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THREE NEW *TRIOZA* SPECIES (HEMIPTERA: TRIOZIDAE) FROM CENTRAL MACARONESIA WITH THE DESCRIPTION OF THE LARVA OF *TRIOZA LIENHARDI* BURCKHARDT

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With 45 figures, 1 table and 1 photo

ABSTRACT. Three new closely related species of *Trioza* Foerster are described, two of them from the *Laurisilva* forest of Madeira Island and a third from the Canary Islands. The new Madeiran species, *Trioza pittospori* sp. n. and *Trioza fernandesi* sp. n. are intimately associated with *Pittosporum coriaceum* Dryander ex Aiton, which is a rare endemic tree. The genus *Trioza* is now represented in Madeira Island by 6 species, half of them living in the *Laurisilva*. The unknown fifth instar larva of *Trioza lienhardi* Burckhardt is described. The host plant and species/host plants relationships of this four species complex is presented, and also keys for the separation of adults and fifth instar larvae.

KEY WORDS: Madeira Island, Canary Islands, Macaronesia, Psyllids, Triozidae, *Trioza*.

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RESUMO. No presente trabalho são descritas três espécies novas, próximas entre si, pertencentes ao género *Trioza* Foerster, duas delas colhidas em zona de vegetação típica da *Laurissilva* Madeirense e uma terceira nas Ilhas Canárias. Ambas as espécies Madeirenses, *Trioza pittospori* sp. n. e *Trioza fernandesi* sp. n. estão intimamente relacionadas com *Pittosporum coriaceum* Dryander ex Aiton, uma pequena e rara árvore endémica. O género *Trioza* passa a ser representado na Ilha da Madeira por 6 espécies, metade delas colhidas na *Laurissilva*. Também é descrita a larva do 5º instar de *Trioza lienhardi* Burckhardt até agora desconhecida. As relações entre as quatro espécies que formam este complexo e as suas plantas hospedeiras é analisada e são fornecidas chaves dicotómicas para a identificação de adultos e larvas.

PALAVRAS-CHAVE: Ilha da Madeira, Ilhas Canárias, Macaronésia, Psilas, Triozidae, *Trioza*.

INTRODUCTION

The knowledge about the faunistics of Madeiran jumping plant lice was updated in **a recent paper** (AGUIAR & MARTIN, 1999) with the addition of several new records raising to 16 the total number of the known species for the island. The genus *Trioza* is presently represented by six species including the following four which were previously recorded: *T. chenopodii* Reuter, *T. erytrae* (Del Guercio), *T. laurisilvae* Hodkinson and *T. urticae* (Linnaeus). The two new Madeiran species are associated with a rare endemic tree – *Pittosporum coriaceum* Dryander ex Aiton (Pittosporaceae) – which was according to PRESS & SHORT (1994), “formerly scattered in various parts of Madeira, including the cliffs of the north coast,” is “now rare and confined to rocky areas and ravines in the laurisilva in the central mountains”. Only one other *Trioza* species is associated with the macaronesian laurisilva forest, *T. laurisilvae*, (HODKINSON, 1990) which exists in both the Madeiran and Canarian archipelagos, and feeds on *Laurus azorica* (Seub.) Franco.

The two new *Trioza* species from Madeira described in the present work were referred in AGUIAR & MARTIN (*in press*) as *Trioza* sp.1 and sp. 2. A third *Trioza* sp. is also described based on a single male collected on the northern part of Gran Canaria Island (Canary Islands) but without host plant data. The previously unknown larva of a fourth, closely related species – *T. lienhardi* Burckhardt – is also described.

In all four species the male *aedeagus* is similar in shape presenting a long apical projection directed downwards.

SPECIES DESCRIPTIONS

Trioza pittospori sp. n.

(Figs. 1-14)

Description: Adult. Head (Fig. 2) yellowish with epicranial suture and occiput with a dark brown patch reaching the posterior ocelli in darker specimens; antennae (Fig. 3) with the scape, pedicel and flagellomere 1 pale, flagellomere 2 pale on its proximal half and dark on distal half; flagellomeres 5 to 8 all dark; ellipse shaped rhinaria present at the extremities of flagellomeres 2, 4, 6 and 7; flagellomere 8 with terminal setae, one being longer and more acute than the other one; antennae 1.94-2.60 times longer than head width. Thorax yellowish on the sides except for the mesepisternum and metacoxae which are brown; dorsal surface of thorax presenting areas of brown and very dark brown pigmentation, including the pronotum, mesopraescutum, mesoscutellum and metascutellum; legs pale with the second tarsal segment darkened; hind coxa with a short and blunt meracanthus (Fig. 7); hind tibia 0.94-1.09 times longer than head width, with several little genual spines at its base and one outer and two inner sclerotised black spurs apically (Fig. 8). Wings transparent. Fore wings (Fig. 1) elongate oval with a bluntly angled apex, 2.47-2.96 times longer than wide, densely covered in surfaced spinules in cells cu_2 and m_2 , sparsely in cells cu_1 , m_1 , r_2 except for cells $c+sc$ and r_1 which are almost devoid of any spinules; radular areas sharply defined, elongate, triangular, present on the margin of cells m_1 , m_2 and cu_1 . Veins pale brown, sparsely clothed with short setae except for the costal margin, which bears slightly longer and denser setae; M branching distal to $Rs-Cu_1$ line, m_1 cell value 1.07-143, cu_1 cell value 1.06-144. Abdomen of immature females have a completely green colouration unlike mature ones that present a yellowish dorsum with brown tergites, each one with a dark brown patch at the centre; venter green; apex of ovipositor dark; female genitalia (Fig. 4) short triangular in profile; proctiger 0.74-0.86 times longer than head width with its apex slightly upcurved; dorsum of proctiger between circum-anal ring and apex, covered with long and acute setae and sinuate in profile; circum-anal pore ring with a double row of pores; subgenital plate short triangular with a strongly arcuate posterior margin and venter covered with acute but slightly shorter setae; apex of ovipositor dark coloured, protruding, longer than the apex of proctiger; adult male with abdomen predominantly green; genitalia (Fig. 5) with proctiger and subgenital plate yellow; parameres (Fig. 6) green, slightly darkened at their apices and densely covered with acute setae; apical segment of aedeagus (Fig. 9) bearing a long apical projection directed downwards.

Fifth instar larva. Dorsum yellowish with a central dark brown ovoid patch extending longitudinally from occiput to the circum-anal pore rings and transversally between the inner margins of the fore wing pads. Body length 0.95-1.08 mm (Fig. 12), ovoid with a marginal fringe of pointed sectasetae (Fig. 11), 45 to 53 on each fore wing pad and 88 to 111 around the abdomen; antennae 7 segmented; tarsal arolia as in Fig. 13; tarsal claws

absent; dorsal surface of body densely covered with long and finely pointed setae; circum-anal pore rings as in Fig. 14.

The eggs have a dark brown corion covered with wax filaments in a reticulate pattern. They are laid sparsely on both surfaces of leaves and also inside and on the borders of the gall's concavity.

Measurements (in mm): Males (7). Body length 1.83-1.93; head width 0.45-0.47; width of vertex 0.25-0.26; length of vertex 0.17-0.19; length of genal cones 0.16-0.17; length of antenna 1.03-1.07; length of ultimate rostral segment 0.08-0.09; length of fore wing 1.93-2.10; width of fore wing 0.70-0.80; length of hind tibia 0.44-0.50; length of parameres 0.17-0.18; length of aedeagus apical segment 0.14-0.15. Females (13). Body length 2.03-2.32; head width 0.47-0.50; width of vertex 0.25-0.28; length of vertex 0.16-0.19; length of antenna 0.95-1.30; length of ultimate rostral segment 0.09-0.11; length of genal cones 0.16-0.19; length of fore wing 2.21-2.85; width of fore wing 0.85-1.10; length of hind tibia 0.46-0.54; length of proctiger 0.35-0.43.

Type material: Holotype male, Chão da Ribeira, Seixal, 585m, 28.viii.1997, ex *Pittosporum coriaceum*, leg. I. Silva, MMF31949, slide-mounted. Paratypes, 2 females, same data as holotype, MMF31950, ICLAM-C818; 7 males, 9 females, 7 fifth instar and 18 earlier stage larvae, Lombo do Barbinhas, Seixal, MMF31951-31955, ICLAM-C609a-1 to C609a-9, 705 m, 19.vii.1995, ex *P. coriaceum*, leg. F. Fernandes, slide-mounted and ethanol stored; 3 males, 4 females, 8 fifth instar and 17 earlier stage larvae, same data, BMNH-C609a; 1 male, 4 females, Lombo do Barbinhas, Seixal, ICLAM C685-1 to C685-5, 705 m, 13.vi.1996, ex *P. coriaceum*, leg. F. Aguiar, slide-mounted.



Photo 1 - Pit galls of *Trioza pittospori*. a - galls on the surface of *Pittosporum coriaceum* leaves. b - lower surface detail with gall apertures.

Depositories. MMF - Museu Municipal do Funchal (História Natural); ICLAM - Insect Collection, Laboratório Agrícola da Madeira; MHMB – Naturhistorisches Museum Basel; BMNH – British Museum Natural History, (presently NHM - The Natural History Museum).

Host plant. Larvae cause pit galls (Photo 1) on the underside of leaves of the endemic *P. coriaceum* Dryand. ex AIT. [Pittosporaceae].

Etymology. This species is named after its host plant.

***Trioza fernandesi* sp. n.**
(Figs. 15-31)

Description. Adult. Head (Fig. 16) yellowish with red eyes and ocelli; long antennae (Fig. 17), 2.55-3.24 times longer than head width; pale scape, pedicel and proximal half of flagellomere 1 and almost black from distal half of flagellomeres 1 to 8; ellipse shaped rhinaria present at the extremities of flagellomeres 2, 4, 6 and 7; flagellomere 8 with two terminal setae, one being twice longer and more acute than the other one. Thorax with yellowish sides; dorsum, including mesothoracic praescutum, scutum and scutellum, presenting a pattern of light and dark brown coloured patches; prothoracic and mesothoracic tibiae very dark, almost black; first tarsal segment pale, second darker on both prothoracic and mesothoracic legs; metathoracic legs almost completely pale except for the metacoxa which is brown; hind coxa with a well developed and pointed meracanthus (Fig. 22); hind tibia 0.95-1.09 times longer than head width, with several little genual spines at its base and one outer and two inner sclerotised / black spurs apically (Fig. 23). Wings transparent. Fore wings (Fig. 15) elongate oval with an angular apex, 2.61-3.31 times longer than wide, densely covered in surfaced spinules in cells cu_2 and m_2 , sparsely in cells cu_1 , m_1 , r_2 except for cells $c+sc$ and r_1 which are almost always devoid of any spinules; radular areas sharply defined, elongate, triangular, present on the margin of cells m_1 , m_2 and cu_1 . Veins pale brown, sparsely clothed with short setae except for the costal margin, which bears slightly longer and denser setae; M branching distal to $Rs-Cu_1$ line, m_1 cell value 1.30-1.59, cu_1 cell value 1.12-1.82. Abdomen of immature adults are pale green, slightly darkened on dorsum; mature females have a green abdomen with tergites 3 to 7 very dark, almost black; female genital segment (Figs. 18-19) short triangular in profile and of the same colour of abdomen except for the proctiger apex, which is very dark; proctiger 0.60-0.70 times longer than head width with a blunt apex; dorsum of proctiger sparsely covered with short acute setae, mainly on its lower distal half; circum-anal pore ring with a double row of pores; subgenital plate short, broadly triangular with the ventral distal half covered with short and acute setae; apex of ovipositor slightly dark coloured; adult male with abdomen predominantly bright green; genitalia (Fig. 20) including proctiger and subgenital

and proximal half of parameres (Fig. 21) yellowish; parameres distal half very dark and sparsely covered with acute setae; the setae of the posterior margin 2-3 times longer than those of the anterior margin; first segment of aedeagus conspicuously dark; apical segment of aedeagus (Fig. 24) showing evident morphological similarities with the previous species.

Fifth instar larva. Dorsum uniformly dark brown, 1.75-1.83 mm long (Fig. 28) with a peripheral fringe of truncate sectasetae with invaginate apices (Fig. 27), 67 to 71 on each fore wing pad and 129 to 146 around the abdomen; antennae 7 segmented (Fig. 26); tarsal arolia similar to those of *T. pittospori*; tarsal claws absent; dorsal surface of body heavily rugose (not shown in drawing of dorsum, but partially visible in fig. 27) with patches of short clavate setae (Fig. 29); circum-anal pore rings as in Fig. 30.

The eggs are similar to those of *T. pittospori*, with a dark brown corion covered with wax filaments in a reticulate pattern.

Measurements (in mm): Males (17). Body length 2.00-2.35; head width 0.54-0.58; width of vertex 0.30-0.33; length of vertex 0.15-0.17; length of genal cones 0.16-0.18; length of antenna 1.53-1.78; length of ultimate rostral segment 0.08-0.09; length of fore wing 2.18-2.88; width of fore wing 0.75-0.93; length of hind tibia 0.50-0.61; length of parameres 0.14-0.16; length of aedeagus apical segment 0.13-0.14. Females (17). Body length 2.32-2.64; head width 0.60-0.65; width of vertex 0.33-0.36; length of vertex 0.16-0.18; length of antenna 1.63-1.88; length of ultimate rostral segment 0.09-0.11; length of genal cones 0.16-0.18; length of fore wing 2.90-3.68; width of fore wing 1.05-1.23; length of hind tibia 0.59-0.65; length of proctiger 0.37-0.44.

Type material: Holotype male, Chão da Ribeira, Seixal, MMF31956, 585m, 28.viii.1997, ex. *P. coriaceum*, leg. I. Silva, slide-mounted. Paratypes, 13 males, 14 females, same data as holotype MMF31957-31963, ICLAM C817-1 to C817-20, slide-mounted. 5 males, 1 female, 3 fifth instar and 4 earlier stage larvae, Lombo do Barbinhas, Seixal, MMF31964-31965, ICLAM C609-1 to C609-5, 705 m, 19.vii.1995, ex. *P. coriaceum*, leg. F. Fernandes, slide-mounted and ethanol stored; 4 males, 2 females, 4 fifth instar and 3 fourth instar larvae, same data, BMNH C609, all slide mounted; 2 females, 9 earlier stage larvae, Lombo do Barbinhas, Seixal, ICLAM C686-1 to C686-2, 705 m, 13.vi.1996, ex. *P. coriaceum*, leg. F. Aguiar, slide-mounted.

Depositories. MMF - Museu Municipal do Funchal (História Natural); ICLAM - Insect Collection, Laboratório Agrícola da Madeira; MHMB – Naturhistorisches Museum Basel; BMNH – British Museum Natural History, (presently NHM - The Natural History Museum).

Host plant. Larvae seem to be free living on the fresh stems and leaves of the endemic *Pittosporum coriaceum* DRYAND. ex AIT. [Pittosporaceae].

Etymology. This species is named after Dr. Francisco Fernandes from the Botanical Garden of Madeira, who brought to our attention for the first time the pit galls on leaves of *P. coriaceum*.

***Trioza montanetana* sp. n.**
(Figs. 32-39)

Description: Adult male. Head (Fig. 33; a – ventral view, b – dorsal view) dark brown with slightly paler genal cones apices; antennae (Fig. 34) with the scape and pedicel pale, flagellomere 1 pale on its proximal half and dark on distal half; flagellomeres 2 to 8 all dark; ellipse shaped rhinaria present at the extremities of flagellomeres 2, 4, 6 and 7; flagellomere 8 with two terminal setae, one being twice as long and more acute than the other one; antennae 2.17 times longer than head width. Thorax dark brown except for the first coxae and metacoxae which are paler; prothoracic legs with dark tarsus and tibia, femur pale, slightly darker dorsally, trochanter pale; mesothoracic legs similar; metathoracic legs paler with second tarsal segment, femur and coxae slightly darkened; metacoxa with a short and blunt meracanthus; metatibia 1.22 times longer than head width, with several little genual spines at its base (Fig. 38) and one outer and two inner sclerotised black spurs apically (Fig. 39). Wings transparent. Fore wings (Fig. 32) elongate oval with a bluntly angled apex, 2.77 times longer than wide, densely covered in surfaced spinules in cells cu_2 , less in cell m_2 , sparsely in cells cu_1 , m_1 , r_2 except for cells $c+sc$ and r_1 which are almost devoid of any spinules; radular areas sharply defined, elongate, triangular, present on the margin of cells m_1 , m_2 and cu_1 . Veins pale, almost transparent, sparsely clothed with very short setae except for the costal margin, which bears slightly longer but sparser setae and the rest of the surface densely covered with very short setae; M branching distal to $Rs-Cu_1$ line, m_1 cell value 1.25, cu_1 cell value 1.44. Abdomen dark brown; genitalia (Fig. 36) proctiger, subgenital plate and parameres (Fig. 37) dark brown; parameres sparsely covered with acute setae, being those of the posterior margin 2-3 times longer than those of the anterior margin; first segment of aedeagus conspicuously dark; apical segment of aedeagus pale (Fig. 35) bearing a long and acute apical projection directed downwards, similar to that of *T. lienhardi*.

Measurements (in mm): Male (1). Head width 0.41; width of vertex 0.22; length of vertex 0.18; length of genal cones 0.09; length of antenna 0.89; length of ultimate rostral segment 0.06; length of fore wing 1.80; width of fore wing 0.65; length of hind tibia 0.50; length of parameres 0.10; length of aedeagus apical segment 0.08.

Female: Unknown.

Fifth instar larvae: Unknown.

Type material: Holotype male, above Guia in direction to Moya, near La Montañeta,

Gran Canaria (Canary Islands), IC-99/6 (MHMB), 300 m, 26.ii.1999, ex varied trees and bushes, leg. C. Lienhard, slide-mounted.

Depositories. MHMB – Naturhistorisches Museum Basel

Host plant. Unknown.

Etymology. This species is named after the locality where it was collected.

***Trioza lienhardi* Burckhardt, 1981**
(Figs. 40-45)

Description: Fifth instar larva. Dorsum uniformly pale yellowish. Body length 1.15-1.30 (Fig. 43), with a peripheral fringe of truncate sectasetae with slightly invaginate apices (Fig. 41), 41 to 43 on each fore wing pad and 81 to 87 around the abdomen; antennae 7 segmented (Fig. 40), with the last segment slightly darkened; tarsal arolia (Fig. 45) similar to those of *T. pittospori* and *T. fernandesi*; tarsal claws absent; dorsal surface of body smooth, sparsely covered with very short and acute setae (Fig. 42); circum-anal pore rings as in Fig. 44.

Material: 2 fifth instar larvae, Atlit, Israel, P2740 (MHMB), 24.ii.1989, ex *Lycium europaeum*, leg. J. Halperin, slide-mounted.

Depositories. MHMB – Naturhistorisches Museum Basel

Host plant. Larvae and adults feed on *Lycium afrum* L. and *Lycium europaeum* L. [Solanaceae].

SPECIES RELATIONSHIPS – THE LIENHARDI GROUP

This small, rather heterogenous and probably monophyletic group at present includes *fernandesi* sp.n., *lienhardi* Burckhardt, *montanetana* sp.n. and *pittospori* sp.n.

The *lienhardi* species group is characterised by the apical portion of the male aedeagus which bears a long and acute apical projection directed downwards. Other characteristics common to all members of the *lienhardi* group are the short female genitalia, the presence of 1+2 apical metatibial spurs, the presence of metatibial genal processes and related to the larval morphology, the antenna shape, the tarsal arolium shape and the absence of claws.

Other characters are rather variable; the forewing shape with a bluntly angled apex in *lienhardi*, *montanetana*, *pittospori* and *fernandesi* with angled apex; forewing spinulation densely covering the wing membrane in *fernandesi*, *montanetana*, *pittospori*

and absent in *lienhardi*; the shape of marginal sectasetae in first instar larvae, only known for *fernandesi* and *pittospori* but showing evident morphological interest to separate the species within the group.

SPECIES SEPARATION

Of all species of *Trioza* known to date, only *T. lienhardi*, described from Tunisia and also recorded from Saudi Arabia (BURCKHARDT & MIFSUD, 1998) and Israel (present paper), shows, relatively to the three new species here described, a similar shaped male aedeagus. From its description, we can see that *T. lienhardi*'s colouration is close to that of *T. pittospori*. The morphological characteristics of the forewing of *T. lienhardi* are slightly different. Contrary to the Macaronesian species *T. lienhardi*'s fore wing lacks any surface spinules. The female terminalia of *T. lienhardi* is rather similar to that of *T. fernandesi*, being short, straight in lateral view, with apex of proctiger rounded. As in *T. lienhardi* a not so pronounced excavation in the female subgenital plate of *T. fernandesi* can be observed in ventral view. The structure of the circum-anal pore ring, as in most Psylloidea, is similar in the three species, showing two unequal rows of pores (Fig. 19).

Based on the above mentioned morphological characters the following key can be used to separate the adults of *T. lienhardi*, *T. montanetana*, *T. pittospori* and *T. fernandesi*:

1. Forewing surface densely covered with spinules.....2
 - Forewing surface not covered with spinules; male terminalia as in BURCKHARDT (1981: 224), Figs. 63-68 and female terminalia, Figs. 69-72 (Tunisia, Saudi Arabia, Israel).....***T. lienhardi*** Burckhardt
2. Forewing with an angulated apex as in Fig. 15; male terminalia as in Figs. 20-21; aedeagus Fig. 24; female terminalia Fig. 18-19 (Madeira).....***T. fernandesi*** sp. n.
 - Forewing with a bluntly angled apex as in Figs. 1 and 32.....3
3. Smaller species with antennal length 0.89 and forewing length 1.80; male terminalia as in Figs. 35-37; aedeagus Fig. 35 (Gran Canaria – Canary Islands).....***T. montanetana*** sp. n.
 - Larger species with antennal length 0.95-1.30; forewing length 1.93-2.85; male terminalia as in Figs. 5-6; aedeagus Fig. 9; female terminalia Fig. 4 (Madeira).....***T. pittospori*** sp. n.

Key to separate the fifth instar larvae of *T. lienhardi*, *T. pittospori* and *T. fernandesi*:

1. Fore wing pad with less than 44 marginal sectasetae.....2
 - Fore wing pad with more than 44 marginal sectasetae.....3
2. Fore wing pad with 41-43 marginal sectasetae and abdomen with 81-87 marginal sectasetae; body length 1.15-1.30; habitus as in Figs. 40-45.....***T. lienhardi*** Burckhardt
3. Fore wing pad with 45-53 marginal sectasetae and abdomen with 88-111 marginal sectasetae; body ovoid with a length of 0.95-1.08; habitus as in Figs. 11-14.....***T. pittospori*** sp. n.

- Fore wing pad with 67-71 marginal sectasetae and abdomen with 129-146 marginal sectasetae; body length 1.75-1.83; habitus as in Figs. 26-3.....*T. fernandesi* sp. n.

It is possible to use other morphological characters to differentiate these four species apart from the evident differences in genital morphology. The measurements and ratios taken for all four species of the *lienhardi* group are summarised in Table 1. The values, which can be used to differentiate the four species are enhanced in bold.

TABLE 1 - Measurements and ratios for *T. lienhardi* (*T. l.*), *T. montanetana* (*T. m.*), *T. pittospori* (*T. p.*) and *T. fernandesi* (*T. f.*): head width (HW); vertex width (VW); vertex length (VL); antennal length (AL); genal cones length (GCL); forewing length (FWL); forewing width (FWW); proctiger length (PL); parameres length (PaL); length of apical portion of aedeagus (AeL); length of ultimate rostral segment (LuRs); length of hind tibia (LHT); cu1 cell value (Cu1); m1 cell value (m1); length of first flagelomere segment (LfFs). Figures in bold are diagnostic. All measurements in mm.

	<i>T. l.</i>	<i>T. m.</i>	<i>T. p.</i>	<i>T. f.</i>
HW	0.38-0.48	0.41	0.45-0.50	0.54-0.65
VW	0.26-0.28	0.22	0.25-0.28	0.30-0.36
VL	0.17	0.18	0.16-0.19	0.15-0.18
AL	0.72-0.85	0.89	0.95-1.30	1.53-1.88
GCL	0.12-0.18	0.09	0.16-0.19	0.10-0.18
FWL	1.62-2.07	1.08	1.93-2.85	2.18-3.68
FWW	0.70-0.75	0.65	0.70-1.10	0.75-1.23
PL	0.29-0.32	n.a.	0.35-0.43	0.37-0.44
PaL	0.12	0.10	0.17-0.18	0.14-0.16
AeL	0.09-0.12	0.08	0.14-0.15	0.13-0.14
LuRs	0.07	0.06	0.08-0.11	0.08-0.11
LHT	0.38-0.40	0.50	0.44-0.54	0.50-0.65
Cu1	0.94-1.15	1.44	1.06-1.44	1.12-1.82
m1	1.07-1.16	1.25	1.07-1.43	1.30-1.59
AL : HW	1.68 – 2.14	2.17	1.94-2.60	2.55-3.24
FWL : FWW	2.49-2.88	2.77	2.47-2.96	2.61-3.31
GCL : VL	0.67 – 1.00	0.50	0.84-1.06	0.53-1.13
FWL : HW	3.98-4.60	4.39	4.20-5.70	4.40-5.94
PL : HW	0.65-0.69	n.a.	0.74-0.86	0.60-0.70
HW : LuRs	5.43-6.86	6.83	4.45-5.63	5.73-7.25
HW : LfFs	1.81-2.67	1.86	1.40-1.88	1.08-1.33
LHT : HW	0.88 – 0.93	1.22	0.94-1.09	0.95-1.09
VL : VW	0.61 – 0.64	0.82	0.61-0.76	0.44-0.57

HOST PLANT AND BIOGEOGRAPHIC RELATIONSHIPS

Of this four species complex, *T. montanetana*, *T. pittospori* and *T. fernandesi* can only be found on Central Macaronesia (Madeira and Canary Islands *sensu* KUNKEL, 1993), whilst *T. lienhardi* was so far found on two Mediterranean countries (Israel and Tunisia) and also Saudi Arabia. As to host-plant associations, the Madeiran species, *T. pittospori* and *T. fernandesi* are restricted to the endemic *Pittosporum coriaceum*, a rare tree of the Madeiran laurel forest [*Laurisilva*], and apparently only *T. pittospori* causes the formation of pit galls on the host leaves. The galls in mature leaves are yellow coloured on the exterior (on its convexity), which contrasts with the dark green of the leaf. It is interesting to point out that these pit galls are outstandingly visible on a picture of the host plant, on page 41 of NEVES & VALENTE (1992). The few larvae of *T. fernandesi* observed on the host plant were never associated with pit galls and furthermore, they are quite different in appearance from those of *T. pittospori*. Albeit these differences in behaviour, the adults of both species can be found together on the same branches of the host. Only one other *Trioza* species – *T. vitreoradiata* (Maskell), a quite common native species of New Zealand, is known to feed on several species of *Pittosporum*, e.g. *eugenoides*, *tenuifolium*, *crassifolium*, *colensoi* (TUTHILL, 1952). More recently MARTIN & MALUMPHY (1995), recorded *T. vitreoradiata* from Britain (Cornwall and Isles of Scilly) on *P. tenuifolium* and *P. crassifolium*.

Regarding *T. montanetana*, we have no data whatsoever on its host plants, although the locality in the Canary Islands where the only specimen was collected has several shadowy and humid places favourable to *Laurisilva* plant species (Carlos Suarez-Rodriguez, pers. comm.). It is also in the North Coast of Gran Canaria near the type-locality that one can still find isolated small patches of the once extensive *Laurisilva* woods (BRAMWELL & BRAMWELL, 1994). Therefore it is possible that *T. montanetana* is also associated with *Laurisilva* host plant(s).

T. lienhardi lives on *Lycium* spp. (Solanaceae), characteristic of dry environments and although some species of this genus are also present in both Macaronesian archipelagos (HANSEN & SUNDING, 1993), a preliminary survey in Madeira revealed no psyllids associated with these plants. It will be interesting to survey the same plants in the Canary Islands.

The association of *T. lienhardi* to *Lycium* spp. and *T. pittospori* and *T. fernandesi* to *Pittosporum coriaceum* poses an interesting question. Why do *T. pittospori* and *T. fernandesi* occur on *P. coriaceum* (Macaronesian endemic) and not on *Lycium* (European species) when both occur naturally in Madeira?

The Macaronesian flora was once abundant in southern Europe and northern Africa but during the Pleistocene, ca. 1.5 million years ago (SUNDING, 1979), some components became extinct. One, therefore, can not exclude the possibility of *T. lienhardi* being once associated with a Macaronesian species and having been forced to change host when this vegetation became extinct.

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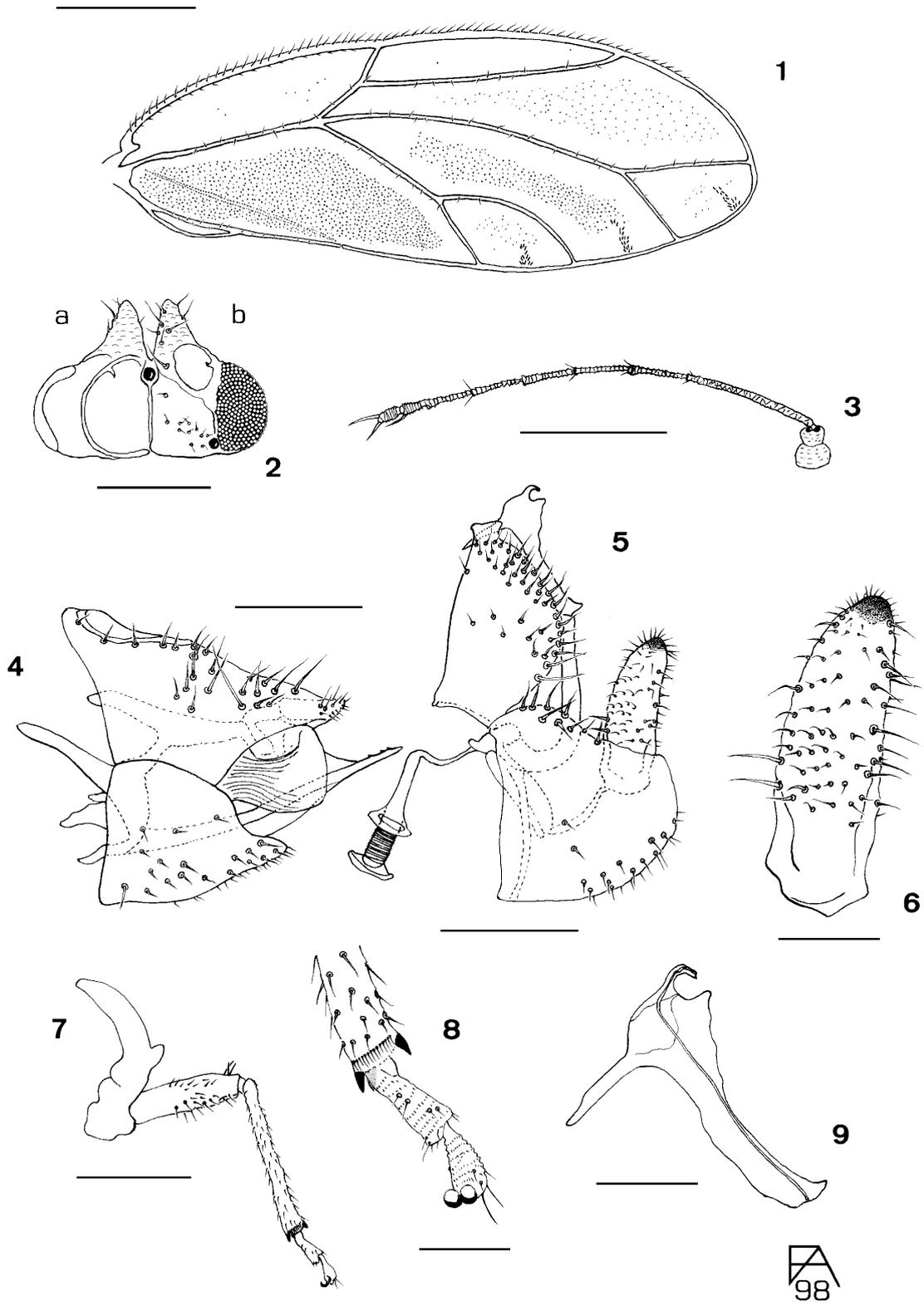
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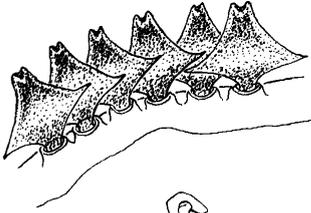
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Figs. 1-9 - *Trioza pittospori* Aguiar sp. n. [imago]: 1 - fore wing (bar = 0.4 mm); 2a - head, ventral side, 2b - dorsal side (bar= 0.24 mm); 3 - antenna (bar= 0.3 mm); 4 - female genitalia (bar = 0.15 mm); 5 - male genitalia (bar = 0.15 mm); 6 - paramere (bar = 0.05 mm); 7 - metathoracical leg (bar = 0.36 mm); 8 - extremity of metatibia showing saltatorial spurs (bar = 0.09 mm); 9 - apical segment of aedeagus (bar = 0.05 mm).

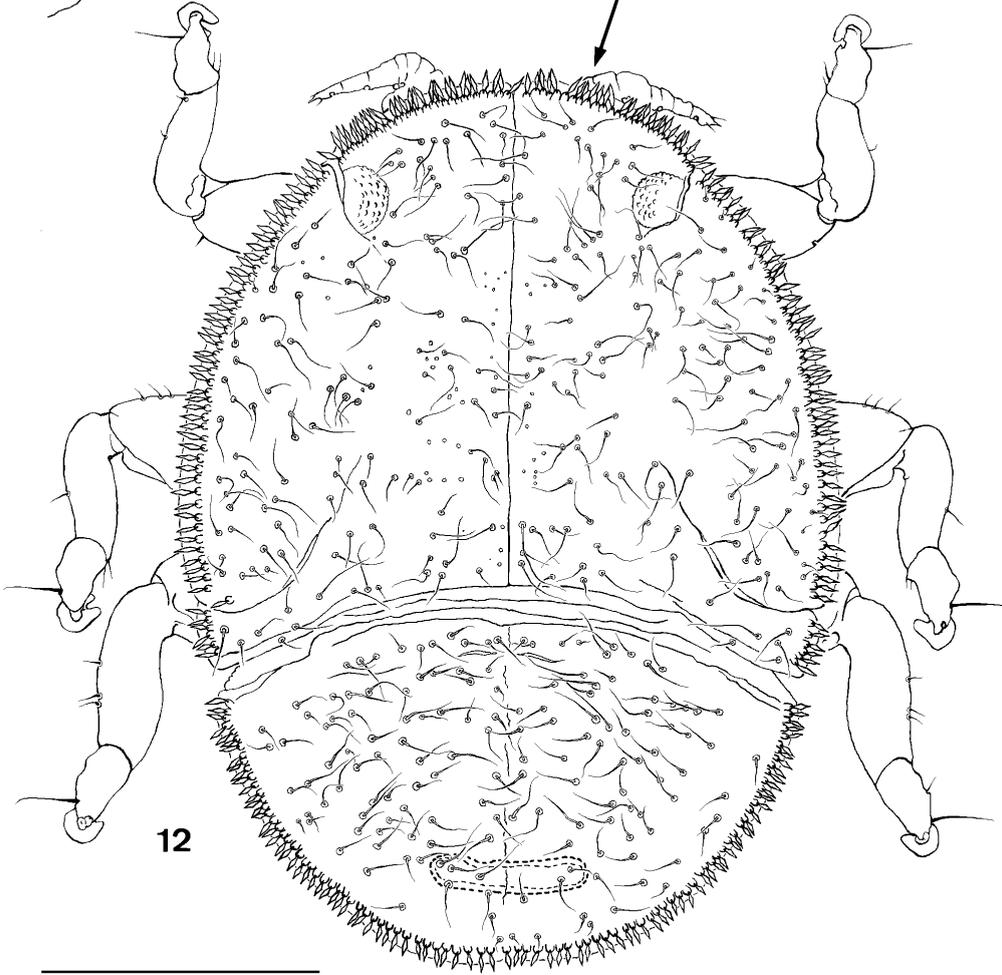


Figs. 10-14 - *Trioza pittospori* Aguiar sp. n. [larva]: 10 - marginal sectasetae of first instar (bar = 0.04 mm); 11 - pointed marginal sectasetae of fifth instar (bar = 0.03 mm); 12 - fifth instar larva (bar = 0.36 mm); 13 - tarsal arolia (bar = 0.04 mm); 14 - circum-anal pore rings (bar = 0.09 mm).

10

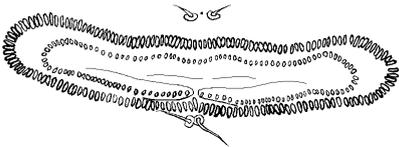
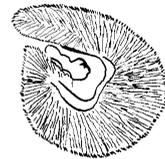


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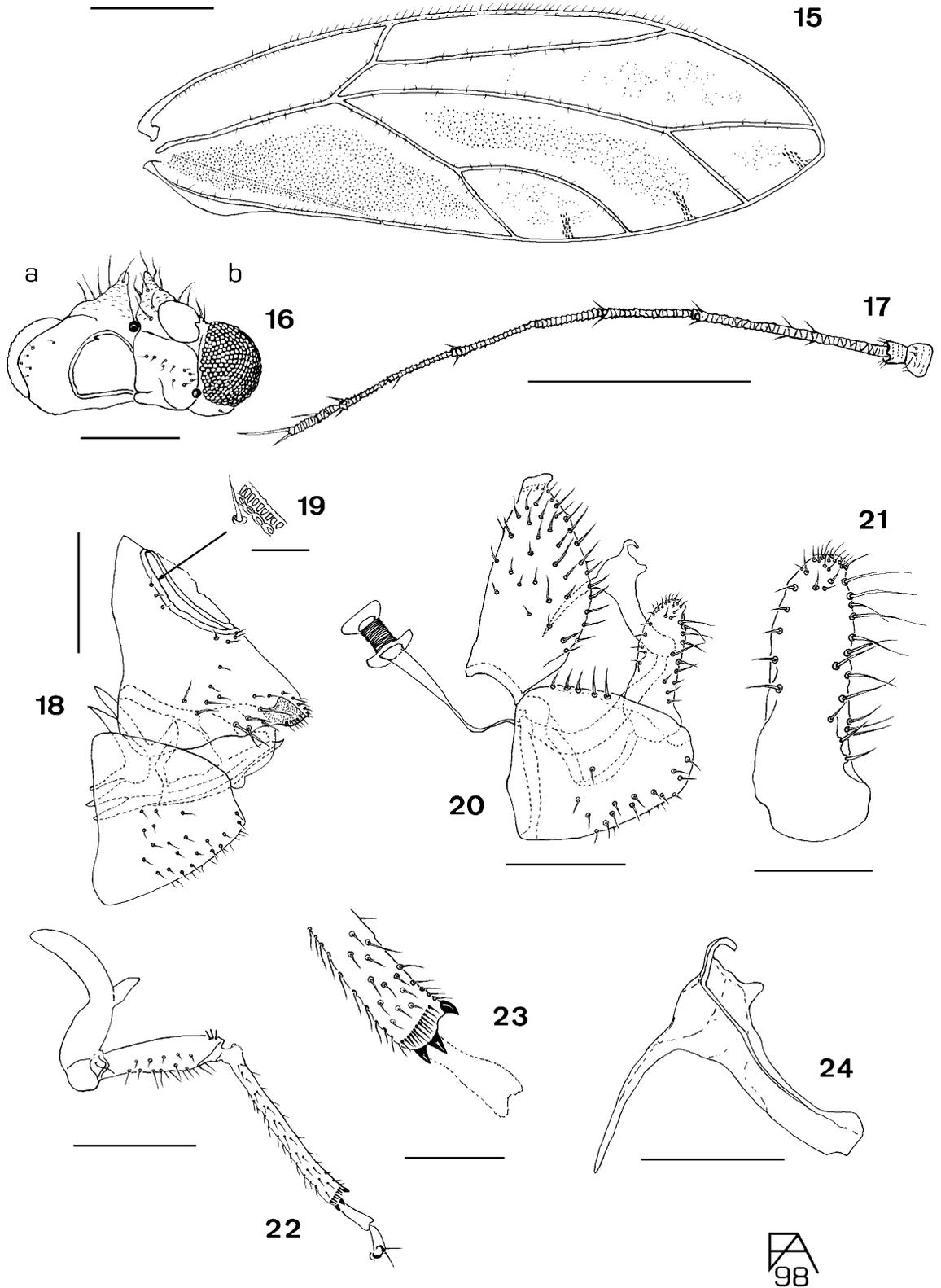
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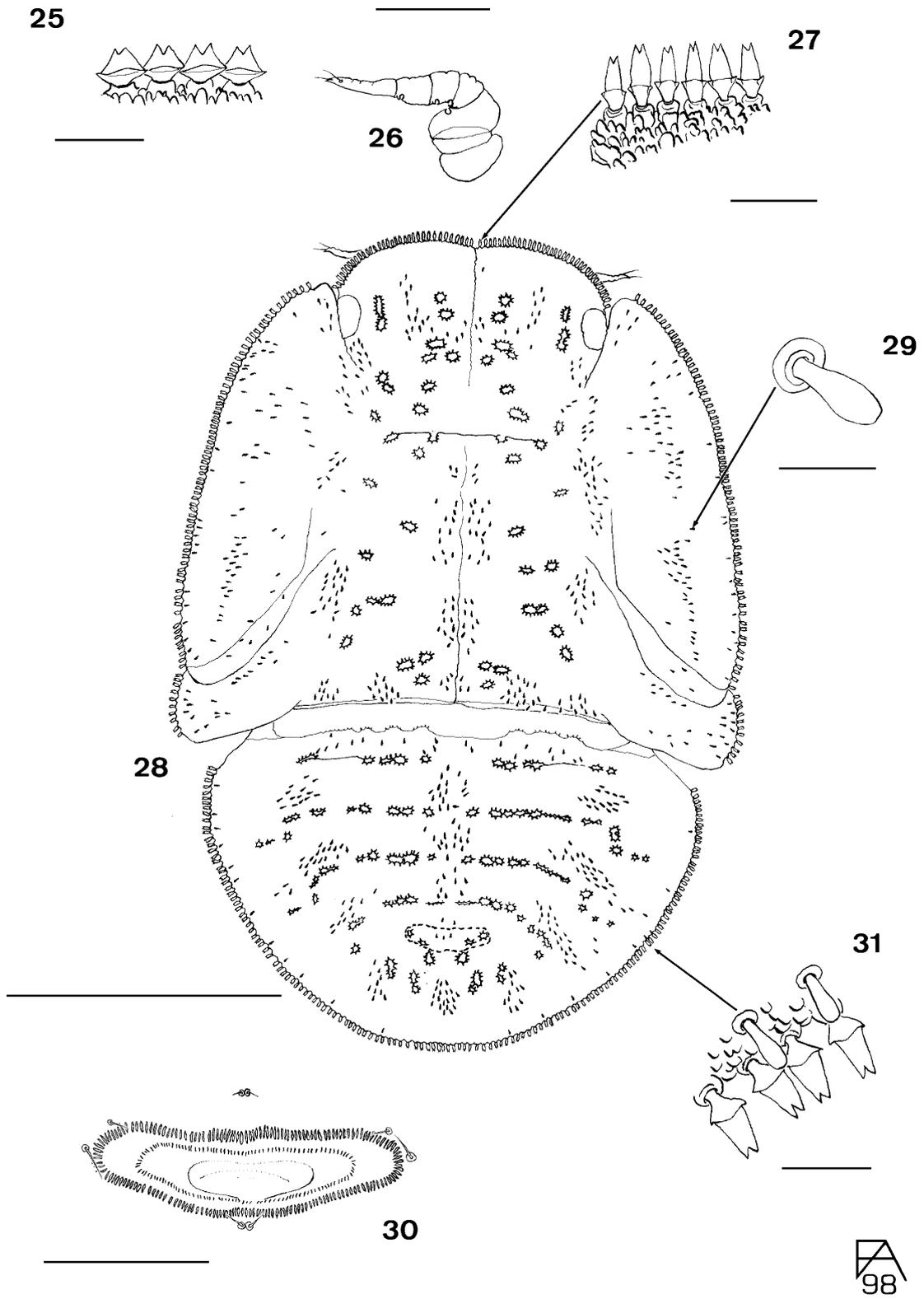
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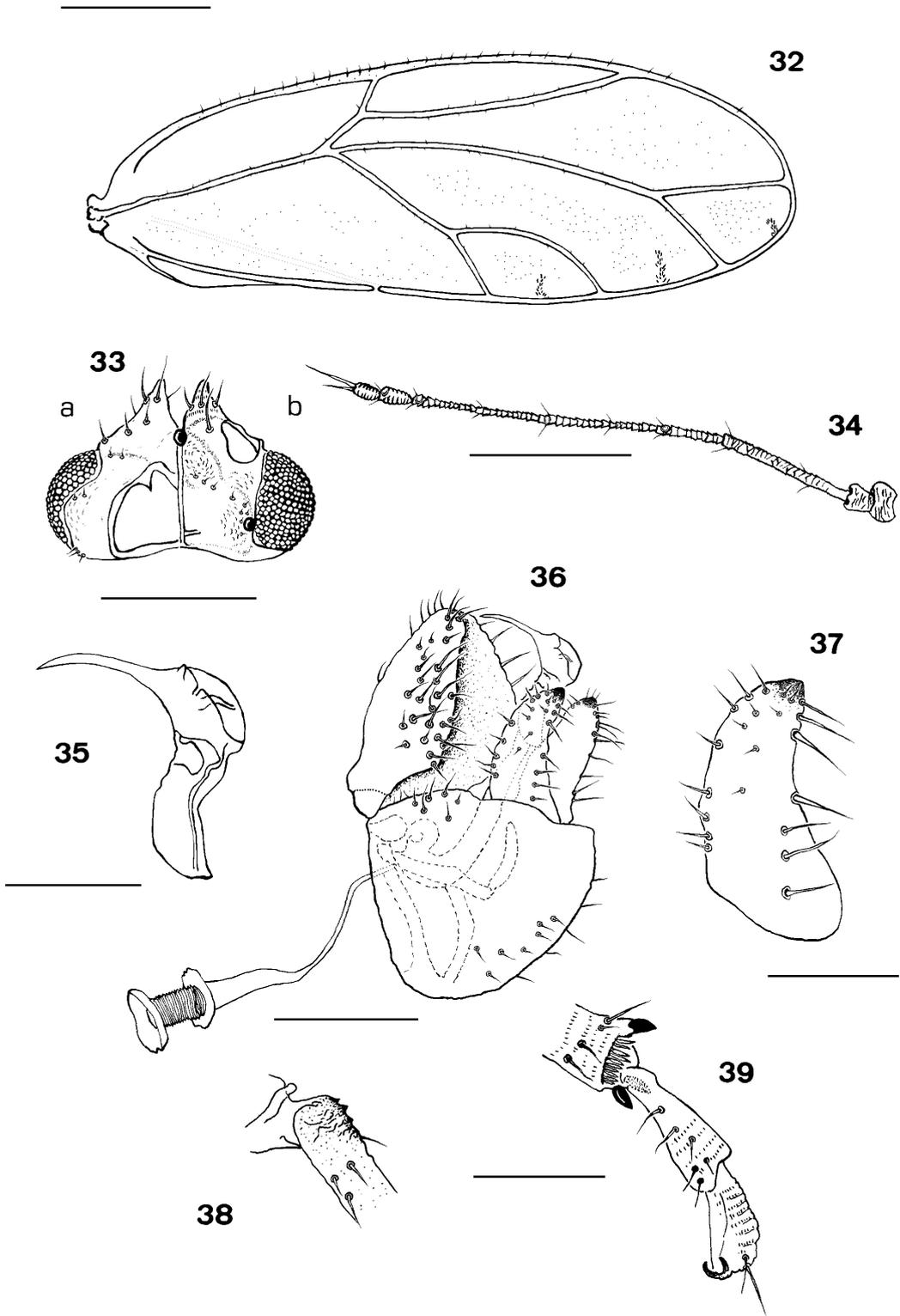
Figs. 15-24 - *Trioza fernandesi* Aguiar sp. n. [imago]: 15 - fore wing (bar = 0.5 mm); 16a - head, ventral side, 16b - dorsal side (bar = 0.24 mm); 17 - antenna (bar = 0.5 mm); 18 - female genitalia (bar = 0.2 mm); 19 - detail of circum-anal pore ring (bar = 0.03 mm); 20 - male genitalia (bar = 0.13 mm); 21 - paramere (bar = 0.06 mm); 22 - metathoracical leg (bar = 0.4 mm); 23 - extremity of metatibia showing saltatorial spurs (bar = 0.12 mm); 24 - apical segment of aedeagus (bar = 0.07 mm).



Figs. 25-31 - *Trioza fernandesi* Aguiar sp. n. [larva]: 25 - marginal sectasetae of first instar (bar = 0.03 mm); 26 - antenna (bar = 0.15 mm); 27 - marginal sectasetae of fifth instar (bar = 0.04 mm); 28 - fifth instar larva (bar = 0.6 mm); 29 - dorsal short clavate setae (bar = 0.01 mm); 30 - circum-anal pore rings (bar = 0.09 mm); 31 - marginal sectasetae and clavate setae (bar = 0.02 mm).



Figs. 32-39 - *Trioza montanetana* Aguiar sp. n. [male]: 32 - fore wing (bar = 0.4 mm); 33a - head, ventral side, 33b - dorsal side (bar = 0.24 mm); 34 - antenna (bar = 0.24 mm); 35 - apical segment of aedeagus (bar = 0.05 mm); 36 - male genitalia (bar = 0.1 mm); 37 - paramere (bar = 0.05 mm) 38 - base of metatibia (bar = 0.1 mm); 39 - extremity of metatibia showing saltatorial spines (bar = 0.1 mm).



Figs. 40-45 - *Trioza lienhardi* Burckhardt [larva]: 40 - antenna (bar = 0.07 mm); 41 - marginal setae of fifth instar (bar = 0.06 mm); 42 - dorsal short acute setae (bar = 0.01 mm); 43 - fifth instar larva (bar = 0.09 mm); 44 - circum-anal pore rings (bar = 0.05 mm); 45 - tarsal arolium (bar = 0.02 mm).

