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Makarorysa n.g. - a new genus for the Canaro-Madeiran Eurysa ribauti LINDBERG-group with remarks on speciation, distribution and phylogenetic relationship within this taxon (Homoptera Auchenorrhyncha Fulgoromorpha Delphacidae)

with
22 figures

by

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Abstract

Closer examination of Eurysa ribauti LD.-material (formerly recorded as a single endemic species from 4 of the western Canary Islands and from Madeira) from different islands of the Canaries and from Madeira revealed that this taxon is a monophylum of its

own not closer related to Eurysa FIEB. s.str., thus it is established as a separate genus: Makarorysa gen.nov., type-species: Makarorysa canteca n.sp.. This genus contains 4 morphologically clearly distinguishable taxa: two allopatrically distributed on the Canary Islands (M.ribauti (LD.) (comb.nov.) on La Palma and La Gomera and M.canteca n.sp. on Tenerife and Gran Canaria) and two sympatric species on the main island of Madeira (M.madalta n.sp. and M.madeco n.sp.). The Canarian and the Madeiran species apparently form two sister-groups, the Madeiran group is separated as a subgenus of its own: Madeurysa subgen. nov., subgenus-type-species: M.madeco n.sp.. All 4 species seem to belong to the set of laurel forest taxa, though they mainly occur in graslands, where dense forest has already disappeared. Speciation has very probably occurred allopatrically in the two Canarian taxa, less certainly so in the case of the Madeiran taxa. With this we have the first case of evolutionary speciation within the Delphacidae of the Mid-Atlantic Islands.

Makarorysa n.g. - a new genus for the Canaro-Madeiran Eurysa ribauti LINDBERG-group with remarks on speciation, distribution and phylogenetic relationship within this taxon (Homoptera Auchenorrhyncha Fulgoromorpha Delphacidae).

Delphacidae - though in the majority of their species flightless specimens with reduced wings prevail - are amongst those higher taxa of Auchenorrhyncha which have successfully colonized oceanic islands and island-groups. They obviously possess an adequate "spread potential" (LESTON, 1957), i.e. they are able not only to reach islands, but also to establish populations on them. Beyond this these colonisators have been able in some cases to evolve subsequently into a sometimes remarkably large number of "daughter-species" by adaptive radiation as well as by splitting

up into island-taxa (e.g. on the Hawaiian Islands, see GIFFARD, 1922; ZIMMERMAN 1948).

In contrast to some other groups of oceanic islands the archipelagoes of the eastern Atlantic Ocean north of the tropic of cancer and south of the 40th parallel of latitude, i.e. the Azores, Madeira, Selvagens, and the Canary Islands apparently are inhabited not only by a disharmonic set of Delphacid-species, but by a rather poor one, too (about 20 species so far recorded up to now altogether, that is no more than about 20 percent of the species number of the southwestern part of the Palearctic. Only very few of these species are endemics of only one of these archipelagoes: Javesella azorica REM., 1974: Azores, "Calligypona" gudruna GYLLENSV., 1968: Canary Islands (but this "species" is, according to the descriptions and figures published by GYLLENSVÄRD, 1968, a mixture of Laodelphax striatellus (FALL.)-males and macropterous "Calligypona" anthracina (HV.)-females - as the holotype is reported to be a female, it will probably run out to be a synonym of the latter).

Another species - Eurysa ribauti LINDB., 1936, the one to be dealt with in this article - was first recorded as endemic on the Canary Islands, but later recorded from Madeira, too (LINDBERG, 1961) - thus seeming to live on two of these archipelagoes. All other delphacid-species are widely distributed or at least known from island-groups outside of this range. No cases of speciation by adaptive radiation or by splitting up into island taxa were so far known within the Delphacidae of these archipelagoes.

An examination of "Eurysa ribauti" specimens from several of the islands of the Canarian archipelago and from Madeira, however, brought about two results:

1. "Eurysa" ribauti LINDB. is not a member of that monophyletic group, to which the genotype of Eurysa FIEB., Delphax lineata PERRIS, 1857, belongs (see REMANE & ASCHE, 1983 for further details): The synapomorphically specialized features of the male

genitalia (for instance the dorso-basal direction of the peculiarly shaped distal part of the aedeagus) of this group are not present. As indicated before (REMANE & ASCHE, l.c.), within the old "genus" Eurysa FIEB. many species have been united by several authors, which have in common not more than the relatively simple characters of more or less "stout" body, a toothless ("stiromine") posttibial spur and a broad head with a rounded transition between frons and vertex with at least at that place evanescent carinae. In other characters of probably higher phylogenetic importance there exist considerable differences between some of these "Eurysa"-species leaving doubts as to their monophyletic origin. This has already led some authors to transfer some species into genera of their own (e.g. E.lurida FIEB. to Eurysula VILB., E.maculiceps HORV. to Stiromoides VILB. - see NAST, 1972) or to other already existing genera (e.g. E.clypeata HORV. to Pastiroma DL. by ANUFRIEV, 1981). The remaining set of Old- and New-World species still is rather heterogeneous, it is under work in order to analyse the phylogenetic relations between these taxa as well as to others - the results may then serve as a base for taxonomic decisions concerning the formation of supraspecific taxa.

2. Comparison of specimens from different islands and different biotopes revealed the existence of morphological differences in the genital structures of the males and - though less pronounced - in size and colouration. Four morphological groups with non-overlapping ranges of variation were found up to now: two allopatrically distributed groups on the Canary islands, and two sympatric groups on Madeira. If we assume the shape of these morphological structures to be genetically controlled, their different shapes might be explained to have been brought about by diverging evolution after an initial interruption of gene-flow between these populations.

In case of sympatric occurrence of such groups we may postulate

the existence of isolating mechanisms: speciation to the level of true "biological" species has apparently taken place. No safe decision concerning the degree of speciation can be made, of course, in case of allopatric distribution of such groups, but in case of non-overlapping range of variation of at least one character in one sex it has been proposed to treat such groups as different species, too (REMANE, 1968).

As the Eurysa ribauti-group is not a member of Eurysa FIEB. s.str., the phylogenetic relationship of this group to other taxa still included in Eurysa FIEB. or already established as supra-specific taxa of their own had to be examined in order to decide the phyletic position and the systematic status of this group. Besides of the general characters present in oviduct - gland bearing Delphacini (see ASCHE, 1985) and those aforementioned characters which induced LINDBERG (1936) to place it in Eurysa, the Eurysa ribauti-group has many characters in common with some other taxa grouped by WAGNER (1963) in his "Stirominae":

1. Reduction to absence of dentation of the posttibial spur, 2. a relatively long, rather cylindrical male genital segment, 3. Analtube apically not closed by a complete strongly chitinized bridge, thus ventral side thinly chitinized with the exception of two transverse basal armlike stripes almost touching each other centrally, with distoventrally directed, mostly spinelike appendages, lobe-like setose membraneous structures situated basiventrally of the spinelike appendages.

4. Aedeagus forming more or less a simple tube with teeth arranged in longitudinal rows, its ventral side largely membraneous, phallotrema ventroapical.

5. Suspensorium attached medioventrally to the base of the theca, fused dorsally to a plate-like structure attached to the center of the basoventral margin of the analtube.

6. Thinly chitinized region of the genital segment around the base of the styles heart-shaped by a ventral process of a

vertical median phragma-rim.

At the moment we are not yet able to decide which of these phenetic similarities are not only homologous but in addition synapomorphic characters, and in which sequence they were evolved - at least some of them might have been developed more than once or may be considered symplesiomorphic at a certain level of taxa (and therefore no indicators of close relationship). Thus the question of the sister-group of the Eurysa ribauti-group cannot be settled here and now - the highest number of phenetic similarities seems to exist to taxa placed in Metropis FIEB., Delphacinus FIEB., and to some African taxa still placed in Eurysa FIEB..

As these species and species-groups possess characters of their own which are to be considered more apomorphic than the respective characters in the Eurysa ribauti-group and, on the other hand, the taxa of the Eurysa ribauti-group possess some special characters, in which they may be considered more apomorphic than all other taxa mentioned here (see below) the latter seem to form a small monophylum of their own. Translating this situation into systematical arrangement, it is thought more adequate to establish a genus of its own for this monophylum than to join it with other taxa which might not be its sister-group - the latter would inevitably lead to wrong zoogeographical or ecological conclusions concerning the historical development of distribution as well as of shifts in using ecological niches.

Makarorysa nov.gen.

Constitutive characters (i.e. characters assumed to be synapomorphic (common derived) for this set of taxa) of the species are located in the genital region:

Male genitalia: phragma-bridge with its median part dorsocaudally

elevated, formed like a jugsocket (see fig. 2b), with a vertical median rim weakening towards its ventral end. Distal end of the styles twisted against the basal part and formed like a lancet (fig. 3a-b). Dorsal row of teeth of the aedeagus shifting basally to the left side.
Female genitalia: Valvifer VIII basally of the GI IX at the inner (median) margin with a dorsally inflated area bearing a small semicircular excision (see figs. 21, 22) (probably the "holds" for the tips of the styles during copulation).

Additional characters (present in identical or very similar way singly or combined in other taxa) as far as not already mentioned before: Wing dimorphism present, but brachyptery less developed than e.g. in Metropis FIEB. or Delphacinus FIEB.: forewings with distinct venation, corioclaval suture present, end of each wing rounded, ending approximately on the sixth abdominal tergite. Venation of the forewings with scattered bristles arising from small granules. Colour dimorphism combined with wing dimorphism: in long-winged specimens thorax and abdomen largely marked with blackish-brown, wings clear, in short winged specimens nearly no dark markings on thorax (and head) and less on abdomen, but forewings more or less blackish-brown in the males of three taxa (i.e. additional sexual colour-dimorphism in all but one of the taxa). - Drumming organ of the male with long, thin S-2-apodomes not only reaching the dorsum, but bent in their distal parts medially - ♂-genital segment subcylindrical, dorsal side with a relatively narrow chitinized bridge due to a broadly v-shaped basal and a more narrowly v- or u-shaped distal incision containing the analtube (see fig. 2c). Seen from behind more or less circular, margin without spines or excisions except for a shallow, v-shaped incision on the ventral side. Analtube including anal style and surrounding parts of the genital segment yellowish, the other parts of the anal segment more or less infuscated to black except for the narrowly whitish lateral part

of the posterior margin. Styles diverging, relatively short, not bifurcated.

Aedeagus: straight, ventral side except for the basal part of the theca thinly chitinized, phallotrema ventroapical, laterally equipped from base to tip with dentation (teeth of different size, partly arranged in longitudinal rows).

Female genitalia: two atrium-plates (divided by a narrow median line of thin chitinization) situated cephally of the C VIII.

Typus generis: Makarorysa canteca nov. spec.

As mentioned before, Makarorysa n.g. was found to consist of four morphologically separable taxa instead of only one. The two Canarian taxa have so far been found on four of the five truly oceanic islands: the one inhabits the centrally situated, rather large islands of Tenerife and Gran Canaria, the other the islands of La Gomera and La Palma. These two taxa are rather similar to each other, the differences between them are located in the male genitalia, especially in the shape of the processes of the anal-tube and in the basal part of the aedeagus. Both Canarian taxa differ clearly in several characters from the two Madeiran taxa (see table 1). The two Madeiran taxa apparently form a monophylum of their own, though the morphological differences between them are more developed than between the two Canarian taxa. In order to express this sister-group relation systematically a new subgenus is established for the Madeiran Taxa :

Madeurysa n.subgen.

Constitutive characters: theca of aedeagus on its ventral base with a distinct, apically directed process surmounting the base of the membraneous part of the ventral side.

All other characters, in which the Madeurysa-taxa differ from those of Makarorysa s.str. are either more plesiomorphic (e.g. simple form of the suspensorium) or their evolutionary state is not to be assessed with certainty.

Typus subgeneris: Makarorysa (Madeurysa) madeco nov. spec.

At least three of these four taxa - the two from Madeira and one from the Canaries - have to be described as new - but which of the two Canarian taxa is Eurysa ribauti LINDBERG, 1936?

LINDBERG (1936) had described his species Eurysa ribauti after three specimens (2♂♂, 1♀) collected by Frey and Stora on the Canary Islands: one specimen each on La Palma, Tenerife, and Gran Canaria. LINDBERG's figures of the male genitalia show a rather sketchy caudal and later in addition (LINDBERG, 1954) a lateral aspect of the genital capsule, obviously no examination of the analtube, phragma or aedeagus was ever made by him. As usual LINDBERG (1936) in his description mentioned no type locality, but the collection-numbers of the type material only (in this case he published the designation of two holotypes - "Holotypen, ♂ (No 7664), ♀ (No 7665)..." - but this rather unusual situation seems to have been altered: a few years ago Dr.Meinander, from Helsinki Museum kindly informed me that the first mentioned male is kept as holotype). This male specimen was collected on La Palma, the name ribauti LINDB. thus has to be applied to the La Palma -La Gomera-species, the one from Tenerife and Gran Canaria, though already contained in LINDBERG's original material, has to be named and described.1)

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1)This could be confirmed by re-examination of the type material of E.ribauti LD. kindly sent to us by Dr. A.Jansson, Helsinki. The holotype ♂ is from La Palma, - the allotype ♀ from Gran Canaria concerns another species, and here is additionally integrated as paratype into the type-series of M.canteca n.sp..

1. Makarorysa (s.str.) canteca nov.spec. (figs. 6-10, 21)

Body size and proportions, colouration, markings and degree of sexual and wing dimorphism like in M.ribauti (LINDB., 1936). ♂ Genital segment with phragma-bridge and styles like in M.ribauti (LD.), but appendages of the analtube with simple tip (not bifurcate as in ribauti) (fig. 9); basal part of aedeagus (fig. 10a-d) laterally less dentated, base of thinly chitinized ventral region of aedeagus much broader (see fig. 10b).

Female in all characters so far examined not differing from that of M.ribauti (LD.).

Holotype ♂: Canary Islands, Tenerife, Anaga-area, Igueste, 15.3.66. R.Remane, leg., in coll. Remane, Marburg.

Paratypes (numerous ♂♂ and ♀♀) from above mentioned locality and date in addition from several other localities, especially in Anaga- and Teno-area and from Gran Canaria (Reg. El Palmital), Remane leg., in coll. Remane, Marburg.

Biology:

Found especially on the northern sides of Tenerife and Gran Canaria from the lowlands above sea level up to about 1000 m altitude. Like M.ribauti (LD.) apparently a species of the laurel forest region, but mainly found in marginal or open places, where grasses grow, by this occurring in forest clearings, on meadow terraces, way sides of cultivated fields and similar biotopes. Probably no strict synchronisation of development, presumably more than one generation per year.

Geographic Distribution:

Endemic species of the Canary Islands, so far found only on the oceanic islands Gran Canaria and Tenerife, replacing there

M.ribauti (LD.).

2. Makarorysa (Madeurysa) madeco nov.spec. (figs. 11-15, 22)

Length ♂♂ (brachypterous): 2,6-2,7 mm, ♀♀: 3,4 mm

Relatively large species, sexual dimorphism in the colouration of the brachypterous form not developed (plesiomorphic state or secondary loss?). Forewings in male greyish-stramineous as in the female, grey markings of the abdomen only in some male specimens more developed than in the females.

Genital structures of the male characterized by very broad, depress appendages of the analtube (see fig. 14a-b) and a nearly symmetrical, distally notched, rather short process of the ventrobasal part of the aedeagus (fig. 15b).

Females: Small females perhaps not distinguishable from females of the following species M.(M.)madalta n.sp.

♂ Holotype: Madeira, Prazeres, ca 400 m, 8.4.67, R.Remane leg., in coll. Remane, Marburg.

Paratypes (♂♂ and ♀♀) from this place and from several other localities situated in different regions and altitudes of this island: Remane leg., in coll. Remane, Marburg.

Biology:

In grasses from coastal areas up to 1800 m (Pico Ruivo). Probably several generations per year.

Geographic distribution:

Endemic species of the Madeira main island, living there sympatric with M.(M.) madalta n.sp.

3. Makarorysa (Madeurysa) madalta nov.spec. (figs. 16-20)

Length: ♂ (macropterous): 3,3 mm; ♂♂ (brachyperous): 2,4 mm, ♀♀ (brachypterous): 2,7-2,8 mm

Smallest of all four species, sexual dimorphism in the colouration of the brachypterous form very pronounced: head, thorax and tegulae stramineous, wings shiny black in the male, wholly stramineous in the female.

Genital structures of the male characterized by slender, not depressed appendages of the analtube (fig. 19a-b) and subacute, asymmetrically based long process of the ventrobasal part of the aedeagus (fig. 20a-d).

Females: in proportions and colouration similar to the preceeding species but smaller - more material has to be examined to decide, whether there exist constant differences to M.(M.) madeco n.sp..

♂ Holotype: Madeira, east of Pico de Areeiro, ca 1450 m, 4.4.1967, R.Remane leg., in coll. Remane, Marburg.

Biology:

So far found only in spring 1967 in a grazed, meadowlike clearing surrounded by Erica-Vaccinicum-shrub on a mountain ridge east of Pico Areeiro at an altitude on 1450 m. The specimens were found in the tussocks of a Juncus species, but may have gone there for shelter in reality feeding on grasses. The species was not present (except perhaps in the egg stage) at this locality in July 1977.

Geographic distribution:

Endemic species of Madeira main island living there sympatric with M.(M.) madeco n.sp., maybe confined to high altitude biotopes.

The four taxa constituting the genus Makarorysa n.g. are part of the Laurisilva (laurel forest) set of taxa and - as many other taxa of this biotop - probably relatively old inhabitants of these island groups showing a relictary type of distribution. As mentioned, the question of their nearest relatives cannot be answered by now - maybe some of the African "Eurysa" will be candidates for this.

Speciation in this group has probably occurred by spatial separation: very probably so in the case of the two allopatrically distributed Canarian taxa (though it seems remarkable, that no morphological differences were found between the populations of each of these taxa living on two different islands: is genetic exchange maintained between the populations of La Palma and La Gomera, but not between the populations living on Tenerife and the nearby La Gomera? Or are there quite recent events of colonisation, i.e. La Gomera recently colonized by specimens from La Palma? Why has no representative yet been found on El Hierro in spite of the presence of Laurisilva on that island?).

Also in the case of the two sympatric species on Madeira main island allopatric speciation seems possible: two colonizing events separated by sufficient time for the first colonisator (or the species on the continent) to differentiate into a species of its own might have taken place. Sympatric speciation by adaptive radiation to different environments cannot be excluded, of course.

Whether both Madeira and the Canary Islands have been colonized independently from continental regions, or whether one of these island groups has been colonized by specimens stemming from the other ("stepping-stone principle" cannot be answered yet.

Further research is needed to find out the autecology and ethology of these species. Crossbreeding experiments might help to elucidate the relationships between the four species.

Tabelle 1: Morphological differences between the Canarian (Makarorysa s.str.) and Madeiran (subg. Madeurysa n.sg.) taxa of Makarorysa n.g.

Characters assumed to be synapomorphous: ——— Characters assumed to be symplesiomorphous ....

(Characters without underlining: evolutionary state not yet decided)

	Makarorysa s.str.	Madeurysa n.sg.
♂ Genital characters	Thinly chitinized area around aedeagal base reaching laterally ventral only to the dorsal margin of the diaphragm (see fig.	Thinly chitinized area around aedeagal base reaching laterally clearly more ventral than the dorsal margin of the diaphragm (see fig.
	distal part of the styli relatively short (fig.	distal part of the styli longer, more slender (fig.
	suspensorium between aedeagus and anal tube completely fused and conically produced caudad (see fig.	suspensorium between aedeagus and anal tube medially partly membraneous, not conically produced (see fig.
	Distal part of aedeagus relatively slender (fig.	Distal part of the aedeagus stout and broad (fig.
	Basal part of the aedeagus laterally expanded (fig.	Basal part of the aedeagus straight, not laterally expanded (fig.
	Ventrobasal part of the aedeagus basally of the membraneous part of the ventral side not distinctly distally produced (fig.	Ventrobasal part of the aedeagus basally of the membraneous part of the ventral side distinctly distally produced (fig.
	Phallotrema at the end of the ventral side of the aedeagus , tip of the aedeagus in dorsal view pointed (fig.	Phallotrema situated ventroapically, tip of the aedeagus in dorsal view distinctly notched (fig.
♀ Genital characters	Inner margin of Vf VIII basally of the excision without acute prolougation (fig.	Inner margin of Vf VIII basally of the excision acutely prolouged (fig.
Dentation of posttibial spur	Most specimens without rests of teeth	Small irregular teeth present

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Figures

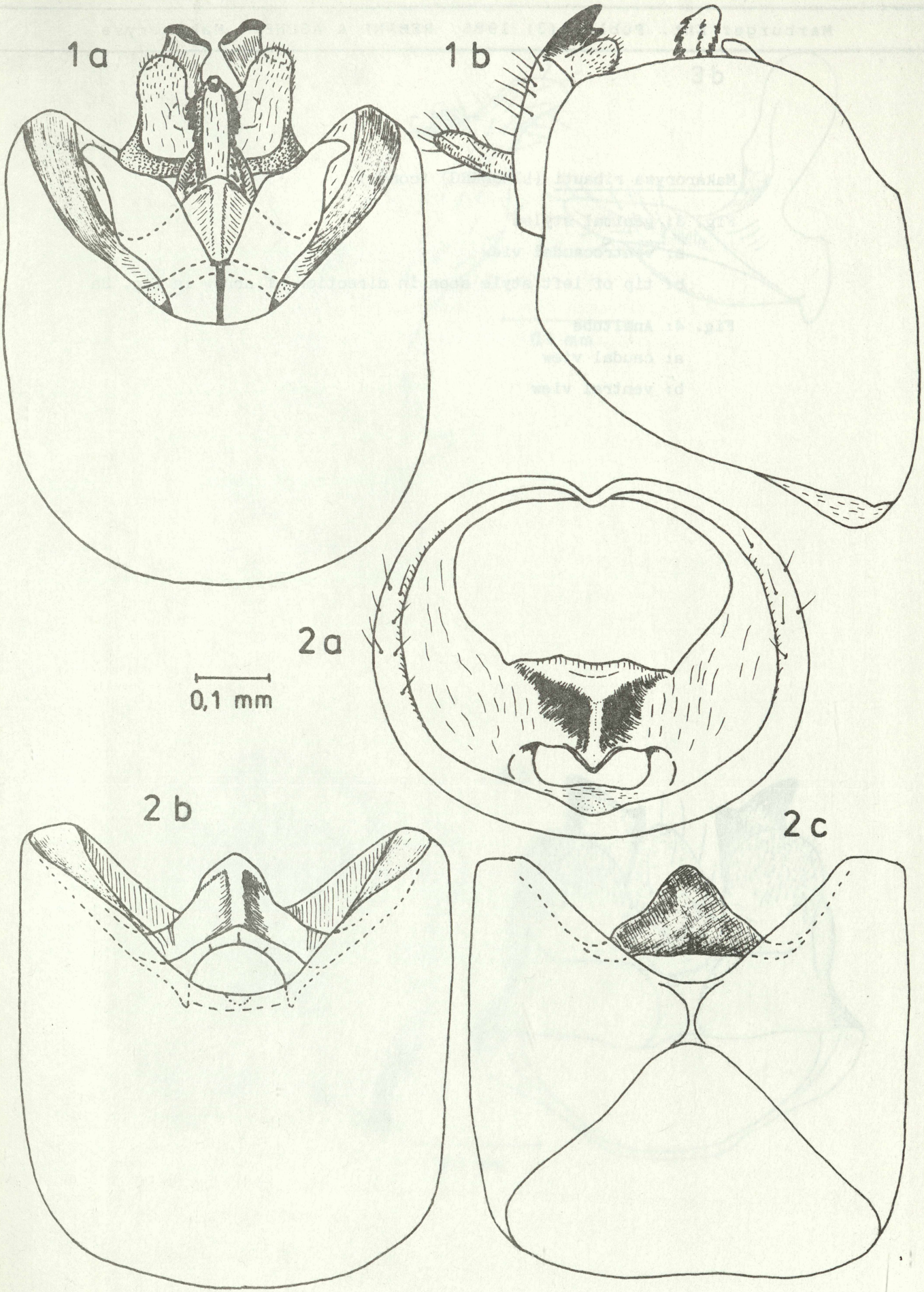
Figs. 1-20 (genital structures of males) have been made after specimens of which the abdomen was macerated in 10% KOH, then transferred into glycerin, resp. glycerin-gelatine.

Figs. 21-22 (genital structures of females) have been taken from specimens dried by air.

Figs. 1-5: Makarorysa ribauti (LINDBERG) (La Palma)

Fig. 1: ♂-genitalia
a: ventrocaudal view
b: left lateral view

Fig. 2: pygofer
a: caudal view
b: ventral view
c: dorsal view


1a
1b
2a
0,1 mm
2b
2c

Makarorysa ribauti (LINDBERG) (cont.)

Fig. 3: genital styles

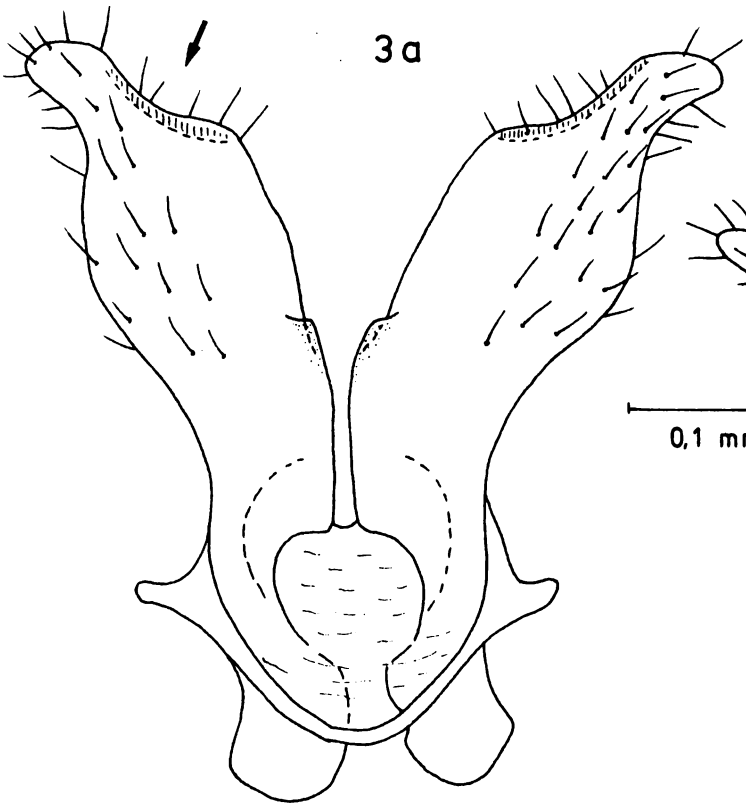
a: ventrocaudal view

b: tip of left style seen in direction of arrow in fig. 3a

Fig. 4: Analtube

a: caudal view

b: ventral view



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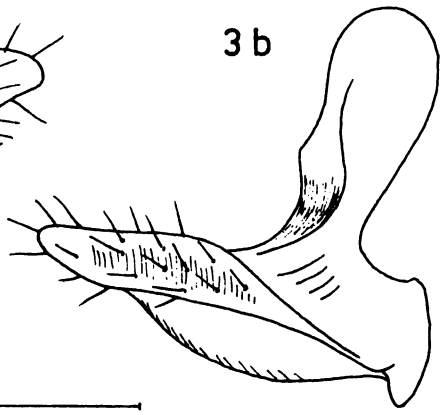

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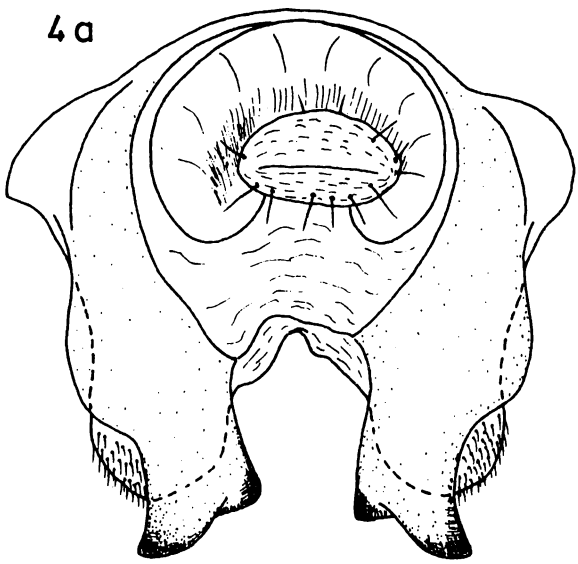
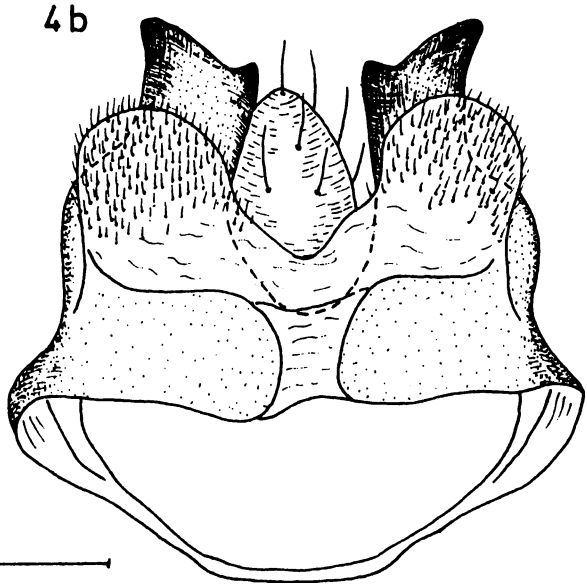


4a



4b

0,1 mm

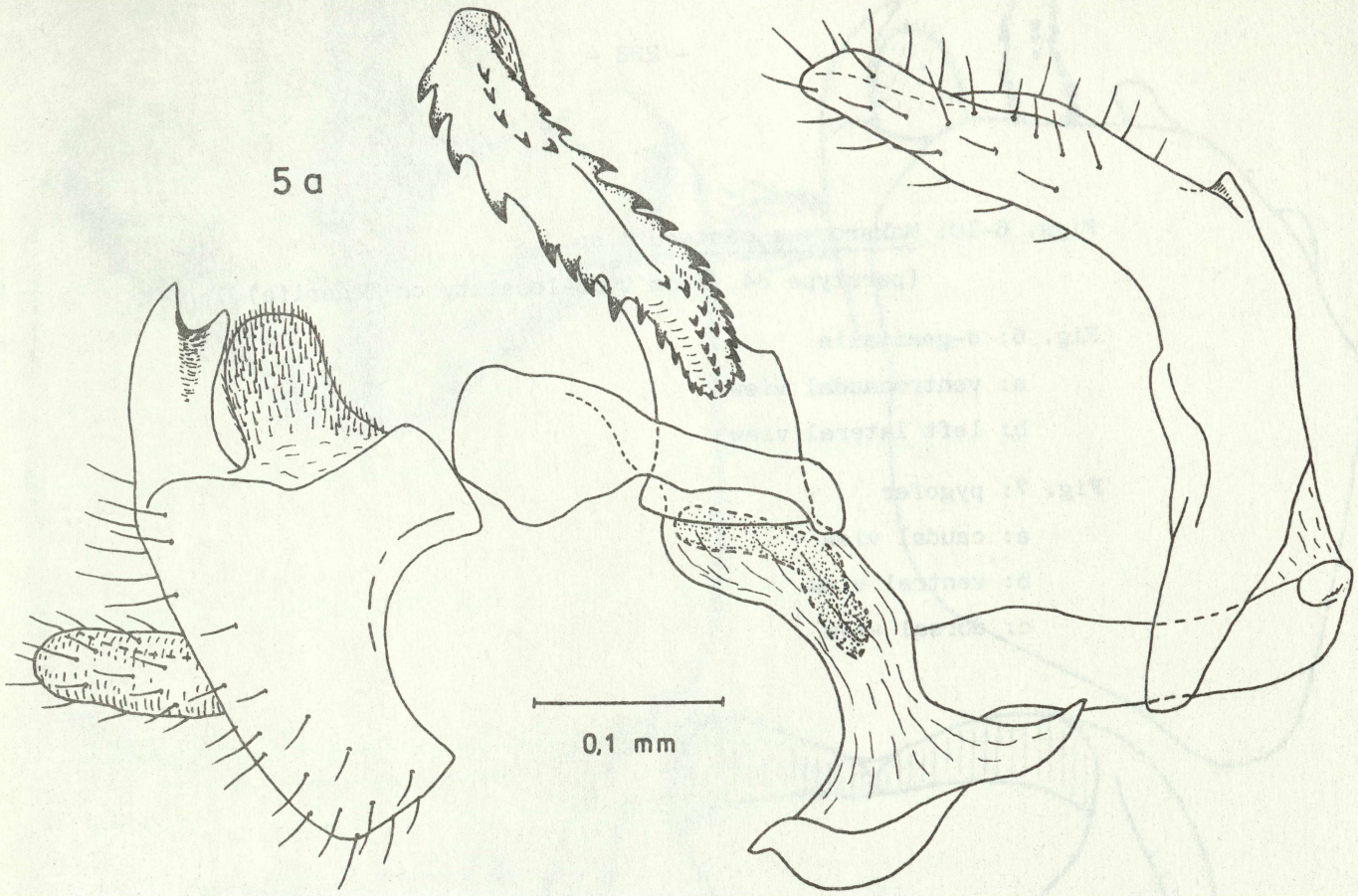
Makarorysa ribauti (LINDBERG) (cont.)

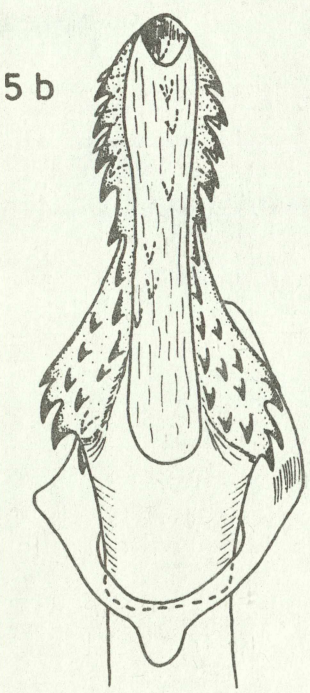
Fig. 5a: ♂-genitalia without pygofer seen from left lateral

b: aedeagus, ventral view

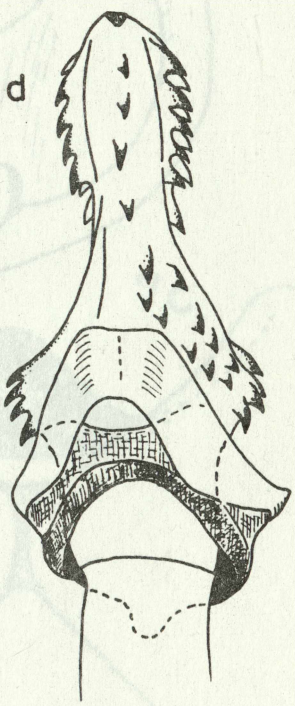
c: aedeagus from right side, slightly twisted to ventral

d: aedeagus, dorsal view


5 a
0,1 mm


5 b

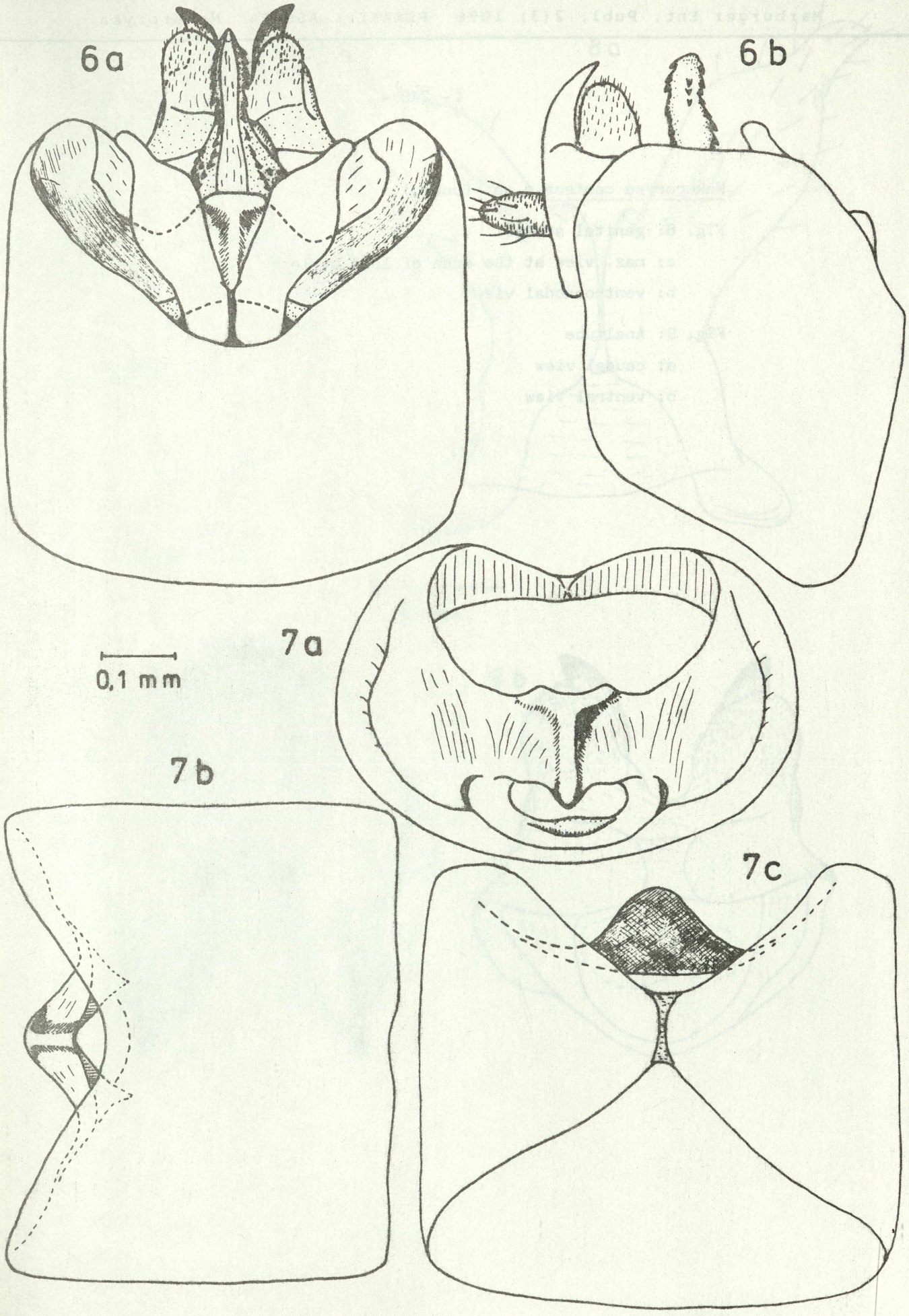

5 c


5 d

Figs. 6-10: Makarorysa canteca n.sp.
(paratype ♂4, from type-locality on Tenerife)

Fig. 6: ♂-genitalia
a: ventrocaudal view
b: left lateral view

Fig. 7: pygofer
a: caudal view
b: ventral view
c: dorsal view


6a
6b
7a
0,1 mm
7b
7c

Makarorysa canteca n.sp. (cont.)

Fig. 8: genital styles

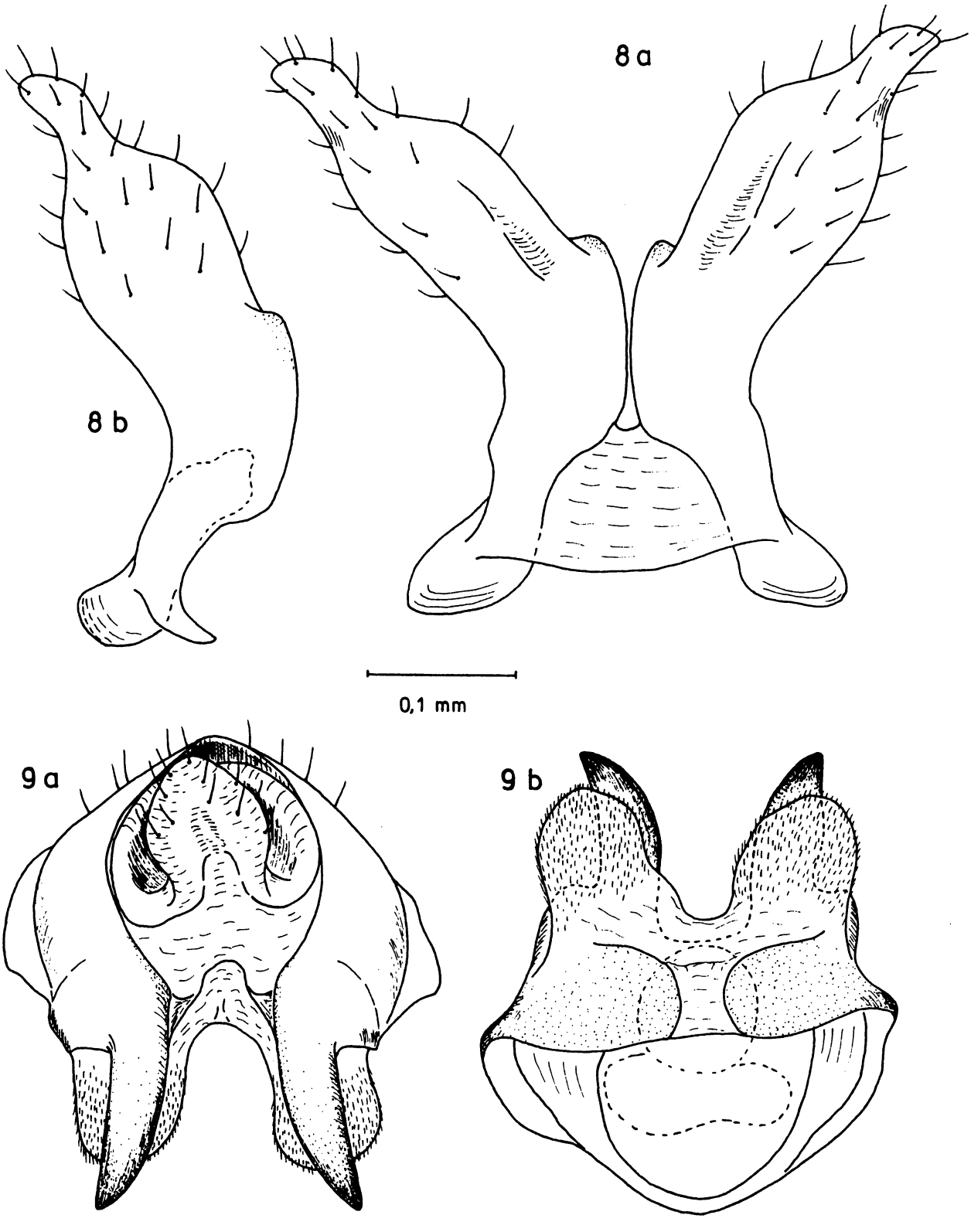
a: max. view at the area of left style

b: ventrocaudal view

Fig. 9: Analtube

a: caudal view

b: ventral view


8 a
8 b
0,1 mm
9 a
9 b

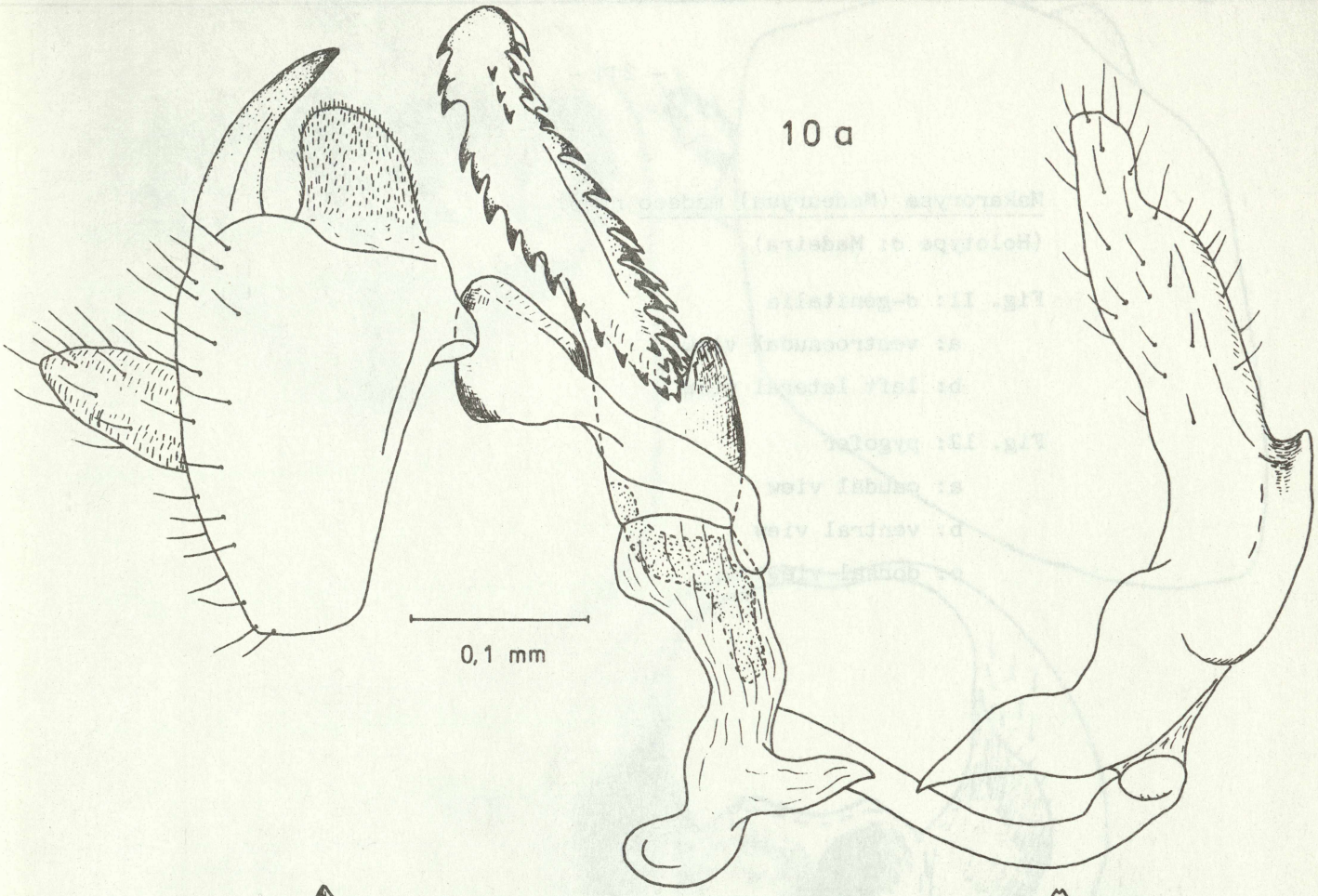
Makarorysa canteca n.sp. (cont.)

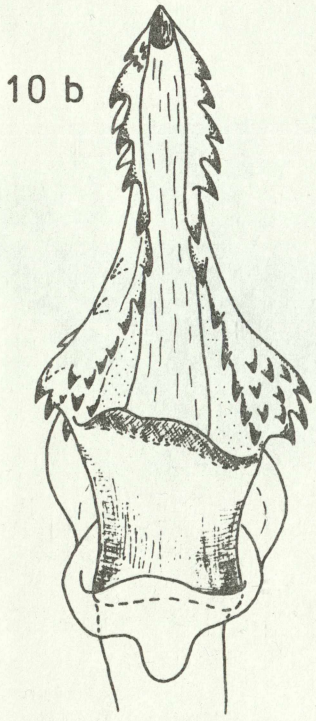
Fig. 10a: ♂-genitalia without pygofer in left lateral view

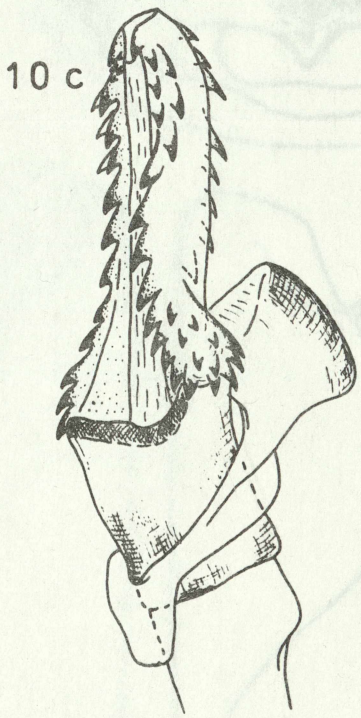
b: aedeagus, ventral view

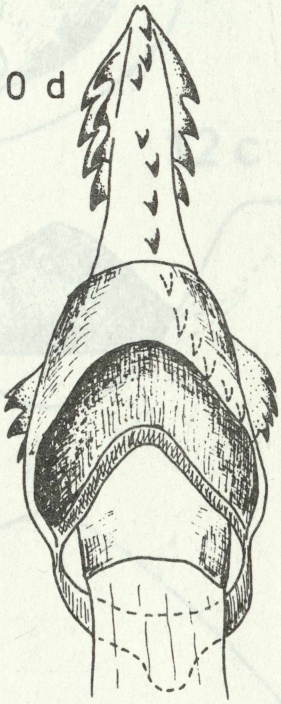
c: aedeagus from right side, slightly twisted to ventral

d: aedeagus, dorsal view


10 a
0,1 mm


10 b

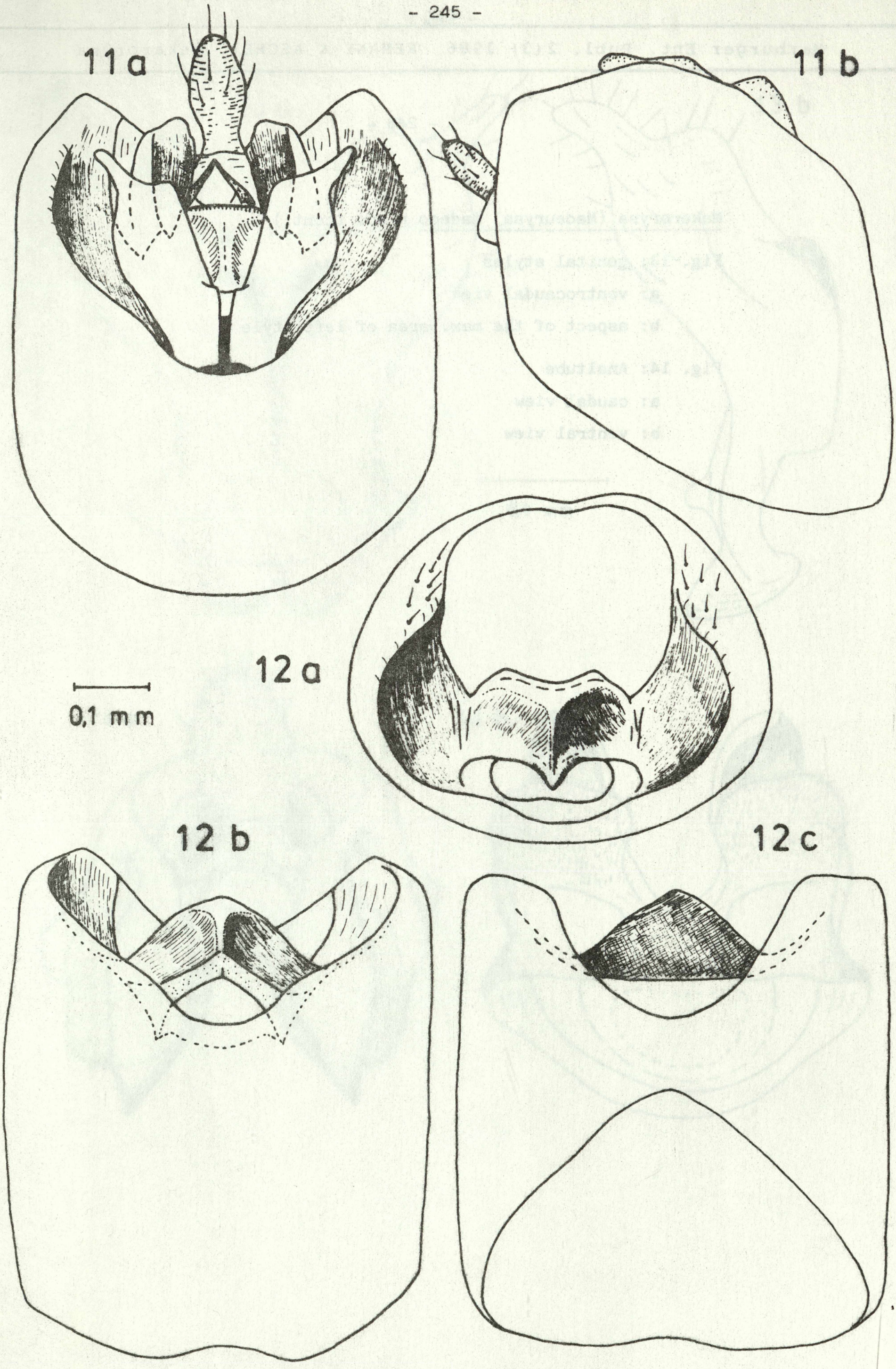

10 c


10 d

Makarorysa (Madeurysa) madeco n.sp.
(Holotype ♂: Madeira)

Fig. 11: ♂-genitalia
a: ventrocaudal view
b: left lateral view

Fig. 12: pygofer
a: caudal view
b: ventral view
c: dorsal view


11 a
11 b
12 a
0,1 mm
12 b
12 c

Makarorysa (Madeurysa) madeco n.sp. (cont.)

Fig. 13: genital styles

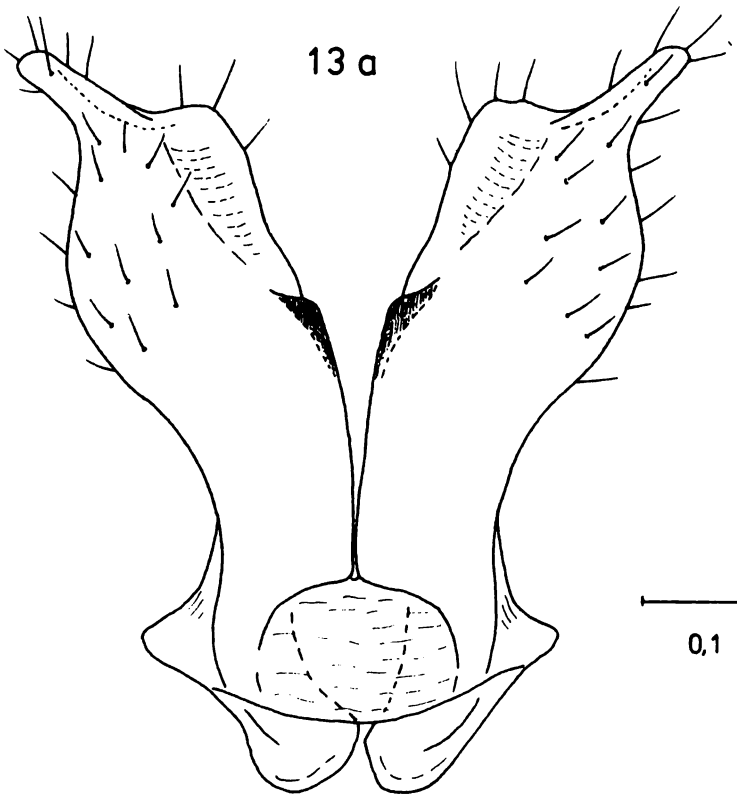
a: ventrocaudal view

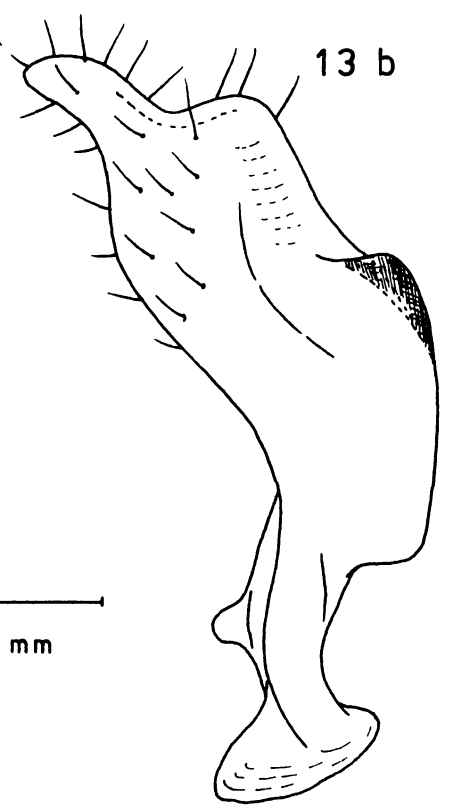
b: aspect of the max. area of left style

Fig. 14: Analtube

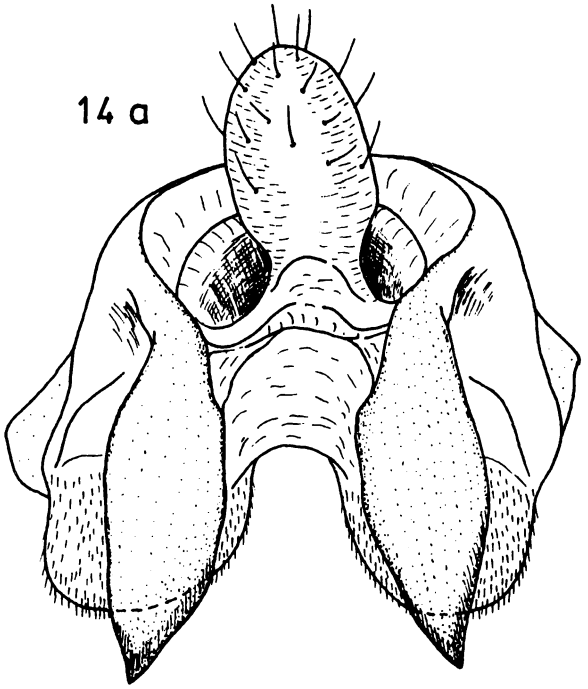
a: caudal view

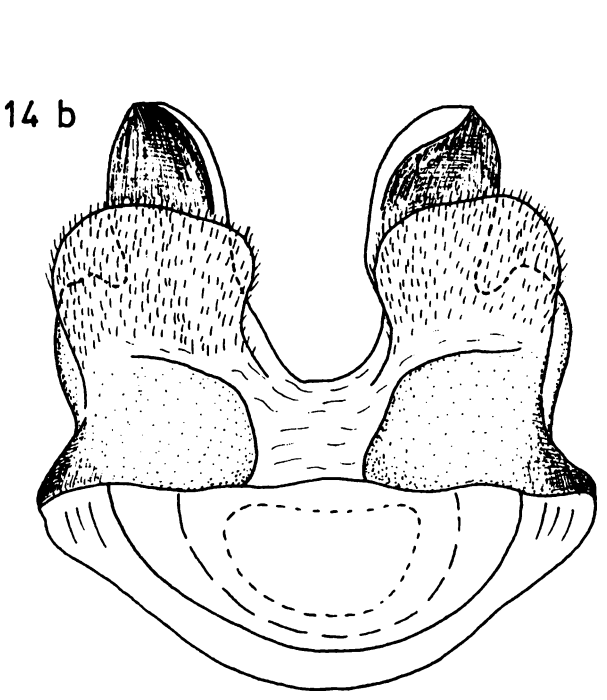
b: ventral view





0,1 mm





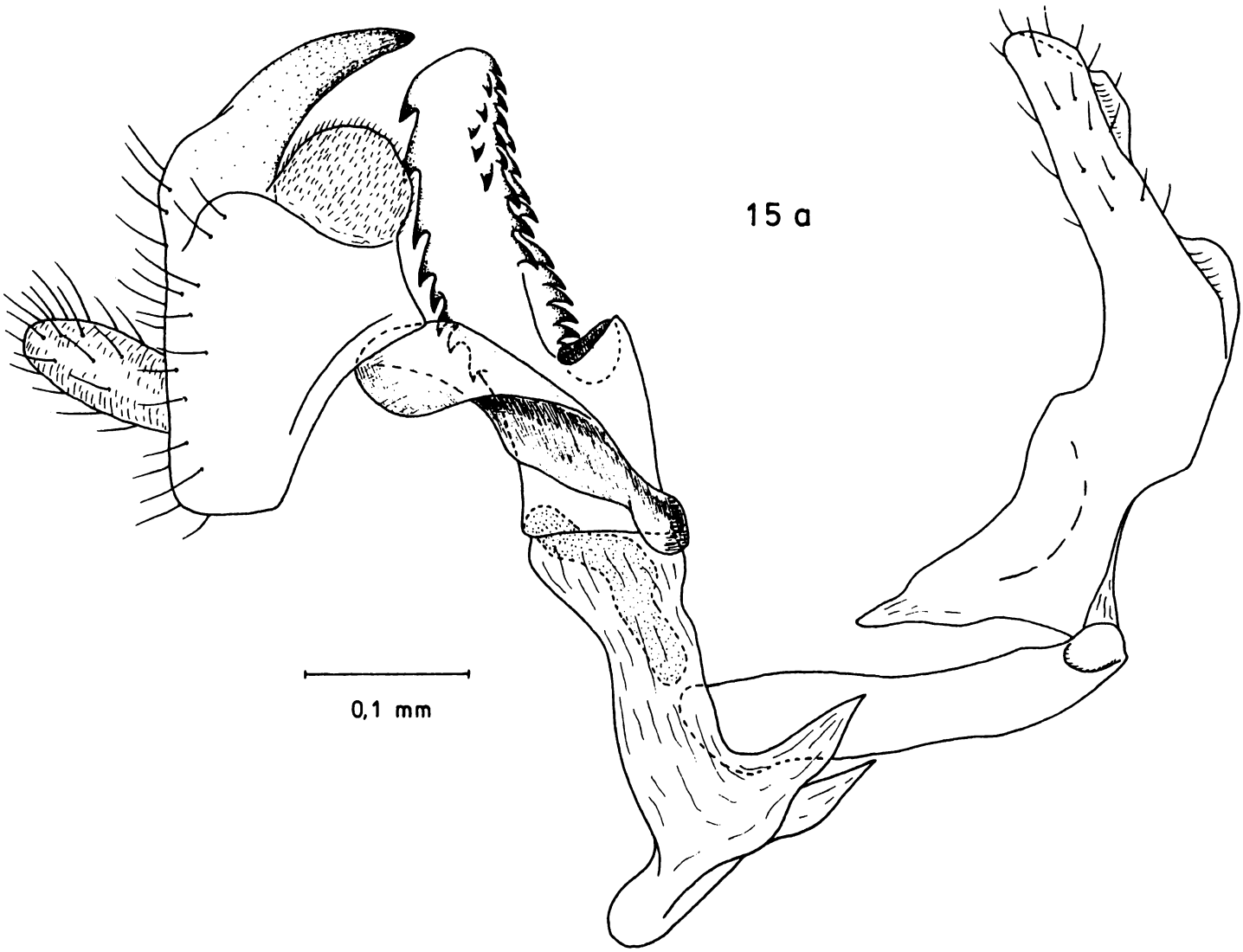
Makarorysa (Madeurysa) madeco n.sp. (cont.)

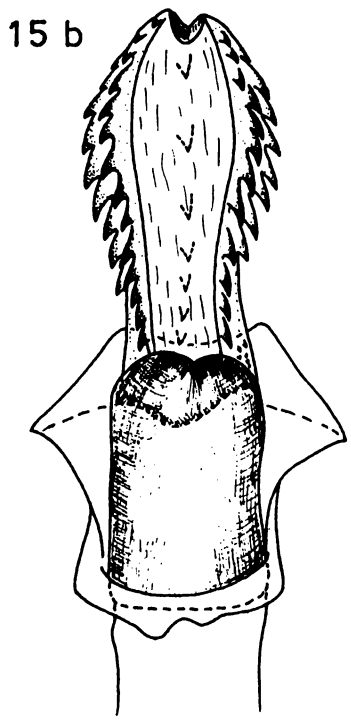
Fig. 15a: ♂-genitalia without pygofer from left lateral

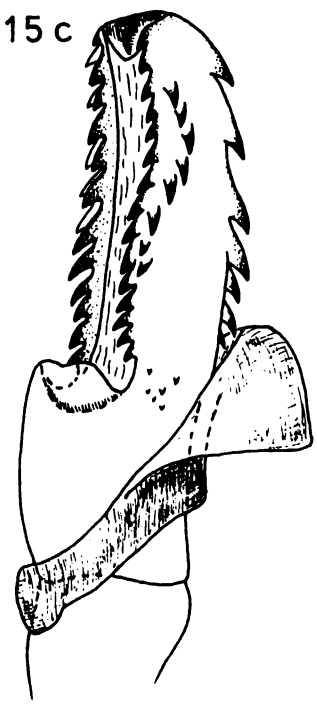
b: aedeagus, ventral view

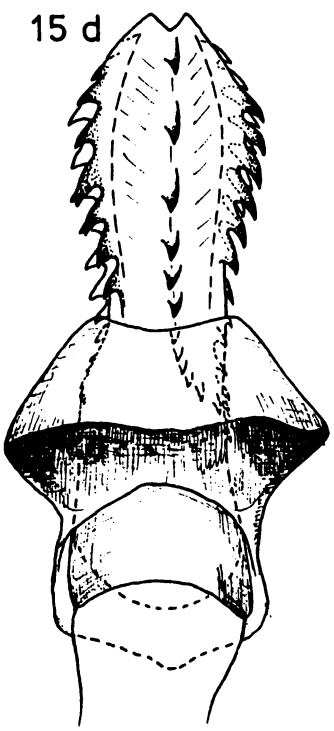
c: aedeagus from right side, slightly twisted to ventral

d: aedeagus, dorsal view


15 a
0,1 mm


15 b


15 c


15 d

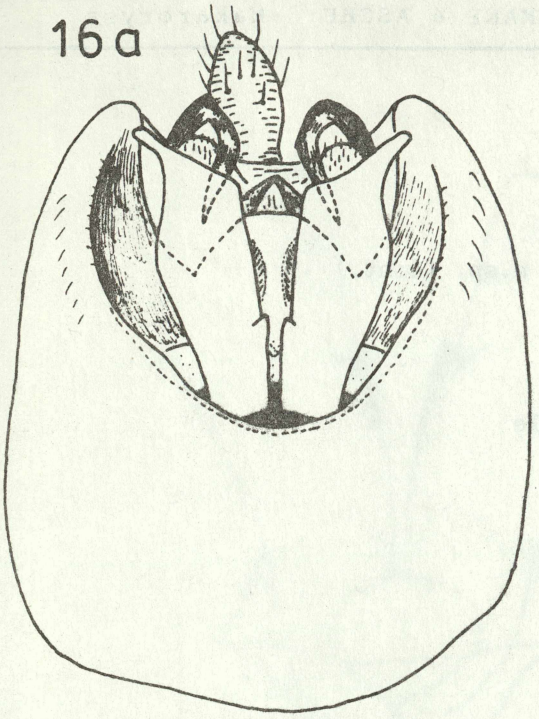
Makarorysa (Madeurysa) madalta n.sp.

(paratype ♂1, Madeira, E infra Pico Areeiro, ca. 1600 m, 15.3.67, Remane leg., in coll. Remane)

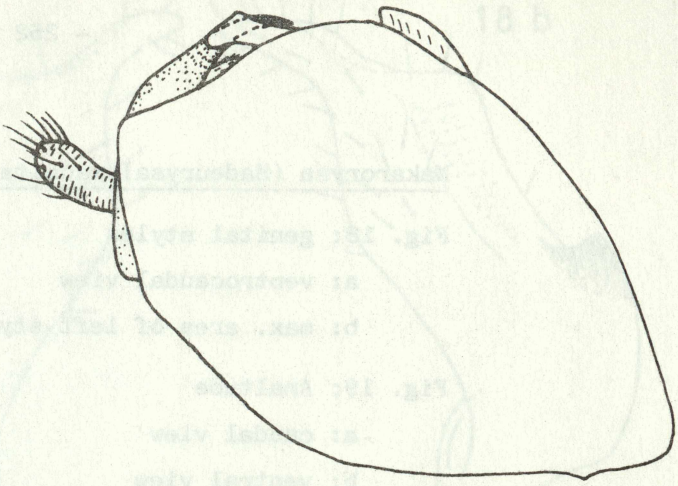
Fig. 16: ♂-genitalia
a: ventrocaudal view
b: left lateral view

Fig. 17: pygofer
a: caudal view
b: ventral view
c: dorsal view

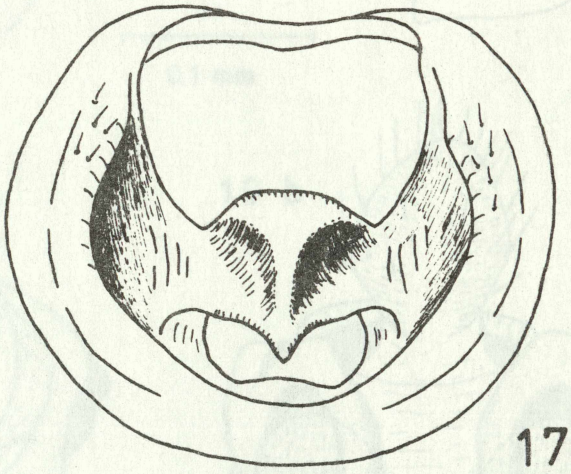
16 a



16 b

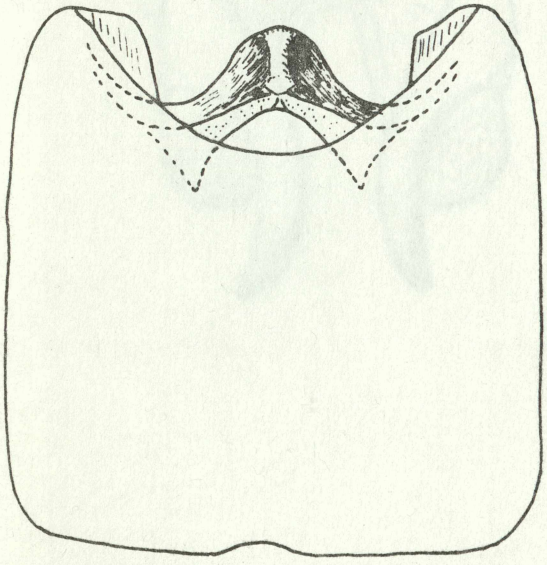


17 a

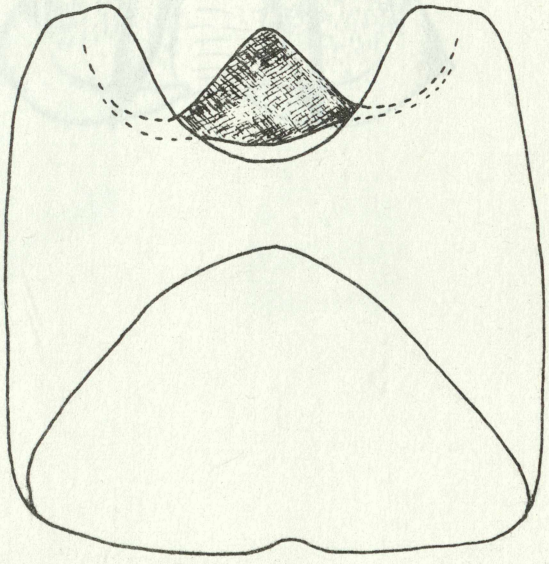


0,1 mm

17 b



17 c



Makarorysa (Madeurysa) madalta n.sp. (cont.)

Fig. 18: genital styles

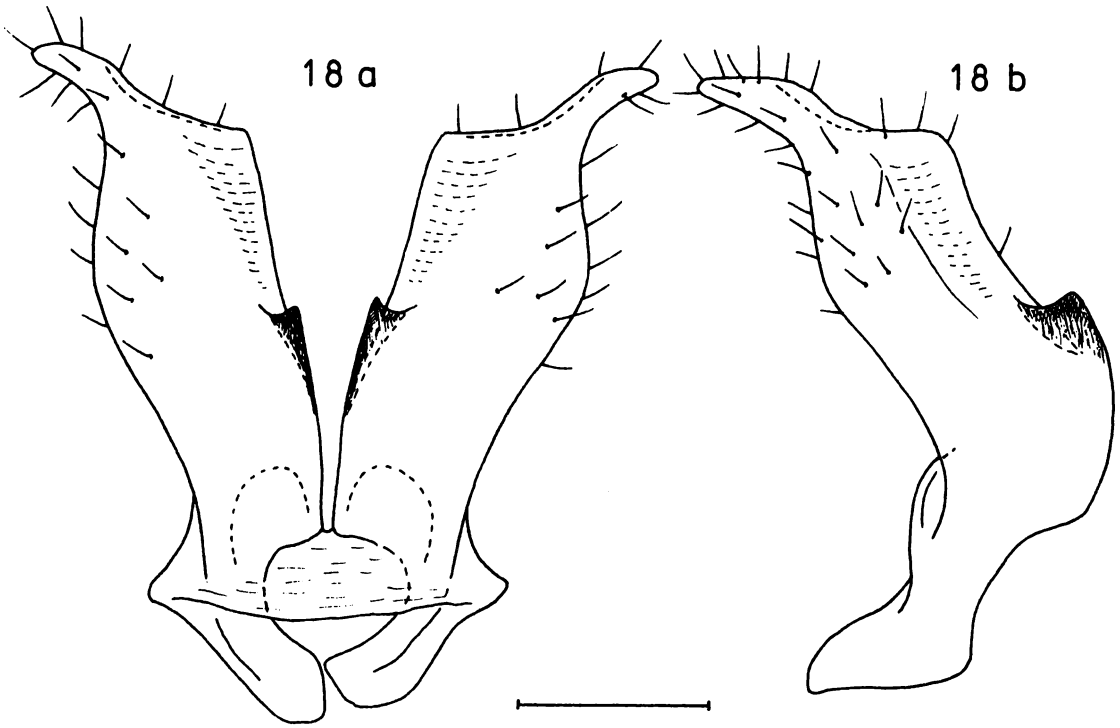
a: ventrocaudal view

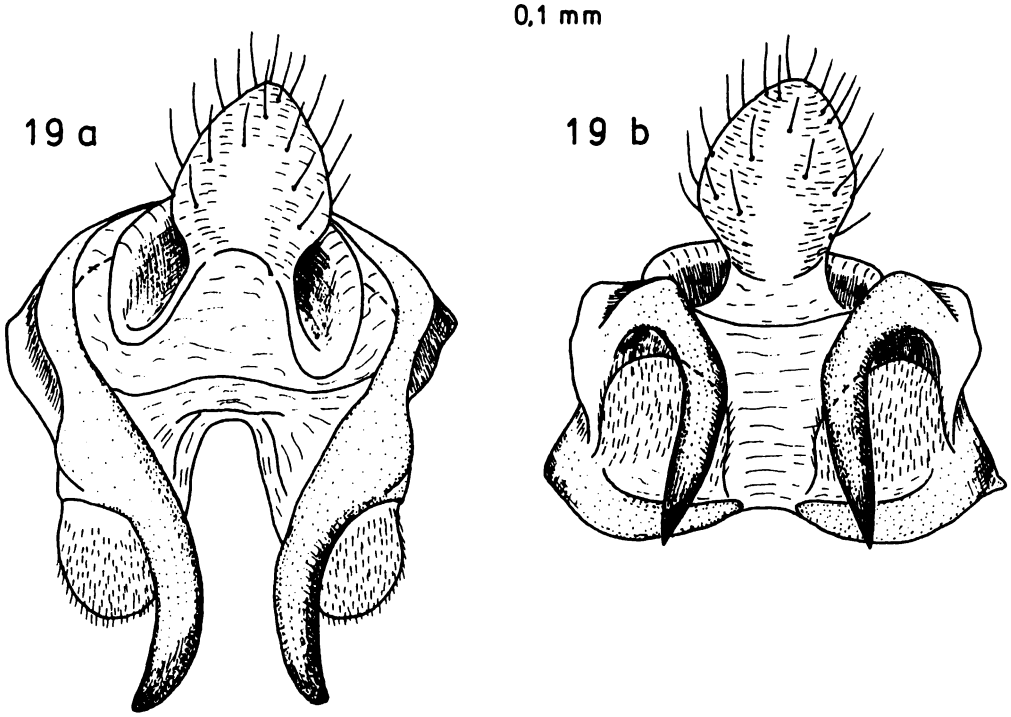
b: max. area of left style

Fig. 19: Analtube

a: caudal view

b: ventral view


18 a
18 b
0,1 mm


19 a
19 b

Makarorysa (Madeurysa) madalta n.sp. (cont.)

Fig. 20a: ♂-genitalia without pygofer in left lateral view

b: aedeagus, ventral view

c: aedeagus from right side, slightly twisted to ventral

d: aedeagus, dorsal view

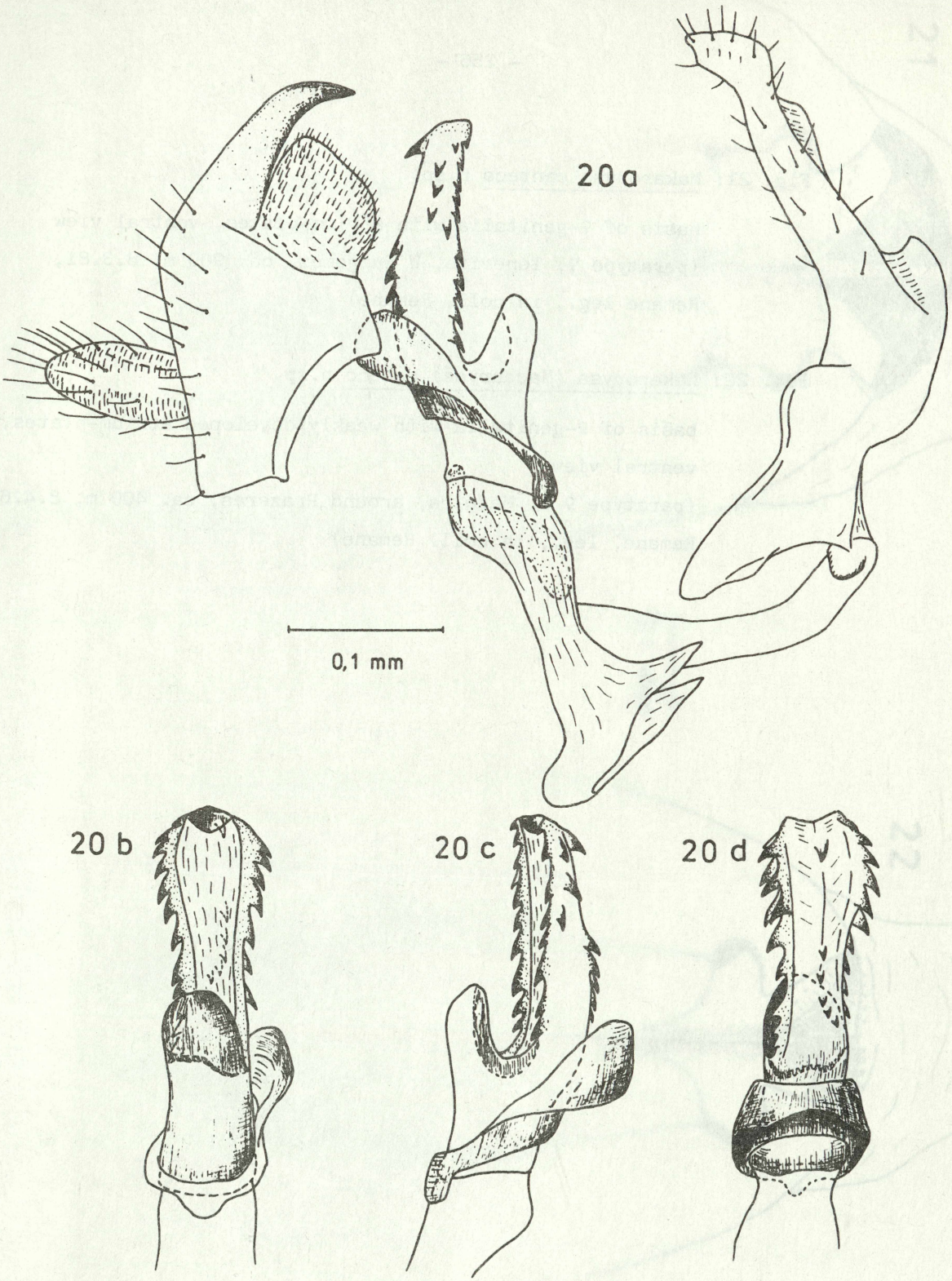
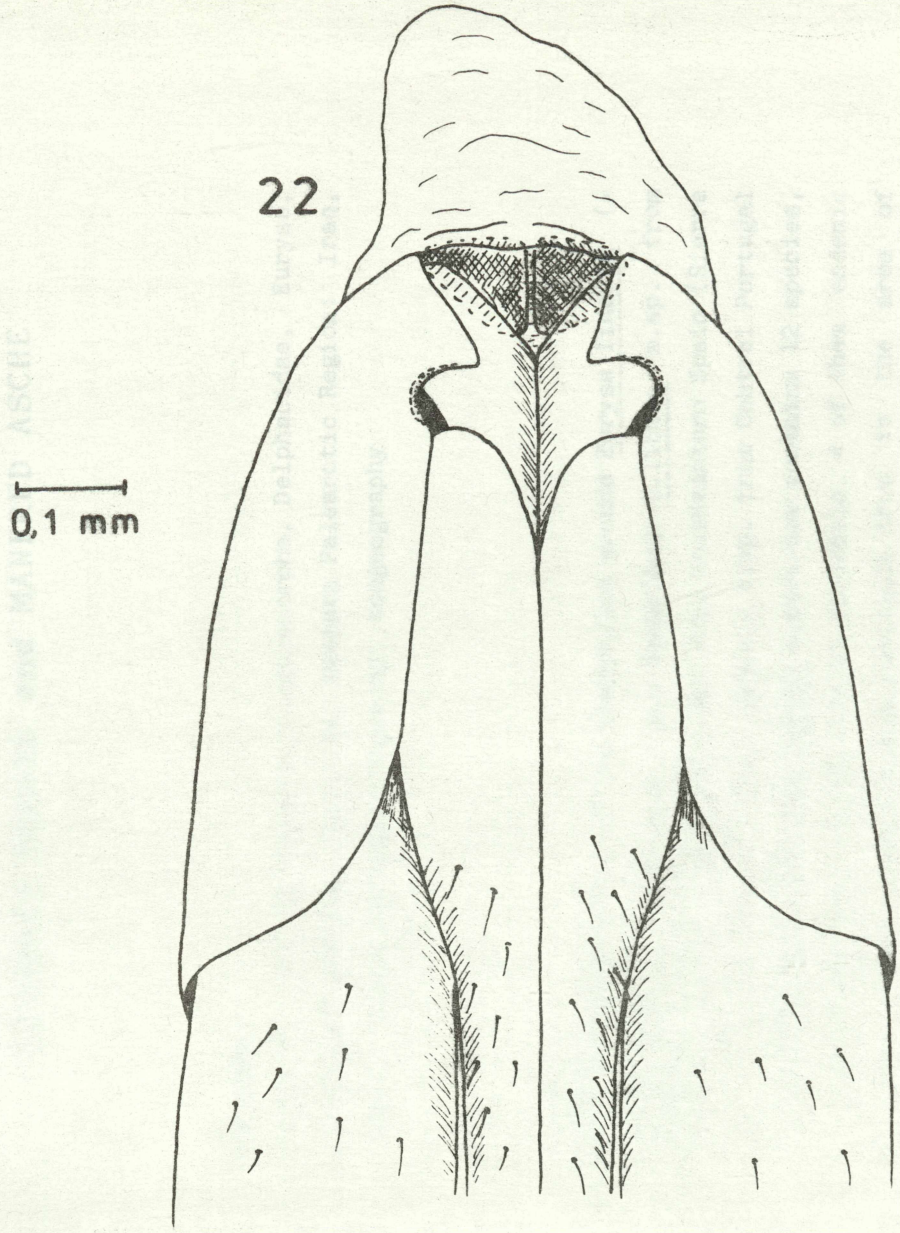

20 a
0,1 mm
20 b
20 c
20 d

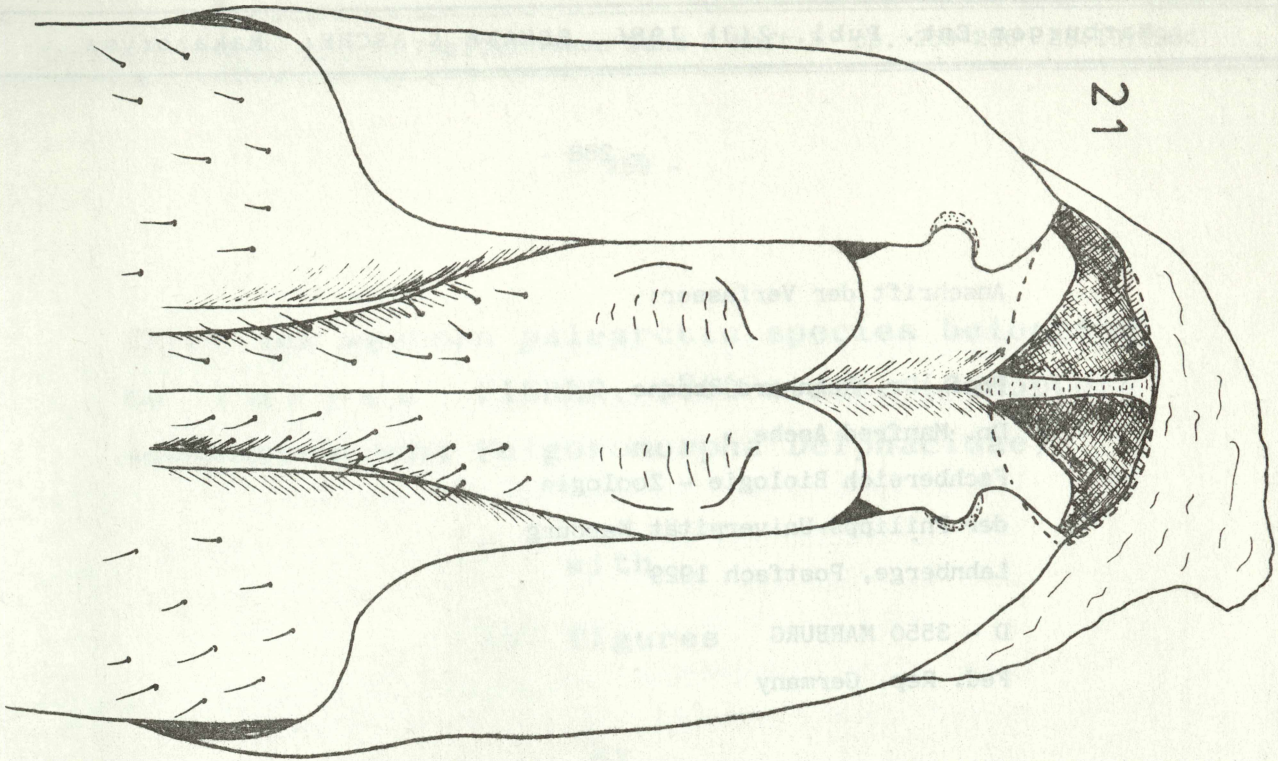
Fig. 21: Makarorysa canteca n.sp.

basis of ♀-genitalia with atrium-plates, ventral view (paratype ♀, Tenerife, W Ruigomez, ca. 900 m, 8.3.81, Remane leg., in coll. Remane)

Fig. 22: Makarorysa (Madeurysa) madeco n.sp.

basis of ♀-genitalia with weakly developed atrium-plates, ventral view
(paratype ♀ 1, Madeira, around Prazeres, ca. 400 m, 8.4.67, Remane, leg., in coll. Remane)


22
0,1 mm



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