NEW RECORDS OF WHITEFLIES (HOMOPTERA: ALEYRODIDAE) FROM MADEIRA ISLAND WITH SOME TAXONOMICAL NOTES

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With 36 figures and 4 maps

ABSTRACT. Following the studies on the Aleyrodidae of Madeira Island initiated by the author in 1993, this paper adds 4 new records, raising the total number of known species to 13.

These new records include the Aleurodicinae *Aleurodicus dispersus* Russell collected on *Carya pecan, Chorisia speciosa, Cinnamomum camphora, Ficus elastica, Magnolia grandiflora, Ocotea foetens, Psidium guajava, Senna didymobotrya, Strelitzia nicolai* and *Wisteria sinensis*; the Aleyrodinae *Bemisia tabaci* (Gennadius) collected on *Euphorbia pulcherrima* and *Psidium guajava*, *Dialeurodes citrifolii* (Morgan) collected on *Citrus limon, Citrus reticulata, Citrus sinensis* and *Pealius azaleae* (Baker & Moles) collected on *Rhododendron mucronatum*.

Data regarding their synonymy, geographical distribution, host plants, pest status and morphological description for easily identification is given.

KEY WORDS: Madeira Island, Macaronesia, Whiteflies, Aleyrodidae, *Aleurodicus dispersus, Bemisia tabaci, Dialeurodes citrifolii, Pealius azaleae*

INTRODUCTION

In the first part of this study (AGUIAR & PITA, 1995), and based on material collected in recent years and also on ancient records not published, we were able to identify 5 species, namely *Aleurothrixus floccosus* (Maskell), *Trialeurodes vaporariorum* (Westwood),

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Aleyrodes proletella (Linnaeus); *Bemisia* sp. near *afer* (Priesner & Hosny) and *Paraleyrodes bondari* Peracchi. The last three were new records for Madeira. The identity of the *Bemisia* species remains still uncertain, but additional material was collected and hopefully an identity will appear with time.

The above mentioned material included besides the species already mentioned, another 4 that we were unable to identify. Fortunately Dr. J.H. Martin of the Natural History Museum was kindly enough to help us. To our great satisfaction 3 of these species were described as new (MARTIN *et al.*, 1996) and the fourth was a new record. They are: *Bemisia lauraceae*, *Pealius madeirensis*, *Aleuroplatus perseaphagus* and *Aleurotrachelus rhamnicola* Goux.

In the mean time the study of new material allow us to add three new records: *Bemisia tabaci* (Gennadius), *Dialeurodes citrifolii* (Morgan), *Aleurodicus dispersus* Russell and to publish for the first time data about the presence of *Pealius azaleae* (Baker & Moles) in Madeira of which and according to MARTIN *et al.*, (1996) some old material is deposited on the Natural History Museum in London.

The addition of these last four whitefly species raises the total number of known species for Madeira Island to 13.

Material and Methods

The samples were collected on various ecosystems like cultivated fields, forests, greenhouses and even gardens from around the Island. Parts of the plants with aleyrodids were taken to the laboratory in plastic bags; in some cases an aspirator was used to collect adults. The mounting method used for pupal cases was that of MARTIN (1987), with a single change on the final stage where Entellan®, a synthetic mounting media, was used instead of Canada Balsam. Whenever possible the adult males and females were mounted using a clearing and mounting mediums normally applied on the microscopic preparation of Acari (AGUIAR & PITA, 1995).

All the slide mounts and samples in 70% ethanol are on the insect collection of the Laboratório Agrícola da Madeira (ICLAM). The only exception is part of the *P. azaleae* and *A. Dispersus* material that is deposited in the collection of the Natural History Museum (BMNH). The material on the ICLAM collection is identified by code numbers beginning by letter "C" (e.g. C370).

The figures shown in this paper were made with a Nikon Labophot light microscope, mainly using 10, 20 and 40X objectives and a camera lucida. The localisation of collecting sites on the distribution maps is based in Universal Transverse Mercator (U.T.M.) co-ordinates (e.g. CB2113). The maps themselves are a reduction of the 1/25.000 military topographic chart of the Madeira Archipelago.

Results

Subfamily **ALEYRODINAE**

Bemisia tabaci (GENNADIUS, 1889)

Aleurodes tabaci GENNADIUS, 1889
Aleurodes inconspicua QUAINTANCE, 1900
Bemisia emiliae CORBETT, 1926
Bemisia costa-limai BONDAR, 1928
Bemisia signata BONDAR, 1928
Bemisia bahiana BONDAR, 1928

This species commonly known as the cotton whitefly or the sweetpotato whitefly has a very large synonymy. Those mentioned are the first 6 of the 23 quoted by MOUND & HALSEY (1978). According to these authors the many names for which *B. tabaci* was known results from the fact that the pupal case morphology vary with the hairiness of hosts leaf surface. It seems that those developing in smooth leaves have very short dorsal setae whereas the ones that develop on hairy leaves may have several pairs of elongated setae. This was already stated by MOUND (1966). The list of known host plants of this whitefly is enormous. MOUND & HALSEY (1978) refer 326 species of plants belonging to 63 families. For BELLOWS *et al.*(1994), there is evidence that *B. tabaci* comprises a species complex with populations which successfully develops on some hosts whereas others do not. The best known example of this situation is the one that refers to strain A (cotton str.) and strain B (poinsettia str.) of *B. tabaci*. These authors, based on several physiological and morphological differences between these strains, describe the strain B as *B.argentifolii* sp.n. This description is a highly controversial matter and many still regards *B. tabaci* as being only one highly biological and genetic variable species.

B. tabaci can be considered today a cosmopolitan species, present in every continent and is indigenous to most of the tropical and sub-tropical regions of the world. In the US its presence in Florida is known since 1894, but more recently during 1986 devastating outbreaks of the strain B had occurred on greenhouse crops (specially poinsettias) and also of outdoor vegetable crops. Over the next 2 years it had spread to almost all the poinsettia growing areas of California due to the importation of infested plant material from Florida. In Europe *B. tabaci* was first detected in the Netherlands and its presence is linked with the importation and movement of certain ornamental plants like the poinsettias from the US.

Since then it has spread to the countries of Southern Europe, but infestations on greenhouse crops had occurred as far north as Scandinavia (PARRELLA *et al.*, 1992; BEDFORD *et al.* 1992).

According to BEDFORD *et al.* (1992), *B. tabaci* poses a major economic threat to world agriculture with its ability to cause severe feeding damage to plants, the existence of populations resistant to pesticides and as the known vector of more than 60 phytopathogenic geminiviruses.

Description of the pupal case - As is mentioned above, on glabrous leaves pupal cases are often large with very small dorsal setae (Fig. 1a), whilst on hairy leaves they are smaller with long setae (Fig. 2). In average the usually colourless suboval pupal case has a length of 835,4 ± 60,5 µm and a width of 617,8 ± 43,5 µm. The margin is finely crenate. Anterior and posterior marginal setae present. Thoracic and abdominal tracheal combs not differentiated from margin, only visible on prepared material. Transverse moulting suture ending on the subdorsal area, longitudinal one reaching the margin. Abdominal segments I to VI plus VIII subequal in median length except VII which is not visible. Nine to eleven pairs of setae on the submarginal-subdorsal regions, plus the caudal pair. The submedian area has three pairs of setae, the cephalic, the 1st and 8th abdominal pairs. There are a number of randomly scattered combined pores (disc pore close to porette) on the submarginal-subdorsal regions whereas on the submedian abdominal area they appear paired. The submedian abdominal depressions are evident and sometimes also the thoracic. The pupal case from hairy leaves (Fig. 2), has a median abdominal tubercle on the 1st abdominal segment and two pairs on the 3rd and 4th, but this can vary. The vasiform orifice (Fig. 3) is triangular elongate with some posterior tubercles. The operculum covers approximately half of the orifice, the elongate lingula is exposed and bears a pair of terminating setae. Caudal furrow and ridges present. On the venter (Fig. 1b), the antennas are short not reaching the mesothoracic legs. Tracheal folds are densely covered with spinules. Other structures visible are the legs, rostrum, adhesive sacs, anterior and posterior spiracles and the 8th ventral-abdominal pair of setae.

Adult male - Upper compound eye with smaller ommatidia and linked to lower compound eye by 1 ommatidium (Fig. 6). Antennas with 7 segments (Fig. 7). The 3rd is the longest and has on its apex (Fig. 8) 2 rhinaria (primary sensoria) and a sensorial cone (flagellate sensoria). The 5th has 1 rhinarium, the 6th 1 sensorial cone and the 7th 1 rhinarium and 1 sensorial cone. Genitalia - genital plate (Fig. 4) as long as broad with three pairs of setae on each side of the operculum/lingula. Claspers finely pointed, slightly longer than genital plate and covered with several pairs of setae including at least four stout ones on the inner face of claspers. Aedeagus (Fig. 5) long and slender but shorter than claspers.

Material studied: C511 - 12 pupal cases, 5 adult ♂♂, 7 adult ♀♀, *Euphorbia pulcherrima*, Jardim Municipal/Funchal, CB2113, 7.i.1995, Col. Passos de Carvalho; C550 - 3 pupal cases, *Psidium guajava*, São Martinho/Funchal, CB1613, 5.i.1995, Col. F. Aguiar; C643 - 1 adult ♂, 8 adult ♀♀, *Euphorbia pulcherrima*, Rib. João Gonçalves/Santo da Serra, CB2820, 24.xi.1995, Col. M. Teixeira.

Dialeurodes citrifolii (MORGAN, 1893)

Aleyrodes citrifolii MORGAN, 1893
Aleyrodes nubifera BERGER, 1909

QUAINTANCE & BAKER (1916) recorded *D. citrifolii* from the U.S.A., Mexico and Cuba pointing out its possibe origin on the Oriental Region which was latter confirmed by SILVESTRI (1927). Presently the Cloudywinged whitefly as is commonly known has a vast distribution area which includes the Oriental Region (India, Malaysia, Vietnam, China); Nearctic Region (U.S.A., Bermuda); Neotropical Region (Mexico Barbados, Jamaica, Porto Rico, Cuba, Trinidad, Venezuela and Brazil); Palaearctic Region (England and Japan) and the Hawaii Islands on the Pacific (MOUND & HALSEY 1978; NGUYEN *et al.* 1993).

D. citrifolii is mainly known as a citrus pest and is recorded from several *Citrus* hosts (Rutaceae), namely *C. aurantifolia, C. aurantium, C. reticulata, C. grandis, C. limon, C. sinensis, Citrus* x *paradisi.* Other known host plants are *Ficus nitida* (Moraceae) and *Gardenia* sp. (Rubiaceae) (MOUND & HALSEY 1978; NGUYEN *et al.* 1993).

Eggs and ninfs of *D. citrifolii* are generaly found on the lower surfaces of leaves. The eggs, like those of several other species of citrus whiteflies are inserted by their pedicel into the stomata and have a characteristic appearance. The egg is covered with wax filaments that give them a 'reticulated' appearance (Fig. 18). They are pale yellow shortly after oviposition but darkens rapidly.

Description of pupal case - Elliptic with a length of 1821,9±217,4 μm and width of 1346,9±182,6 μm (Fig. 9). The cuticle is pale with no dark spots. The living ninphs are transparent with orange tracheal pores, legs, and vasiform orifice. Margin subtly crenate slightly indented anteriorly. Thoracic and caudal tracheal pore openings marked by invaginated pores. The thoracic pair each with 3-5 teeth internally (Fig. 10). Anterior and posterior pairs of marginal setae fine and short. Submarginal ridges on submarginal area conspicuous. Subdorsum with 14-15 pairs of small setae. Cephalic and 8th abdominal pairs of setae present on the submedian area. 1st abdominal pair not present. Abdominal segments I-VIII subequal in median length.

The submedian abdominal and thoracic depressions are evident. The dorsal disc surface shows a reticulated pattern partially visible on Fig. 10. Also visible are two combined pores (disc pore close to porette). A considerable number of these pores are randomly scattered over this area. The vasiform orifice (Fig. 11) is subcircular, with the subtriangular operculum almost filling the aperture and hiding the lingula. The caudal furrow is punctuated by characteristic subcircular markings which give the furrow a 'cobbled' appearance. PERACCHI (1971) on his redescription of *D. citrifolii* wrongly situates this 'cobbled' furrow on the ventral surface.

Adult male - Genital plate (Fig. 12) 2 thirds wider than longer with 3 pairs of setae

on each side of the vasiform orifice which is subcircular. The subquadrate operculum and lingula are well visible. The claspers are longer than the genital plate, terminating on strong and curved points. A subapical small tooth is visible on the inner face of each clasper. The aedeagus (Fig. 13) is long, slender, upturned and acuminate on its apex. The upper and lower compound eyes are linked by 3 ommatidia (Fig. 14). The lower compound eye has larger ommatidia. The antenna has 7 segments (Fig. 15). The 3rd which is the longest presents on its apex 2 rhinaria and 1 sensorial cone (Fig. 16). The 5th and the 7th have 1 rhinarium each one. The 6th and 7th have a sensorial cone each one (Fig. 17).

Material studied: C370 - 6 pupal cases, ex. *Citrus reticulata*, Ponte dos Frades/C^{a} de Lobos, CB1516, 14.iii.1994, Col. A.Fernandes; C610 - 5 pupal cases, 9 adult ♂♂, 15 adult ♀♀, ex. *Citrus limon*, Preces/C^{a} de Lobos, CB1416, 19.vii.1995, Col. F. Aguiar; C618 - 6 adult ♂♂, 6 adult ♀♀, ex. *Citrus sinensis*, Barreiros/Funchal, CB1913, 17.viii.1995, Col. C. Brazão; C648 - 26 pupal cases, ex. *Citrus sinensis*, Panasqueira/C^{a} de Lobos, CB1515, 6.ii.1996, Col. C. Brazão

Pealius azaleae (BAKER & MOLES, 1920)

Aleyrodes azaleae BAKER & MOLES, 1920

The Azalea Whitefly was described from material collected in Belgium but is also recorded for other countries of the Palaearctic region like The Netherlands, England, Scotland, USSR and Japan. More recent records came from Czechoslovakia (ZAHRADNIK, 1987), Italy (BENE *et al.*, 1991) and Taiwan (KO *et al.*, 1990). Records from Australia and New Zealand are the only known from the Australasian region where it was probably introduced.

All this material was collected on ornamental *Rhododendron* (Ericaceae), namely *R. mucronatum, R. pulchrum* and *R. simsii* (MOUND, 1966; MOUND & HALSEY, 1978).

Description of pupal case - Pale, surrounded by a thin wax fringe. Elongate elliptical with a length of 927,8±67,1 μm and a width of 560,2±53,4 μm (Figs. 19,20). Margin finely crenate, slightly more thickened crenulations on the tracheal pore areas. Anterior and posterior marginal setae present. Caudal setae elongate. Submarginal area with 5 pairs of very small setae in front of abdominal segments IV to VIII and a undetermined number of very small difficult to see setae on the cephalo-thoracic submargin. Transverse moulting suture not reaching the submarginal area and longitudinal moulting suture reaching the anterior margin. Three pairs of major setae are present on the submedian area, the cephalic and 8th abdominal pairs, which can be small (Fig. 19) or elongate (Fig. 20), and the 1st abdominal pair. The 7th abdominal segment less than half length of 6th, the others equal in median length. There are a number of combined pores (disc pore close to porette), lined on the cephalo-thoracic submargin and several pairs lined in three rows

on the subdorsal and submedian areas. We can also found 6 pairs of submedian abdominal depressions, 4 pairs of submedian thoracic depressions and 1 pair of submedian cephalic depressions. Vasiform orifice (Fig. 21) elongate cordate with subquadrate operculum and D-shaped lingula tip exposed and presenting a pair of elongate setae reaching the posterior margin of vasiform orifice. Distal third of vasiform orifice ornamented by a pattern of several transverse ridges.

Adult male - Genital plate (Fig. 22) almost as long as wide. Vasiform orifice almost circular with a subquadrate operculum and an exposed lingula tip which almost reaches the posterior margin of the genital plate dorsum. The truncate lingula has on its tip a pair of small setae. Three pairs of stout setae are present on each side of the vasiform orifice. Claspers slightly longer than genital plate, terminating in strong and curved pointed tips. Presence of a strong subapical indentation with a base almost as wide as its lenght. The long and slender aedeagus has a constriction on its apex (Fig. 23). The aedeagus is longer than 2/3 of the claspers length.

The upper and lower compound eyes are linked by 3 ommatidia (Fig. 24). The lower compound eye has larger ommatidia. The antenna has 7 segments (Fig. 25). The 3rd which is the longest presents on its apex 2 rhinaria and 1 sensorial cone (Fig. 26). The 5th have 1 rhinarium. The 6th and 7th have a sensorial cone each one (Fig. 27).

Material studied: C493 - 4 adult ♂♂, 1 adult ♀, ex. ?*Strelitzia reginae*, Jardim Municipal/ Funchal, CB2113, 20.xi.1994, Col. F. Aguiar; C496 - 16 pupal cases, 7 adult ♂♂, 2 adult ♀♀, ex. *Rhododendron mucronatum*, Qtª do Stº da Serra/Machico, 710 m., CB3021, 16.xi.1994, Col. F. Aguiar; 6572 (BMNH) - material not examined, ex. *Rhododendron mucronatum*, Pico das Pedras/ Santana, 900 m., CB2227, 29.iii.1995, Col. J.H. Martin.

Subfamily **ALEURODICINAE**

Aleurodicus dispersus RUSSELL, 1965

A. dispersus was described from material collected on *Cocos nucifera* in Florida and it has been suspected that it maybe a vector of lethal yellowing disease of coconut palms in this region (WEEMS, 1971). According to MOUND & HALSEY (1978), this species is spread from Florida to Brazil and is also present on the Canary Islands. MARTIN (1990), confirms its Caribbean /Central American origin and extend its presence to the Pacific islands (eg. Hawaii, Fiji, Papua New Guinea), Southeast Asia (eg. Malaysia, Indonesia and the Philippines). Recently it has been recorded from Nigeria. Albeit being a native of the Neotropical region, the 'spiralling whitefly' is now extending its geographical range to all the Continents and may become cosmopolite in a short time.

A. dispersus is a highly polyphagous whitefly capable of developing in a great number

of economically important plants like ornamentals and fruit trees. MOUND & HALSEY (1978), refer 28 different genera belonging to 26 families.

Description of pupal case - Pale and elliptical (Fig. 28a) with a length of 1423,8±46,3 μm and a width of 991,5±57 μm. Margin almost smooth. Posterior marginal setae present, anterior pair absent. Presence of 9 pairs of elongate hair-like setae on the submarginal area and 2 pairs on the subdorsal-cephalic region. Posterior marginal and caudal pairs of setae slightly longer than submarginal setae. One uninterrupted row of large wide rimed pores throughout the entire submarginal area close to the hair-like setae is evident and much of the subdorsal area show a dense pattern of smaller size pores. Subdorsal area with 5 pairs of large wax-producing compound pores (Fig. 29), 1 cephalic and 4 abdominal on segments III-VI. Submedian area in all its length showing a pattern of conspicuous septate pores. Several pairs of cephalic and abdominal submedian depressions are well evident. Median length of abdominal segment VII less than half the median length of segment VI. Transverse moulting suture not reaching the submarginal area. Longitudinal moulting suture reaching the anterior margin. Between the transverse moulting suture and the cephalic pair of compound pores the vestige of the 3rd instar compound pores are visible. Vasiform orifice (Fig. 30) subcordate, wider than long. Operculum subrectangular, filling slightly more than half the orifice and showing 2 microsetae on its posterior margin. Lingula large, exposed, tongue-shaped, extending much beyond posterior margin of vasiform orifice. Lingula bears 2 pairs of setae on its extremity. On the venter (Fig. 28b), the usual structures are present: the rostrum, long antennas that reach the basal segment of the metathoracic legs, 2 pairs of spiracles and the 8th ventral-abdominal pair of setae. The legs have tarsal claws, characteristic of the aleurodicinae.

Adult male - Genital plate 1/3 longer than wide (Fig. 31), with vasiform orifice occupying the first 2/3. At least 5 pairs of needle-like setae are present near each side of vasiform orifice, but several other pairs are scattered on the surface of the genital plate. Claspers slightly longer than genital plate, slender with the pointed extremities smoothly curved. The surface of the claspers is heavily covered with very small setae and a pair of inflatable sacs are visible medialy on its inner surface. The aedeagus (Fig. 32), is elongate, strongly upturned and parallel sided in almost all its length, suddenly sharpening on its apex. The ommatidia of the upper and lower compound eyes are similarly sized (Fig. 33). The compound eyes are linked by at least 5 ommatidia. Near this constriction between the compound eyes several stout setae are visible. The antennas (Fig. 34), have 7 segments the 3rd being the longest. This one has at least 18 sensorial cones and 9 rhinaria. A detail of its apex is shown on Fig. 35. The 4th and 6th segments have at least 4 sensorial cones each one. The 5th has 8 sensorial cones and 2 rhinaria. The 7th segment (Fig. 36), has 3 sensorial cones and 1 rhinarium.

Material studied: C485 - 21 pupal cases, ex. *Carya pecan*, São Pedro/Funchal, CB2013, 8.x.1994, Col. F. Aguiar; (BMNH) - 6 pupal cases, ex. *Carya pecan*, São Pedro/Funchal, CB2013,

8.x.1994, Col. F. Aguiar; C492 - 5 pupal cases, 11 adult ♂♂, 7 adult ♀♀, ex. *Wisteria sinensis*, São Pedro/Funchal, CB2013, 20.xi.1994, Col. F. Aguiar; C494 - 6 pupal cases, 1 adult ♀, ex. *Strelitzia nicolai*, Jardim Municipal/Funchal, CB2113, 20.xi.1994, Col. F. Aguiar; C495 - 2 pupal cases, ex. *Ficus elastica*, Jardim Municipal/Funchal, CB2113, 20.xi.1994, Col. F. Aguiar; C521 - 4 pupal cases, ex. *Cinnamomum camphora*, Jardim Municipal/Funchal, CB2113, 20.xi.1994, Col. F. Aguiar; C544 - 3 pupal cases, ex. *Chorisia speciosa*, R. do Castanheiro/Funchal, CB2113, 15.iii.1995, Col. F. Aguiar; C546 - 4 pupal cases, ex. *Ocotea foetens*, Jardim Municipal/Funchal, CB2113, 8.x.1994, Col. F. Aguiar; C629 - 3 pupal cases, ex. *Senna didymobotrya*, Praia Formosa/São Martinho, CB1712, 21.ix.1995, Col. F. Aguiar; C633 - eggs, nimphs, ex. *Magnolia grandiflora*, São Pedro/Funchal, CB2013, 12.x.1995, Col. F. Aguiar; C636 - 4 pupal cases, 2 adult ♀♀, ex. *Psidium guajava*, Tr. da Nogueira/Funchal, CB2013, 20.x.1995, Col. J. Jesus.

DISCUSSION

On the last six years the total area of protected crops in Madeira has suffered a very important increase of more than 270%, being sensibly half of vegetable crops and half of ornamentals (FELIX, *et al.*, 1995). Although this corresponds only to a total area of 20 ha., the orographic conditions typical of the Madeiran agriculture makes this a very important area. To this area we must add almost 250 ha of intensive outdoor horticulture. Although any outbreak had occurred since its discovery, the presence of *B. tabaci* in Madeira (Map 1) is a threat to many of the vegetables grown, like tomato, pepper, cucumber, beans etc. The B-strain of *B. tabaci* is capable to attack and develop on a wider range of vegetables (around 600 according to WOLL & GREENBERG, 1990). This is aggravated by its greater fertility, resistance to insecticides, and transmition of more than 60 geminiviruses. Presently the B-strain is a serious problem in Italy and other Mediterranean countries where it is associated with heavy losses due to the occurrence of tomato leaf curl virus (TYLCV) on protected tomato crops. The spread of the B-strain has been associated with the global trade in ornamental plants, particularly poinsettia, begonia and gypsophila. It is most probable that the introduction of *B. tabaci* in Madeira had also occurred this way on plants imported from Continental Europe. Even if we are not dealing with the B-strain, the presence of the normal non-B is nevertheless still a threat

D. citrifolii had a very limited distribution when it was recorded for the first time in the Spring of 1994 on the Municipality of Câmara de Lobos. It is now slowly beginning to expand beyond that locality (Map 2). Being this whitefly essentially a citrus pest and thinking on the all year-round temperate climate of Madeira it is most likely that it will spread more or less easily, (depending on the competition with other citrus whiteflies present on the groves like *A. floccosus* and *P. bondari*) on the citrus species scattered along the South coast of the Island.

The so-called 'Spiralling Whitefly' is a recent introduction in Madeira. As is expected

knowing its high polyphagy, *A. dispersus* is already infesting a reasonable number of plants belonging to different families, mainly ornamental shrubs and trees of the Capital Funchal (Map 4). Some of these plants constitute new host records, like *Wisteria sinensis* (Fabaceae), *Chorisia speciosa* (Bombacaceae), *Magnolia grandiflora* (Magnoliaceae) etc. Among the fruit trees attacked by *A. dispersus* in Florida are banana, mango, Citrus and avocado (CHERRY, 1980; WEEMS, 1971). We can not forget that banana is the main crop in Madeira, occupying 1800 ha and also that the Madeiran Regional Government is trying to implement the growing of tropical fruits like mango and avocado. Logically there is a possibility that *A. dispersus* could became a widely spread pest of these fruit trees in Madeira but the fact that we already had found signs of natural parasitism by still unidentified parasitoids gives us some hope that it will be controlled. According to GARRIDO - VIVAS (1992), *A. dispersus* attacks mainly banana and sporadically Citrus in the Canary Islands but after 29 years of presence on these Islands it is not considered an important pest. Given the geographical proximity of Madeira and the Canaries it is probable that the same situation will occur on the former.

The azalea whitefly, *P. azaleae*, is the less frequent (Map 3) of the four species treated in this paper and is specific of *Rhododendron* (Ericaceae) which are shrubs that frequently appear on gardens, but are rare on nature.

ACKNOWLEDGEMENTS

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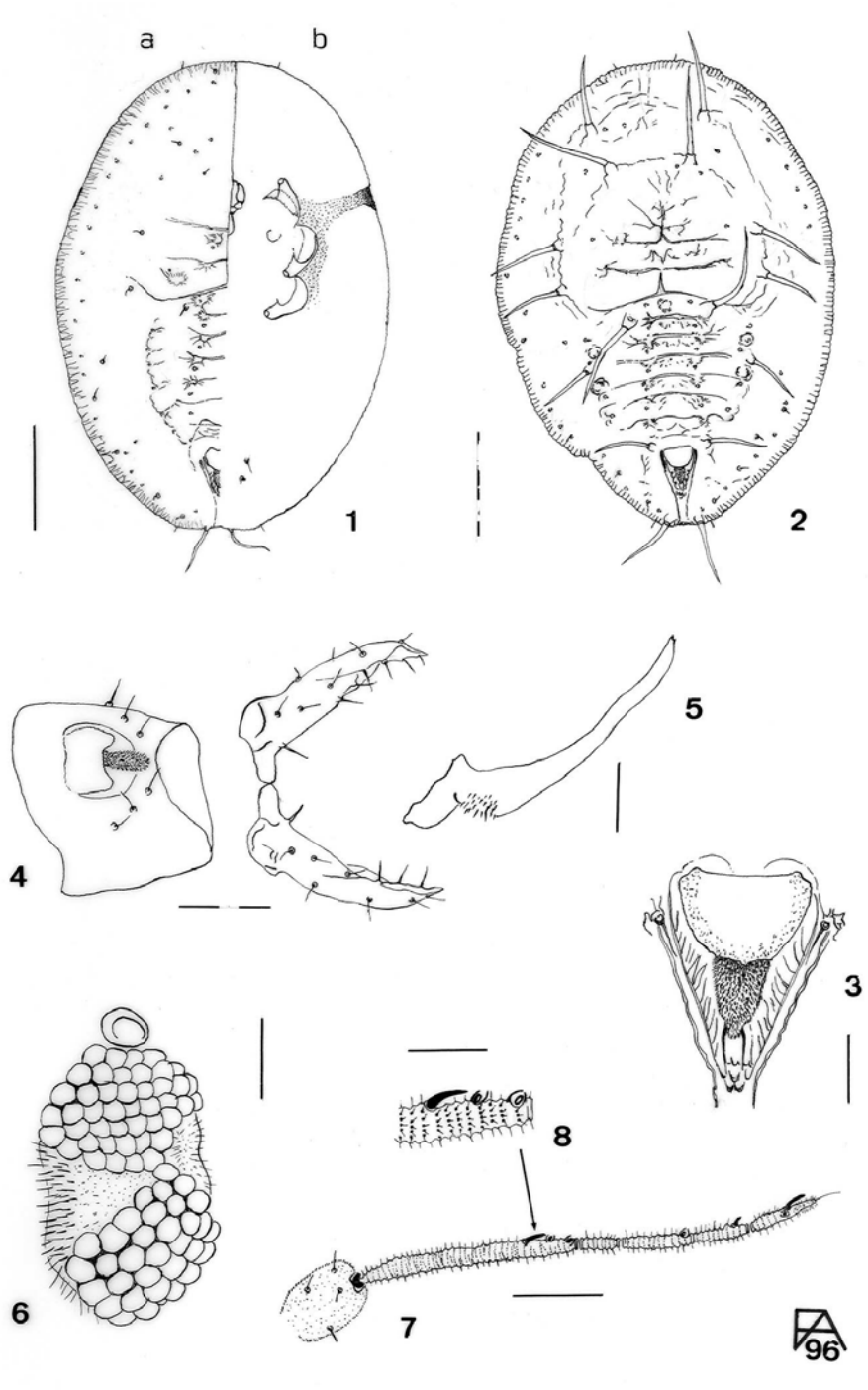
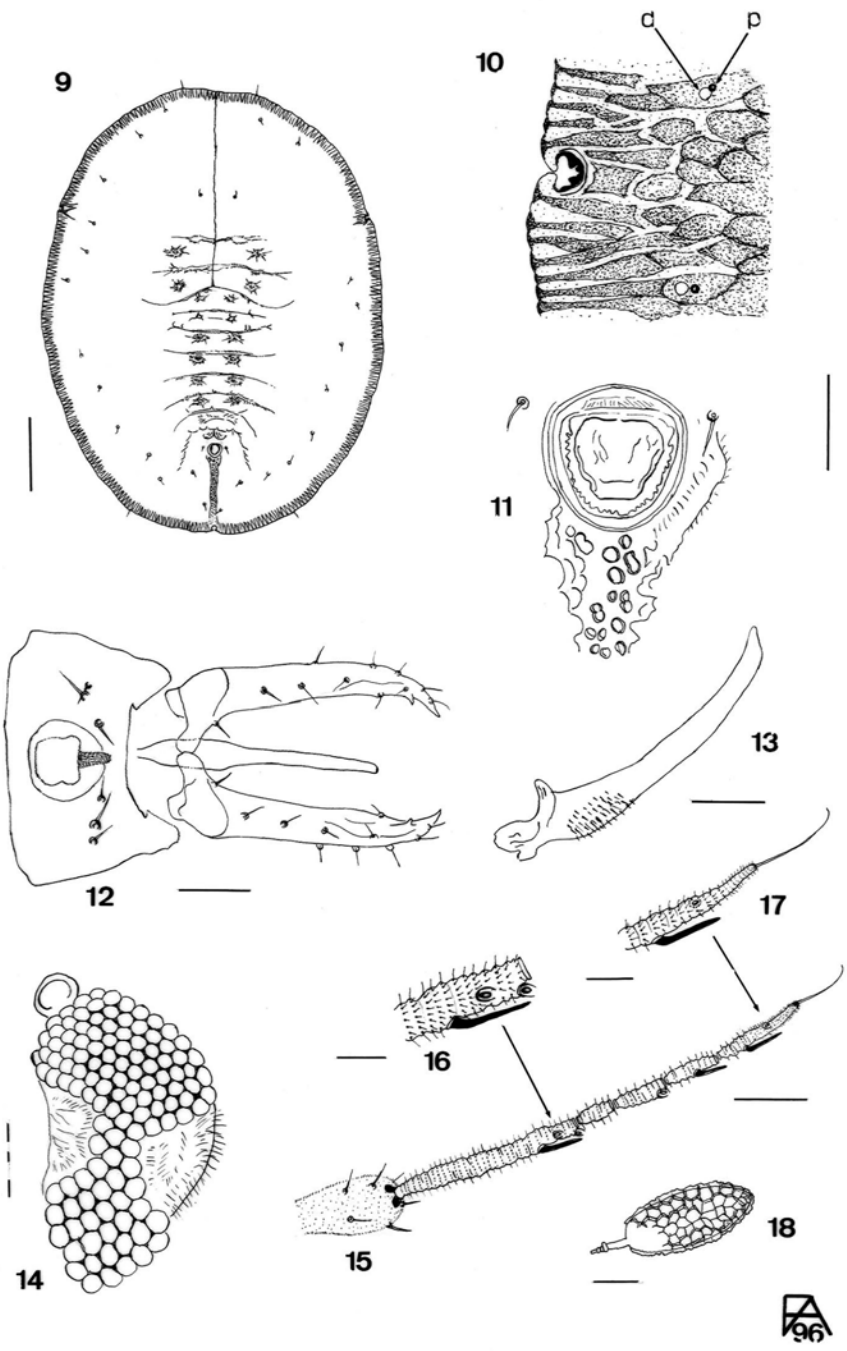
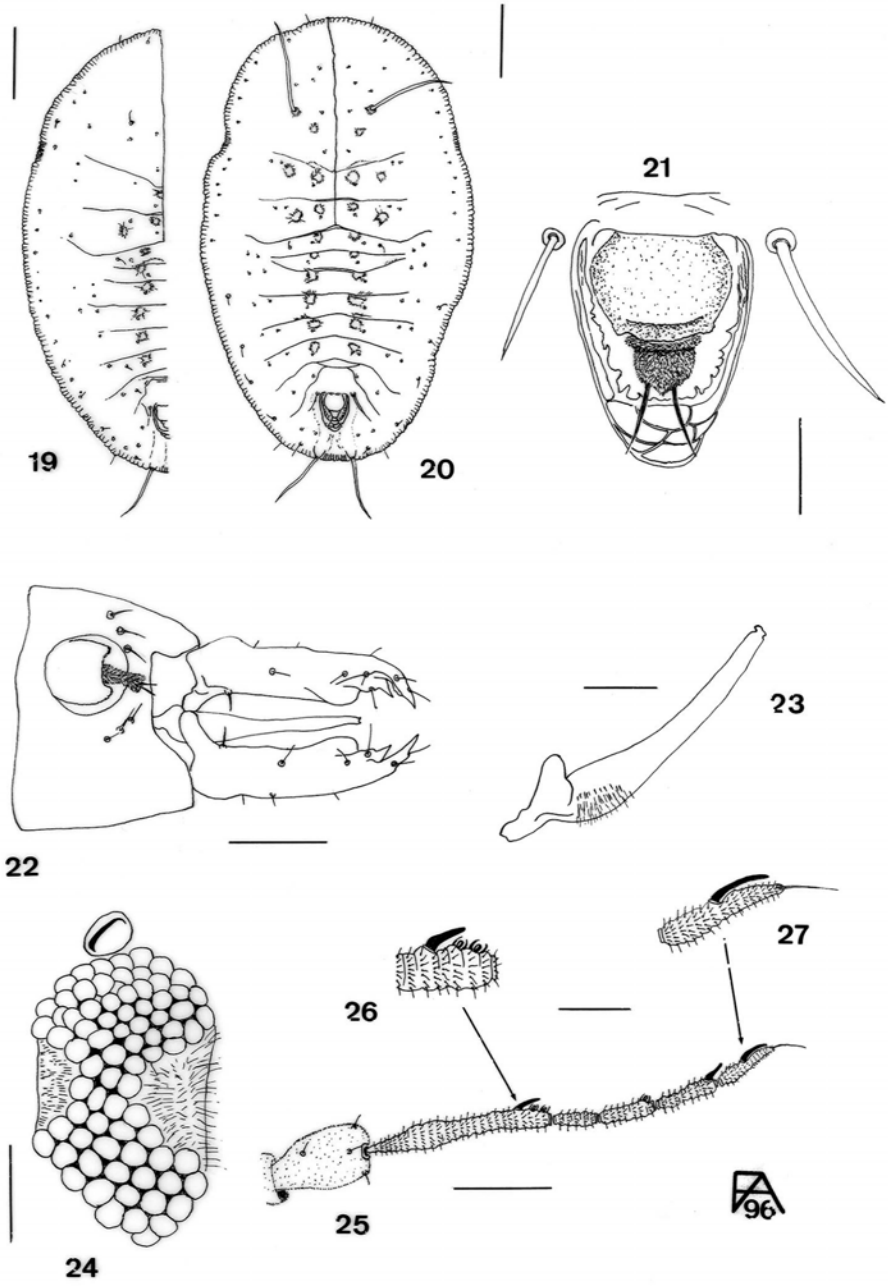


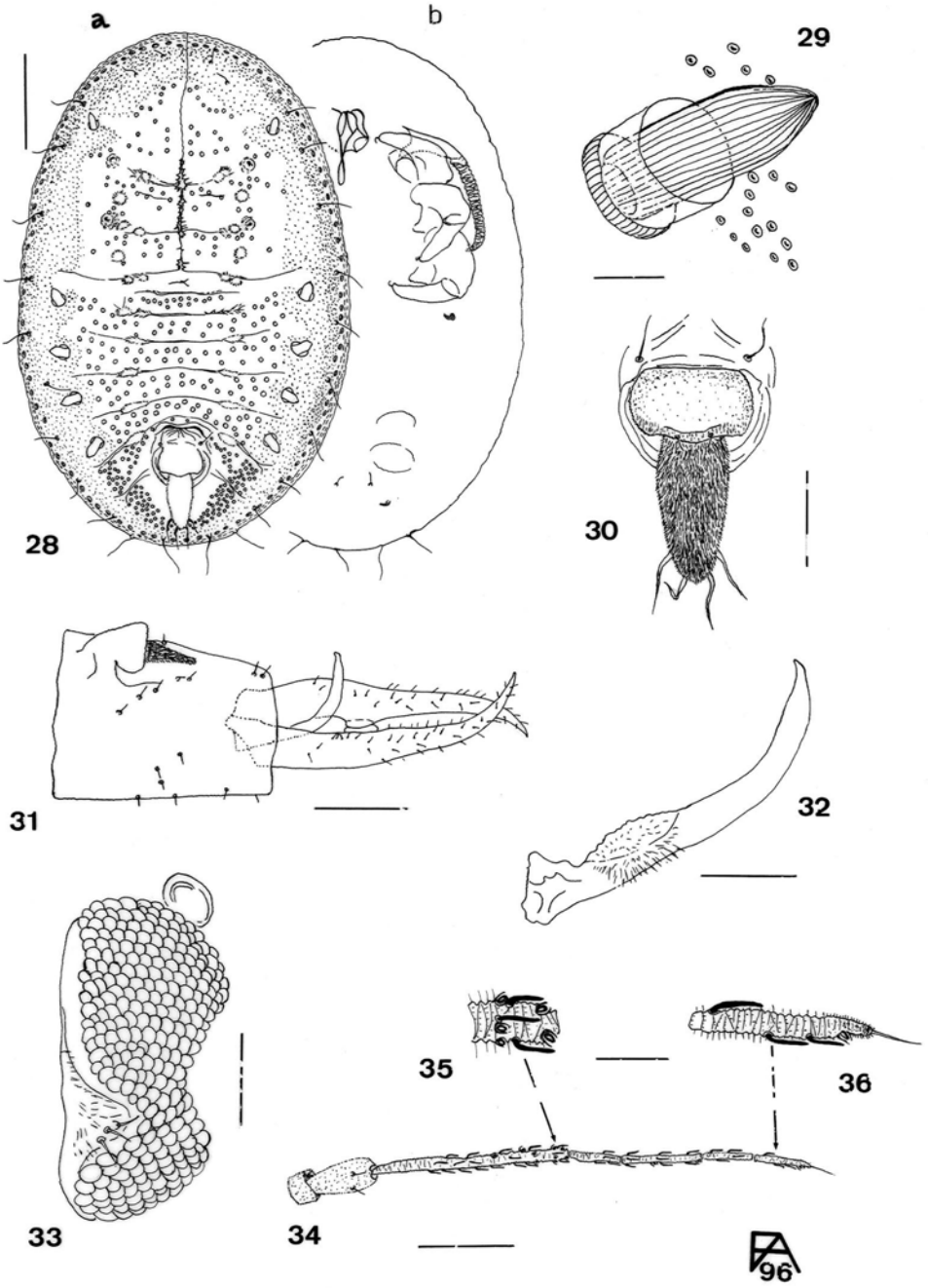
Figs. 1-8 - *Bemisia tabaci*: 1. Pupal case ex. *Psidium guajava*, a - dorsal surface, b - ventral surface (bar=198 µm); 2. Pupal case ex. *Euphorbia pulcherrima* (bar=188,6 µm); 3. Vasiform orifice and eight abdominal setae of fig.1 (bar=30 µm); 4. Adult male genital plate and claspers (bar=60 µm); 5. Side view of aedeagus (bar=30 µm); 6. Adult male upper and lower right side compound eyes (bar=40 µm); 7. Antenna (bar=60 µm); 8. Apex of the antenna third segment (bar=25 µm).



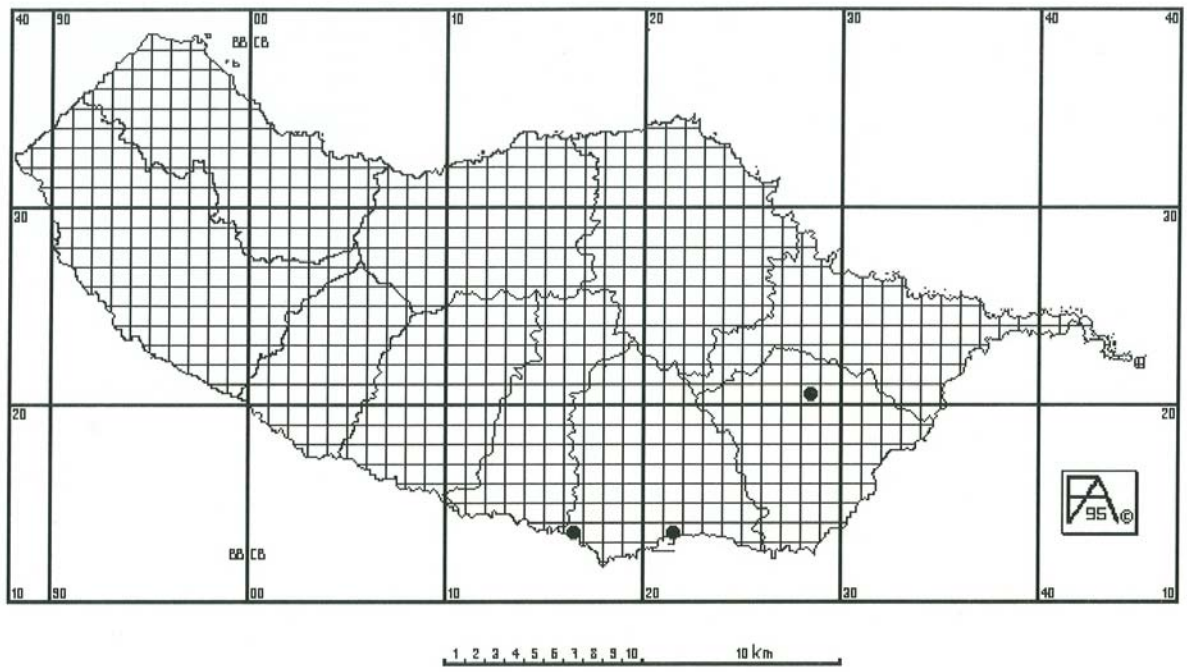
Figs. 9-18 - *Dialeurodes* citrifolii: 9. Pupal case ex. *Citrus reticulata* (bar=333,8 µm); 10. Left side thoracic tracheal pore opening and surrounding area, d - disc pore, p - porette (bar=47,5 µm); ll. Vasiform orifice and eight abdominal setae (bar=47,5 µm); 12. Adult male genital plate, claspers and aedeagus upper view (bar=52 µm); 13. Side view of aedeagus (bar=37,5 µm); 14. Adult male upper and lower right side compound eyes (bar=52 µm); 15. Antenna (bar=52 µm); 16. Apex of the antenna third segment (bar=16,7 µm); 17. Detail of the antenna last segment (bar=18 µm); 18. Egg with surface covered with typical reticulated wax formation (bar=35 µm).



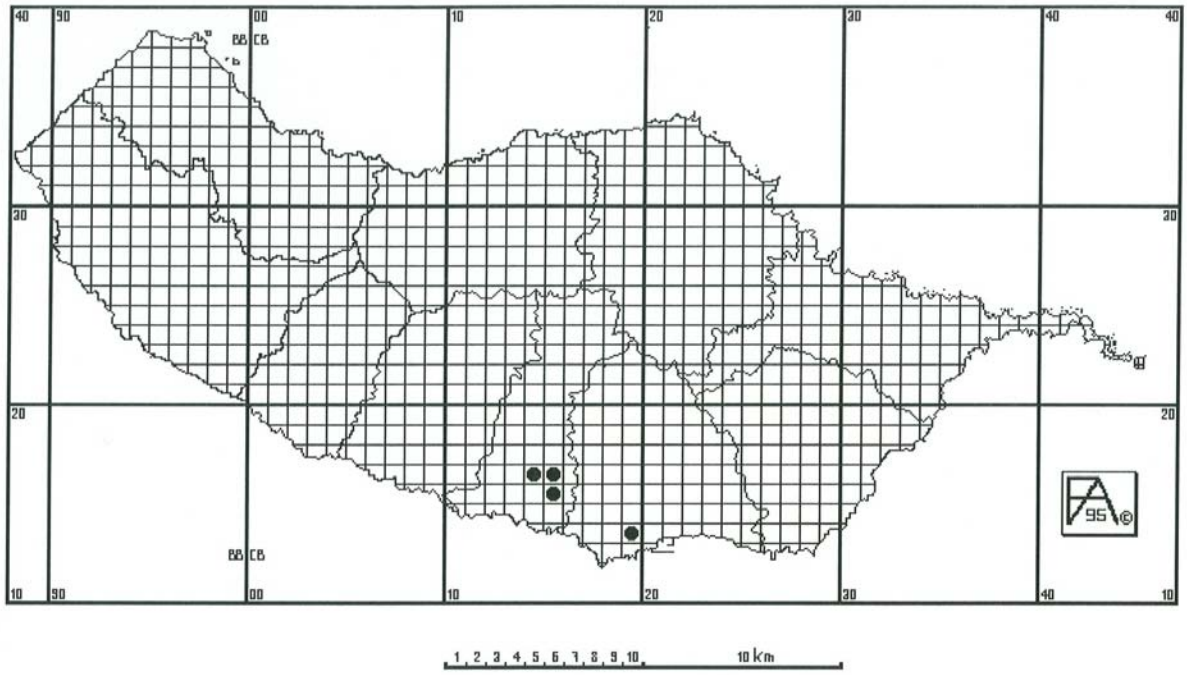
Figs. 19-27 - *Pealius azaleae*: ex. *Rhododendron mucronatum*, 19. Pupal case with short cephalic and eight abdominal setae (bar=168 µm); 20. Pupal case with these setae elongate (bar=159 µm); 21. Vasiform orifice and eight abdominal setae (bar=33,3 µm); 22. Adult male genital plate, claspers and aedeagus dorsal view (bar=62,5 µm); 23. Side view of aedeagus (bar=33,3 µm); 24. Adult male upper and lower left side compound eyes (bar=44,4 µm); 25. Antenna (bar=68 µm); 26. Apex of the antenna third segment (bar=25 µm); 27. Detail of the antenna last segment (bar=25 µm).



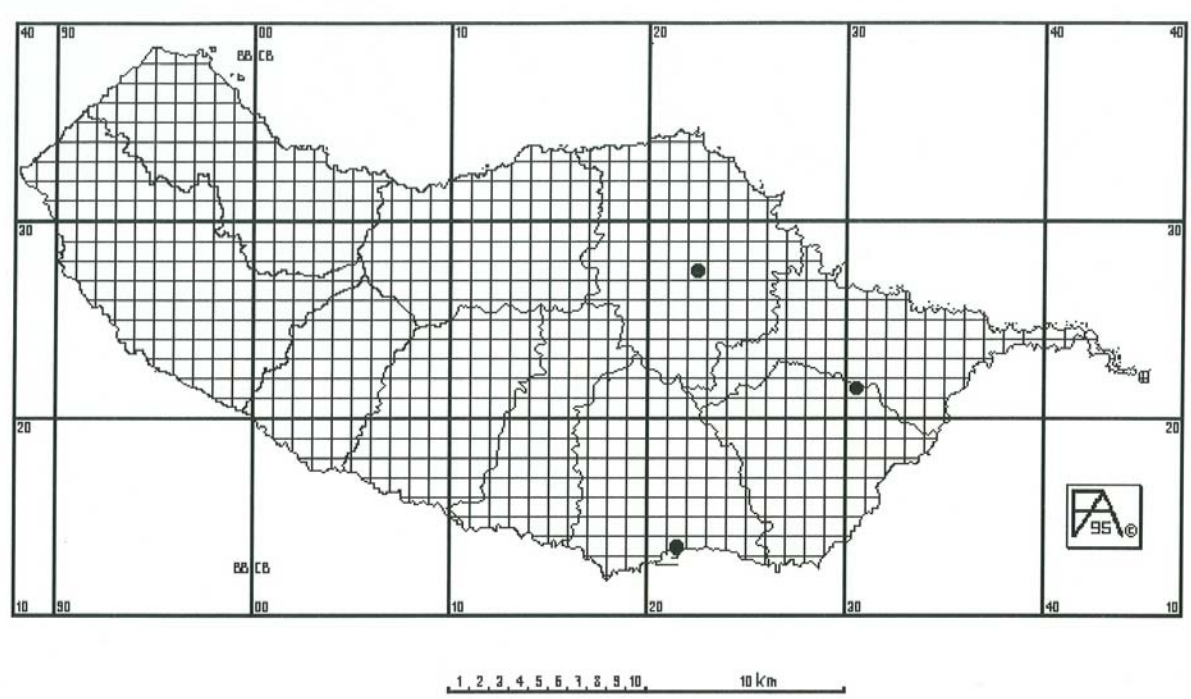
Figs. 28-36 - *Aleurodicus dispersus*: ex. *Chorisia speciosa*, 28.a - Pupal case dorsal surface, b - ventral surface (bar=272 µm); 29. Detail of thoracic compound pore (bar=32,5 µm); 30. Vasiform orifice and eight abdominal setae (bar=102 µm); 31. Adult male genital plate, claspers and aedeagus oblique view (bar=160 µm); 32. Side view of aedeagus (bar=86,7 µm); 33. Adult male upper and lower right side compound eyes (bar=81,6 µm); 34. Antenna (bar=174,6 µm); 35. Apex of the antenna third segment (bar=40 µm); 36. Detail of the antenna last segment (bar=40 µm).



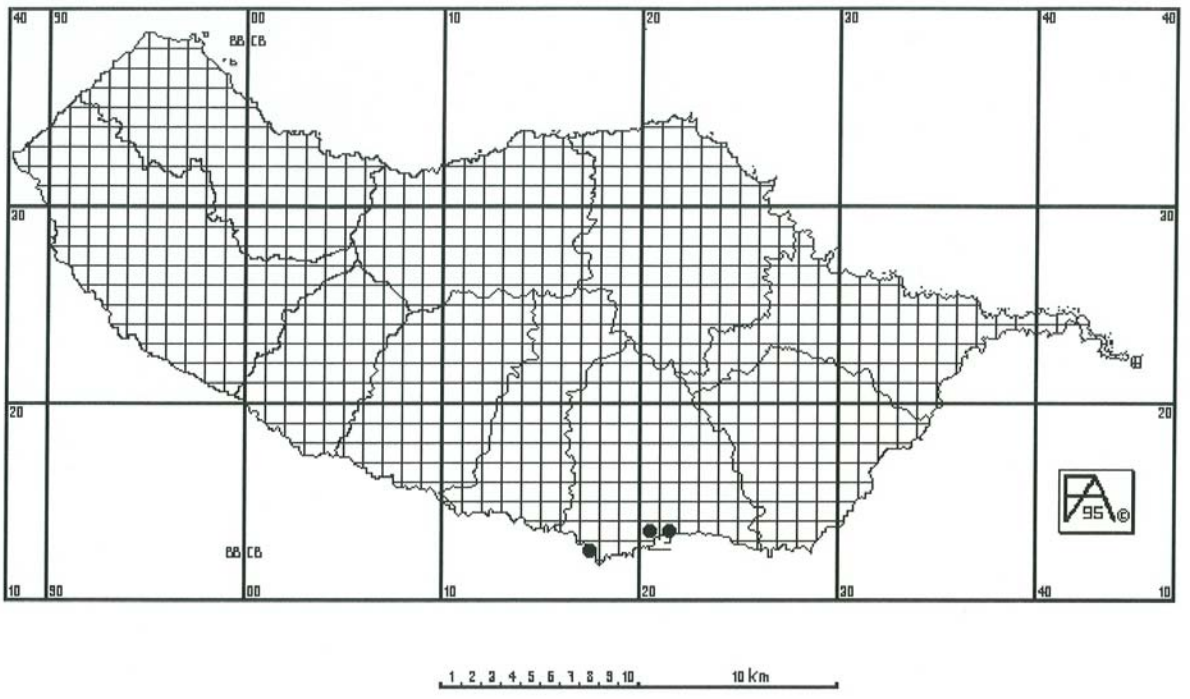
Map 1 - Collecting sites of *Bemisia tabaci*



Map 2 - Collecting sites of *Dialeurodes citrifolii*



Map 3 - Collecting sites of *Pealius azaleae*



Map 4 - Collecting sites of *Aleurodicus dispersus*

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