaria nemorum* L. ssp. *nemorum*, on damp soil; we found also some adults on *Vaccinium myrtillus* L.; we found till now this species on *Cardamine amara* only in one locality (nymphs and adults).

The most of the capture of *T. rotundata* from the literature and from us includes specimens hibernating on conifers, as shelter plants.

Therefore, it is useful to examine the problem of the real host plant of this species. First of all, the only finding of ninety years ago, on *Nasturtium officinalis*, can be an error of determination by the collector, M. Greisiger, whose botanic knowledge we ignore: *Nasturtium* and some species of *Cardamine* are similar and it is possible a confusion among these. We retain doubtful the report of *Nasturtium*, until a possible proof of the contrary.

More recent botanical report regard the finding of *T. rotundata* on three very dissimilar families: *Cruciferae*, *Caryophyllaceae* and *Saxifragaceae*, i.e. on plants of three different orders. The cited botanical species, however, have locally a common habitat in Central Europe, because are plants of very damp habitat.

It is probable, for *Petasites* and *Myrtillus*, a casual transmigration of few adults. On the contrary, *T. rotundata* was found living very well on *Saxifraga aizoides* and *Stellaria nemorum*: many adults hatched in our house from the collected nymphs. The finding on *Cardamine* are sure, thanks to the large number of reports; nobody however published the reports of nymphs; only LAUTERER 1963 published the observations on *Cardamine* of mating and eggs laying; afterwards Lauterer effected many findings on *Cardamine amara* in Czechoslovakia (all data unpublished, *in litteris* 6.IV.87). Still Lauterer (*in litteris* 10.IX.87) write that he observed that *T. rotundata* in overgrowth layed eggs on other different herbaceous plants.

In conclusion, we believe that *T. rotundata* lives on some species of *Cardamine*, but can develop also on very different plants, in overpopulated condi-

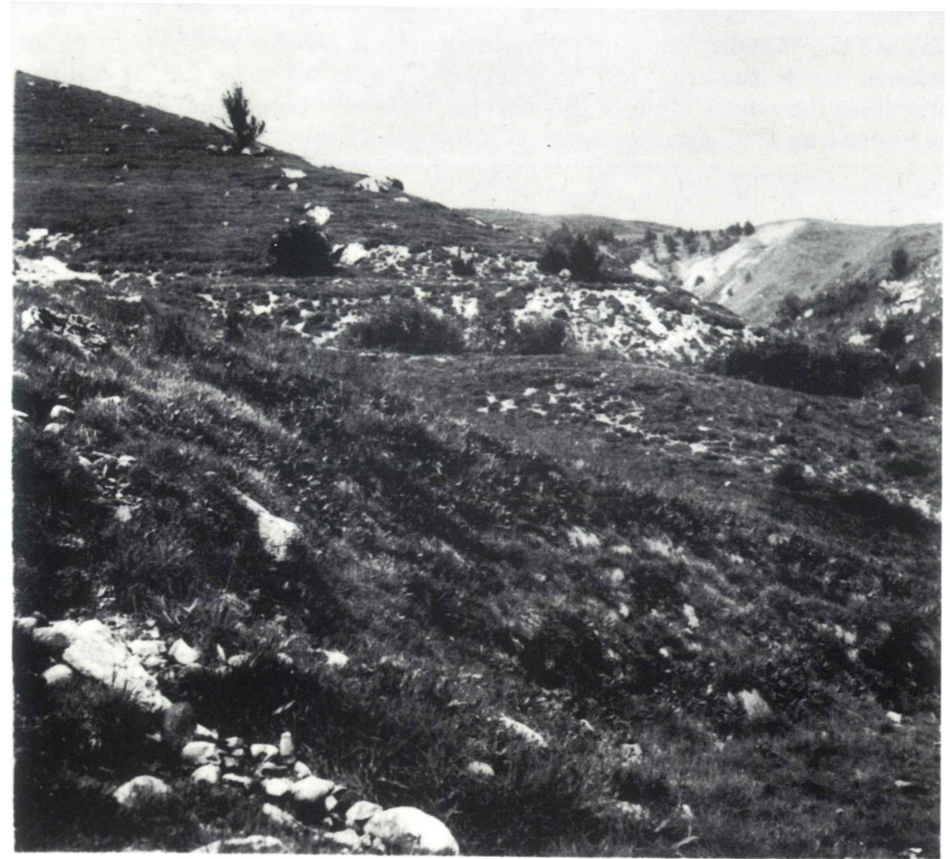


Fig. 47: biotope of *Trioza rotundata* on *Saxifraga aizoides*. Piemonte, Province Cuneo, Demonte, Vallone dell'Arma, 1700 m, August 1986. *Saxifraga aizoides* in this biotope was found flourishing on waterlogged soil. *Cardamine* was not found. (Photo A. Galvagni).

tions or if *Cardamine* disappear in the biotope. Therefore, the species is polyphagous.

Now, *T. rotundata* is the only one psyllid that lives regularly on *Cruciferae* family. Also *Caryophyllaceae* and *Saxifragaceae* are very scarcely appetized by psyllids.

As regards the life history, *T. rotundata* overwinters as adult on conifers and lives on these plants in Italy from September (seldom from August) till April of May. The species has probably one generation per year.

The literature reports very scarce data on other aspect of its life history. *Trioza -coriacea-* was cited to cause small dish-shaped hollows on the leaves of *Cardamine amara* in Czechoslovakia by pricking with the ovipositor for egg-laying; subsequently little pit galls appear on the leaves of the same plant

(VONDRAČEK 1957:346-347, referring a Baudy's letter to Sulc of 3.V.1920; BUHR 1965: 1376). We did not find apparent galls on *Cardamine*, *Saxifraga* and *Stellaria*. Dr. P. Lauterer (in litteris 6.IV.87) kindly wrote us that he followed sometimes the whole cycle of this species, also with breedings. Therefore, for the life history of *T. rotundata*, we refer to a work in preparation by P. Lauterer.

#### DISTRIBUTION

(ms = males; f = females; the number after single localities refers to fig. 48)

Sweden. Harjedalen, Hede, Vemdalskalet (1) (OSSIANNILSSON 1963:203-204).

Poland. Numerous localities, in 7 Regions, either in the Northern plain (Poiezierte Pomorkie, Slupsk (2) and Puszcza Bialowiestca (3)), or in the mountains (M. Bieszczady (4), Ost Beskid (5), West Beskid (6), Tatry (6) (SMRECZYNSKY 1954:144; KLIMASZEWSKI 1962:13; 1964:44, 51; 1967a:32-33, 40-41; 1967b: 252, 253; 1971:174-175; GLOWACKA 1979:48). As *coriacea* it was collected in West Beskid (Zachodni), Rajcza-Hutyrov.

Rumania. Transylvanic Alps, M. Bucegi (8) and M. Semenicolui (9) (DOBREANU & MANOLACHE 1962:300). Also on Transylvanic Alps is Lotrioara (7), former Ungheria, Lotriora, type locality of *T. coriacea* (HORVATH 1895:165; 1897b:59).

Czechoslovakia. Some localities in Slovakia (10), Moravia (11) and Bohemia (12); frequent on Tatra (10) (VONDRAČEK 1957:347; LAUTERER 1963:151; 1974:138; 1977:99). Kéžmarok (10) (former Késmárk, Kressebrunn), type locality of *T. greisigeri* (HORVATH 1897a:643) is in West Slovakia, on Tatra.

West Germany. Sächsische Schweiz (13) (EMMRICH 1978:284).

Austria. Numerous localities in Oberösterreich (14) and above all in Steiermark (15) (WAGNER & FRANZ 1961:174-175). Steiermark, Aflenz and Seewiesen (15), at the foot of Hochschwabgruppe, is the type locality of *T. rotundata* (FLOR 1861:407). It is strange that Löw, which gathered much material from the former Austrian Hungarian Empire, did not collect and did not receive *T. rotundata* from his correspondents.

Switzerland. The species is widespread on the whole territory, in numerous localities of Alps (16, 17, 20, 21) and of Jura (18, 19) in the Cantons Graubünden (= Grigioni) (16, 17); Basel (18), Bern (19, 21), Neuchâtel (19), Vaud (20), Valais (= Wallis, Vallese) (21) (SCHAEFER 1949:63; BURCKHARDT 1983:73).

Italy. Friuli-Venezia Giulia, Province Pordenone (22), Comune Aviano, Monte Cavallo, Col Arnieri, 1600-1650 m, IX.1980, 26 ms, 20 f, on *Abies alba*, *Picea excelsa* and *Fagus sylvatica*; idem, Val Lovo, 940 m, IX.80, 1 female on *Picea excelsa*. - Alto Adige, Province Bolzano-Bozen (23-24), Nova Levante-Welschnofen, Passo Costalunga-Karerpass, 1600 m, 2.IX.85, 1 male on *Picea excelsa*; Aldino-Aldein, 1100-1200 m, 7.IV.83, 6 ms, 4 f, on *Juniperus com-*

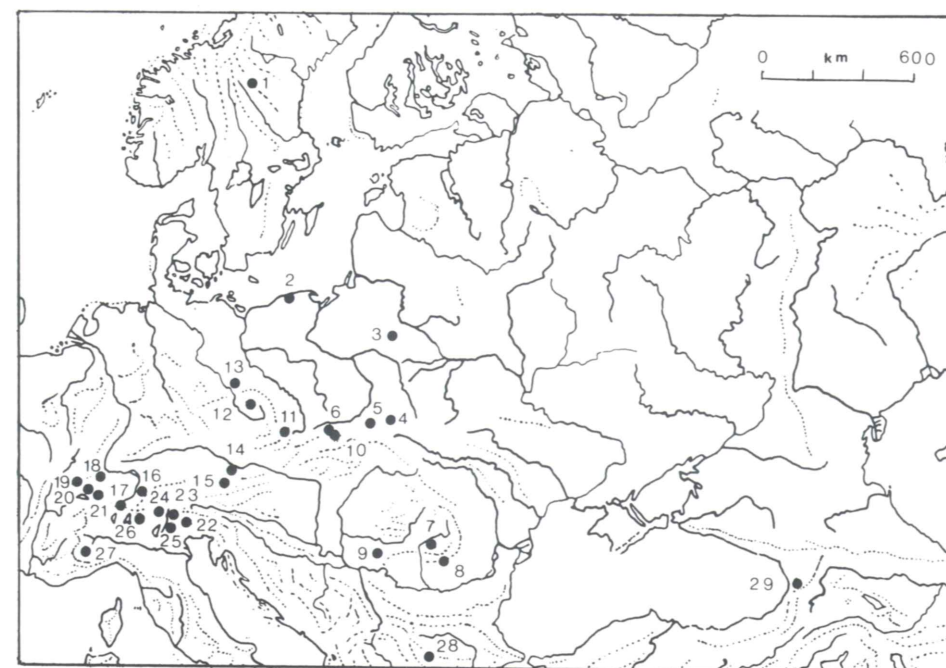


Fig. 48: *Trioza rotundata*, general distribution. The numbers refer to the localities reported in the paragraph -Distribution-. - 1) Sweden, Harjedalen; 2-3) Northern plain of Poland; 4) Poland, M. Bieszczady; 5) Poland, Ost Beskid; 6) Poland, West Beskid, Tatry; 7) Rumania, Lotrioara, Type locality of *T. coriacea*; 8) Rumania, M. Bucegi; 9) Rumania, M. Semenicolui; 10) Czechoslovakia, Slovakia, Kéžmarok, Type locality of *T. greisigeri*; 11) Czechoslovakia, Moravia; 12) Czechoslovakia, Bohemia; 13) West Germany, Sächsische Schweiz; 14) Austria, Oberösterreich; 15) Austria, Steiermark, Type locality of *T. rotundata*; 16-17) Switzerland, Graubünden; 18) Switzerland, Basel; 19) Switzerland, Bern and Neuchâtel; 20) Switzerland, Vaud; 21) Switzerland, Bern and Valais; 22) Italy, Friuli-Venezia Giulia, Pordenone; 23-24) Italy, Alto Adige; 24-25) Italy, Trentino; 26) Italy, Lombardia; 27) Italy, Piemonte, Cuneo; 28) Bulgaria, Rodope; 29) USSR, Georgia, South Caucasus.

*munis*; Nova Ponente-Deutschnofen, Monte San Pietro-Petersberg, 1400 m, 7.IV.83, 3 f on *Picea excelsa*; Madonna di Pietralba-Maria Weissenstein, 1500 m, 7.IV.83, 7 ms, 6 f, on *Abies alba* and *Picea excelsa*; Ultimo-Ulten, Valle Pracupola-Schmiedhofer Bach, near Kuppelwieser Alm, 2000 m, 23.VII.87, some young larvae on *Cardamine amara*; idem, 15.IX.87, some V instar nymphs, 1 female on *Cardamine amara* (the nymphs, with breeding, hatched 5 ms and 3 f, after about one week; idem, 1500 m, 23.VII.87, 14 m, 13 f, newly hatched, on *Vaccinium myrtillus*. - Trentino, Province Trento (24-25), Folgaria, locality Lastebasse, between Malga I and II Posta, 1420 m, 24.IX.83, 4 ms, 6 f; idem, 3.X.84, 1 male, 3 f; idem, 29.VIII.85, 2 ms, 2 f (all on *Picea excelsa*); idem,



14.VIII.87, many nymphs, 1 female, on *Stellaria nemorum* ssp. *nemorum*; idem, 8.IX.87, many nymphs and some adults on the same plant (from the nymphs on *Stellaria*, with breeding, after about one week, hatched many adults); Trambileno (nec Vallarsa), Col Santo, 1900 m, 10.X.76, 1 female on *Picea excelsa*; Ruffré, M. Penegal, 1700 m, 15.IX.85, 1 female on conifers. - Lombardia, Province Bergamo (26), Oltre il Colle, M. Arera, 1680 m, 8.VIII.76, 1 female. - Piemonte, Province Cuneo (27), Vinadio, Vallone S. Anna, 1700 m, 28.VIII.86, 1 female; Demonte, Vallone dell'Arma, 1650-1700 m, 30.VIII.86, some nymphs, 16 ms, 13 f, on *Saxifraga aizoides* (in this locality, the 29.VII.87, the species was disappeared); idem, Colle Sale, 1900 m, 1.IX.86, 1 male, 1 female, on *Juni-perus communis*. (All captures were effectuated by us; some of these findings were reported in CONCI & TAMANINI 1984:267).

In Italy, on the whole, *T. rotundata* was collected by us on the Alps and Prealps, in 5 Regions of North Italy, in 15 localities, with 23 findings, between 950 and 2000 m, in more than 200 specimens, in April and from August to October as adult on conifers, in July-September as nymph and in September as adult on *Cardamine amara* (2000 m), in August and September as nymph and adult on *Stellaria nemorum* and in August on *Saxifraga aizoides*, in Juli as newly hatched adult on *Vaccinium myrtillus*.

We found the typic form in the greater number of localities; specimens a little different are those from Folgaria and Ruffré.

Bulgaria: Rodope (28) (HARISANOV & LAUTERER 1968:140; GLOWACKA & HARISANOV 1983:67).

URSS. Georgia, South Caucasus (29) (GEGECKORI & DJIBLADZE 1976:47-48; GEGECKORI 1984:155).

On the whole, *T. rotundata* is very widespread on the mountains of Central Europe and particularly on the Alps and Jura; it lives on the Carpathians and Transylvanian Alps till Rodope, between 700 and 2100 m; it was found still in the Polish plain (two reports) and in the West-Central Sweden (one report); it is cited, at last, for little Caucasus. Reports are missing for Yugoslavia, W Germany, France and Iberian Peninsula, probably for lacking of searches.

#### AFFINITIES

*T. rotundata* belong to *Trioza* s. str. which have metatibiae with 3 + 1 saltatorial spurs. SULC 1912 considered this species near *flavipennis* and *færsteri*. SCHAEFER 1949 ascribes it to his '-dispar Gruppe', with *dispar*, *proxima*, *færsteri*, *flavipennis* and *schranski*, for the forewings with spinulae on their whole surfaces, up to the veins. KLIMASZEWSKI 1967b: 250 separated it in his '-Artengruppe *rotundata*', with *T. coriacea*, which he considered as a valid species; the Polish Author maintained this opinion in his works of 1968, 1973 and 1975.

*T. rotundata* has, among the palaeartic *Trioza* s. str., an isolated position, which justifies its attribution to an independent group, for the following complex of characters:

#### A) Adult

- Vertex depressions connected at the base;
- forewing with rounded apex, normally brown;
- upper spinulae of the whole surface of the wing, up to the veins;
- peculiar parameres, with a strong basal anterior prominence;
- apex of penis with a long anterior bill;
- anus of the female surrounded by a slightly sclerified membrane;
- genital segment of the female of peculiar form: high as long; with apex almost truncated and with a vertical apophysis at its upper margin; seen from below with very wide, hollowed apex; also the internal structure of the genital segment is peculiar.

B) Preimaginal instars apparently without peculiarities.

C) Life history. Host plant of the genus *Cardamine* (*Cruciferae* family); *T. rotundata* can also live on plants of other families (*Caryophyllaceae* and *Saxifragaceae*).

*Identification* of *T. rotundata* is not difficult: a very evident character is the brown wing (in mature specimens) rounded at the apex, for which the species is apparently like the red-brown *Trioza* of the *dispar* group, with which it can live on conifers in winter. *T. rotundata* can be distinguished with a lens, in the most of specimens, for its greater cell  $cu_1$  (figs. 25-27); in the female a character evident with the lens is the step at the terminalia (fig. 24). The male has peculiar parameres and penis, however distinguishable only with a microscopical preparation.

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