

DERMATOZOONOSIS BY *CULICOIDES*' BITE
(DIPTERA, CERATOPOGONIDAE) IN SALVADOR,
STATE OF BAHIA, BRAZIL *

I — *Entomological Survey*

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(With 19 text-figures)

For the last five years the people of Salvador, State of Bahia, have been complaining to the Public Health authorities of the annoyance caused by *Culicoides*, which are commonly known as "maruim", "muruim", "powder mosquitoes" or "swamp mosquitoes".

Generally, the *Culicoides*' bite is painful and causes a distressful burning sensation. When the flies increase in number, they become a true pest. Furthermore, their bites cause lesions on the skin of sensitive people, sometimes with strong reactions.

The harmful consequences that this diptera has brought to the population of Salvador, are clearly seen in the number of affected people who have passed through the Dermatological Clinic of the "Hospital das Clinicas da Universidade da Bahia". During the years 1960 and 1961, two hundred and thirteen cases with intensive reactional lesions of the skin have been treated in this Clinic.

The fact is that the "maruim" and the dermatosis caused by its bite, have already become a Public Health problem in Salvador. However, very little research has been carried out on this matter, specially in South America. For these reasons we decided to study the problem and hope to report on several aspects of the subject in a series of papers, of which this is the first.

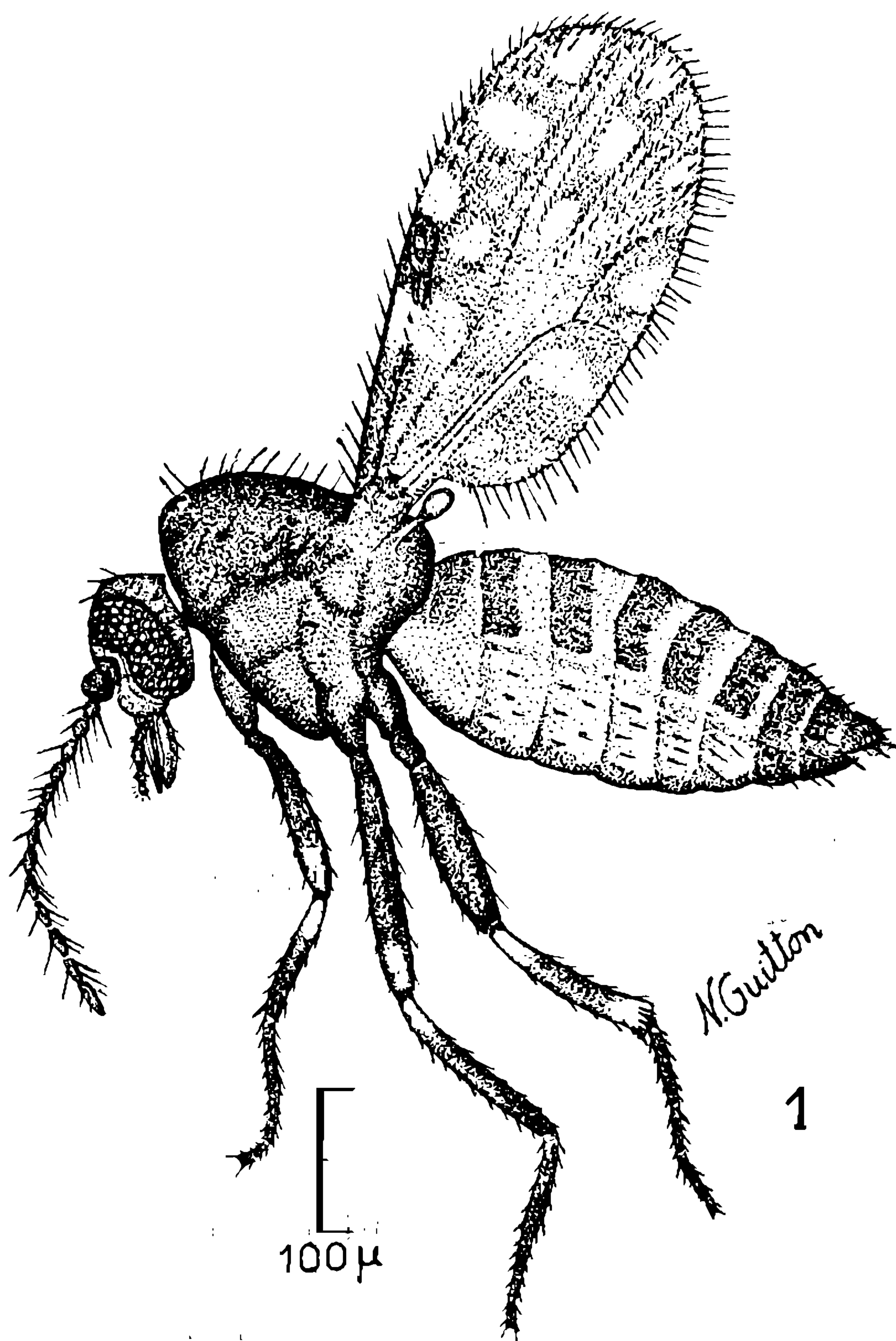
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MATERIAL AND METHODS

Five hundred and forty three specimens of *Culicoides*, collected in the district of Canela in Salvador, during the years 1959 and 1961, were gently transferred to us by Dr. Pedro Sarno of the "Fundação Gonçalo Moniz". In addition, from 1959 to 1963 we made 697 collections and collected 2,404 specimens of *Culicoides* in all districts of Salvador.

Several types of natural habitats of *Culicoides* were inspected, such as forests, marshes, coasts and open fields. The collectings took place in out doors and the collectors themselves served as bait by exposing their legs. The Oliveira Castro's collecting apparatus was used with good results. The specimens collected were maintained in 70% alcohol.



Culicoides (O.) paraensis (Goeldi, 1905) — Fig. 1 — Female, general aspect. Orig.

When we started working with *Culicoides*, specimens were dry mounted on cardboard triangles. Such a method was however, too time consuming, and because these diptera are very small in size, many structures could not be examined with an entomological microscope. Then, we decided to clarify the diptera in phenol and mount them in profile, in Canada balsam. All the interesting structures were clearly visible, with the exception of the upper surface of the thorax. We

think this method excellent for the study of the morphology of *Culicoides*. Besides the advantages mentioned above, the mountings are permanent.

The drawings shown in this paper were made with "camera lucida" from the specimens mounted in balsam.

The subgeneric classification adopted here and the nomenclature used are those of FORATTINI (1957).

RESULTS

In our material collected in Salvador 98 per cent of the specimens belonged to *C. paraensis* (Goeldi, 1905) and the remainder was made up by other species, as one can see in the following Table I.

TABLE I

Species of *Culicoides* collected in Salvador, State of Bahia, from 1959 to 1963

SPECIES	N.º of females col.
<i>Culicoides</i> (O.) <i>paraensis</i> (Goeldi, 1905).....	2,897
<i>Culicoides</i> (O.) <i>limonensis</i> Ortiz & Leon, 1955.....	14
<i>Culicoides</i> (C.) <i>insignis</i> Lutz, 1913.....	2
<i>Culicoides</i> (C.) <i>flavivenula</i> Costa Lima, 1937.....	34
TOTAL.....	2,947

SPECIFIC DISTRIBUTION BY DISTRICTS

We found *C. paraensis* in all districts we inspected. However, its density varied according to the places. It decreased along the coastline and chiefly in mangroves, where there is *C. flavivenula*. The latter species was collected only in marshes. As for *C. limonensis*, its distribution seems to follow that of *C. paraensis*, but the former diptera has a different time of activity, as one will see in our next paper on the habits of these species.

We collected only two specimens of *C. insignis* associated with *C. paraensis*.

In Table II, we give the number of specimens of each species collected, and their geographical distributions by districts.

COMMENTS

The followings species of *Culicoides* were recorded for Bahia, by several authors:

C. (C.) foxi Ortiz, 1950

Ilheus, State of Bahia (Wirth & Blanton, 1956)

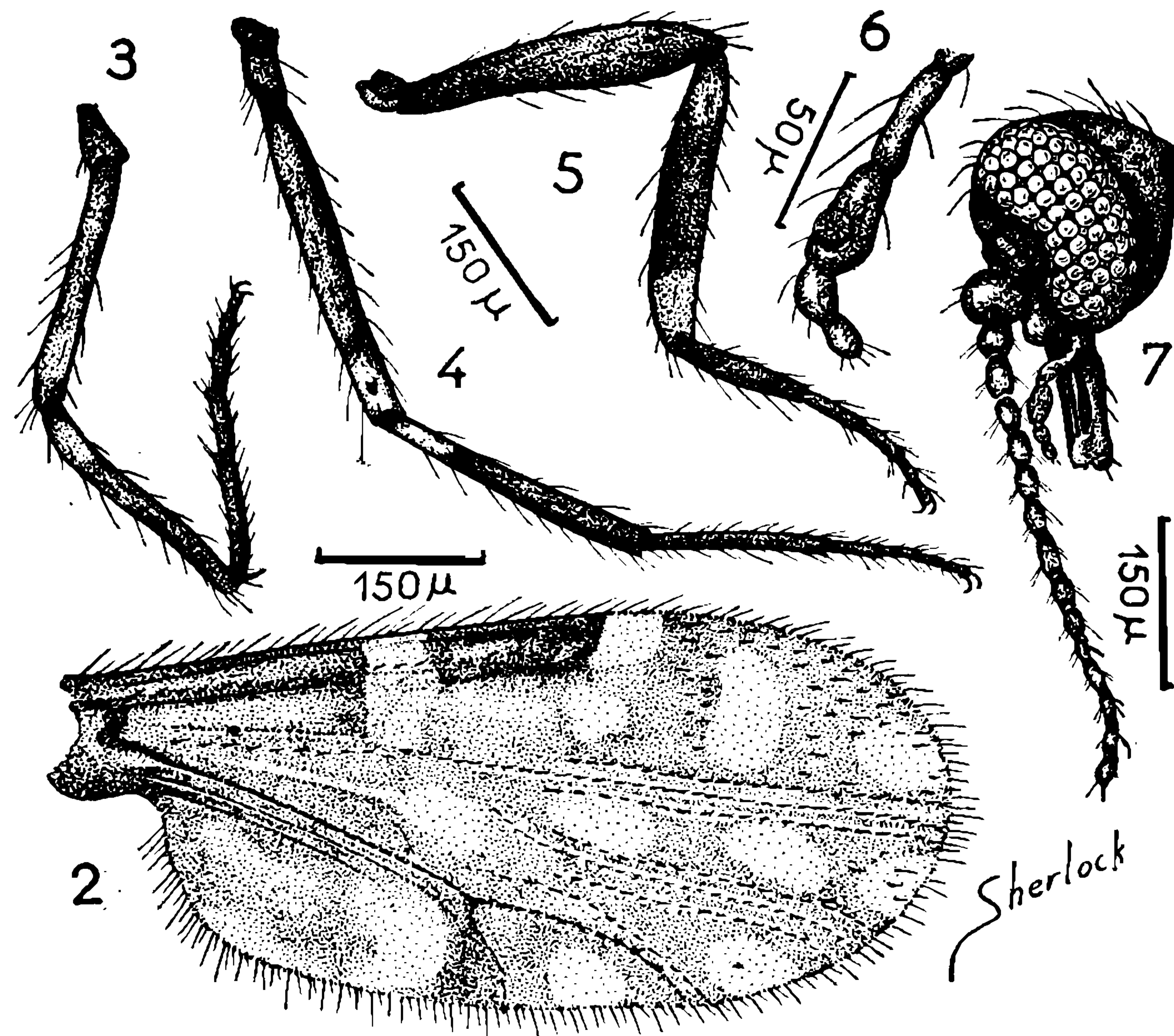
Porto Caxias, State of Bahia (Fox, 1948; Wirth & Blanton, 1956)

Piraya, State of Bahia (Fox, 1948; Wirth & Blanton, 1956)

C. (C.) guttatus (Coquillet, 1904)

State of Bahia, without any mention of localities (Barbosa, 1947)

Rio Grande, State of Bahia (Barbosa, 1947)



Culicoides (O.) paraensis (Goeldi, 1905) — Fig. 2: Wing; figs. 3 to 5: legs; fig. 6: palpus; fig. 7: head. Orig.

C. (C.) maruim Lutz, 1913

State of Bahia, without mention of any locality (Lutz, 1913)

Itapagipe, Salvador, State of Bahia (Fox, 1948; Wirth & Blanton, 1956)

C. (C.) insignis Lutz, 1913

State of Bahia, without mention of any locality (Lutz, 1913)

C. (C.) flavivenula Costa Lima, 1937.

State of Bahia, without mention of any locality (C. Lima, 1937)

C. (O.) bambusicola Lutz, 1913

State of Bahia, without mention of any locality (Barbosa, 1947)

C. (O.) paraensis (Goeldi, 1905)

Paulista, State of Bahia (Lutz, 1913)

Salvador, State of Bahia (Forattini, 1957; Guimarães & Oliveira Rocha, 1959)

C. (O.) reticulatus Lutz, 1913

State of Bahia, without mention of any locality (Lutz, 1913)

TABLE II
Specific distribution of Culicoides in Districts of Salvador Bahia, Brazil

DISTRICTS	Hours and minutes spent	NUMBER OF SPECIMENS				
		paraensis	limonensis	flavivenula	insignis	Total
AMARALINA.....	6:30	7	—	—	—	7
BARBALHO.....	12:00	30	—	—	—	30
BARRA.....	20:00	1	—	—	—	1
BARRIS.....	12:00	—	—	—	—	—
BOA VIAGEM.....	6:30	11	—	—	—	11
BONFIM.....	7:00	8	—	—	—	8
BROTAS.....	2:30	2	—	—	—	2
CABULA.....	?	3	—	—	—	3
CALÇADA.....	?	5	—	—	—	5
CANELA.....	104:30	543	—	—	—	543
FEDERAÇÃO.....	7:50	27	—	—	—	27
GARCIA.....	30:00	57	—	—	—	57
GRAÇA.....	803:00	1,938	14	—	—	1,953
IPITANGA.....	8:00	—	—	—	—	—
ITAPAGIPE.....	28:00	30	—	—	1	31
ITAPOAN.....	5:00	6	—	—	—	6
L. DO TANQUE.....	12:00	16	—	—	—	16
LIBERDADE.....	2:00	4	—	—	—	4
LOBATO.....	13:20	42	—	33	—	75
MONTE SERRAT.....	—	—	—	—	—	—
NAZARE.....	12:00	57	—	—	—	57
ONDINA.....	15:30	7	—	—	—	7
PAU MIUDO.....	?	39	—	—	—	39
PITUASSU.....	12:00	—	—	—	—	—
PITUBA.....	5:00	—	—	1	—	1
RETIRO.....	?	5	—	—	—	5
RIO VERMELHO.....	21:30	26	—	—	—	26
SANTO AMARO.....	6:00	1	—	—	—	1
STO. ANTONIO.....	?	5	—	—	—	5
S. CAETANO.....	4:00	4	—	—	—	4
SÃO PEDRO.....	12:00	4	—	—	—	4
TORORO.....	12:00	14	—	—	—	14
URUGUAI.....	—	—	—	—	—	—
VITORIA.....	?	5	—	—	—	5
TOTAL.....	1,179:40	2,897	14	34	2	2,947

We can say for sure that *C. limonensis*, *C. insignis* and *C. flavivenula* are here recorded in Salvador for the first time.

As to the fact that only female specimens were collected, we gathered the following observations.

Several authors have emphasized that when one works with some species of *Culicoides* he generally collects only female specimens. The type of collectings that we used was that with baits, which is specific to collect female specimens. However, FORATTINI (1959) thinking that he had only obtained female specimens because of the type of collection, changed the method, but he still got the same results. For this reason, he thinks that some species have males with or no disposition to leave their breeding places.

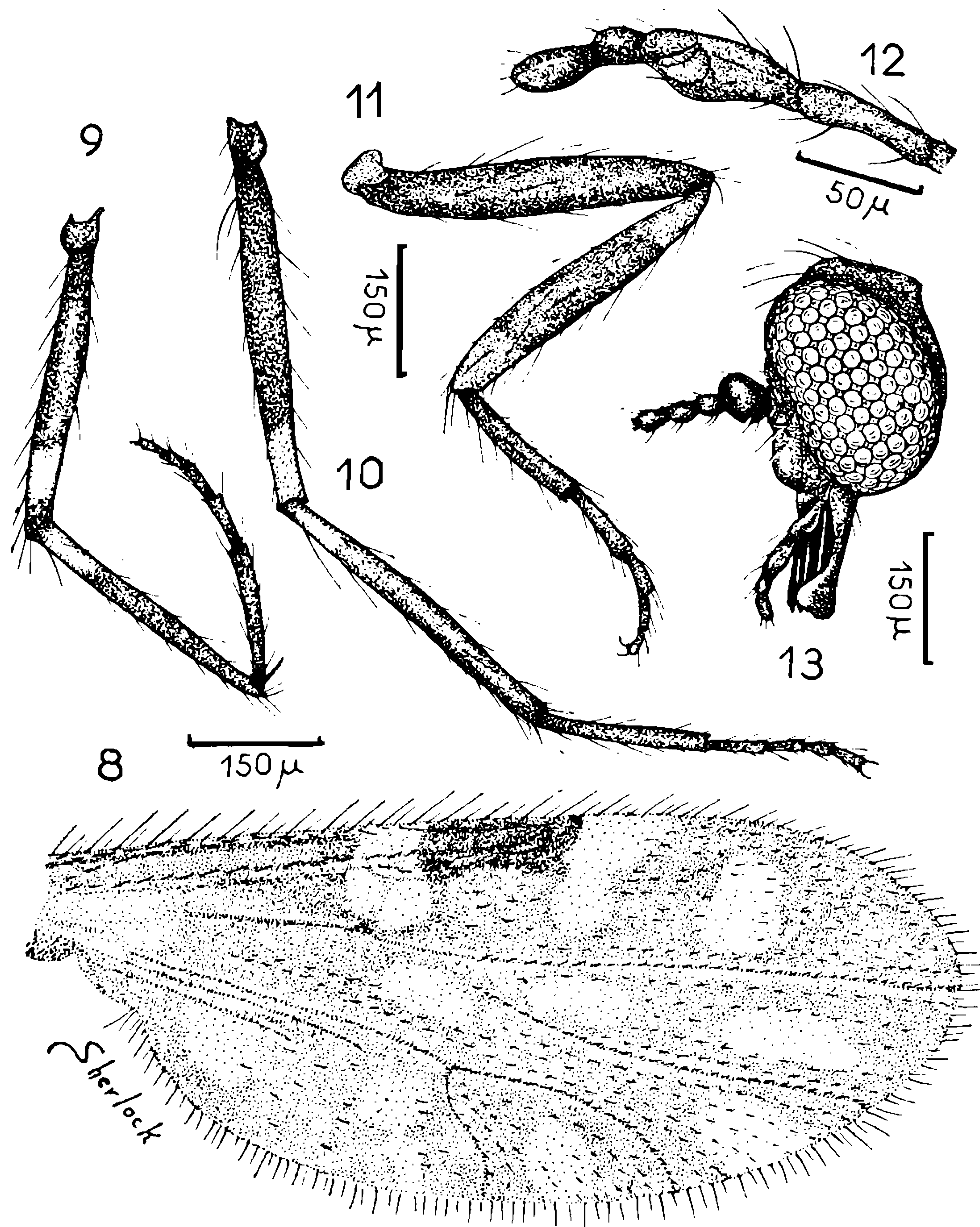
It is possible that Forattini's theory may be applied to the case of the males of *C. paraensis*.

MORPHOLOGICAL CHARACTERISTICS OF THE SPECIES

The common characteristics for all species we have recorded for Salvador, based on the examination of the specimens collected, are as follow:

"Their general color is light brown; dark eyes; palpi having the third segment the longest and swollen. Wings showing two distinctives radial cells. They have two rounded spermathecae".

The other characteristics we are going to present now are specific for each species, that will be reviewed.



Culicoides (O.) limonensis Ortiz & Leon, 1955 — Fig. 8: Wing; fig. 9 to 11: legs; fig. 12: palpus; fig. 13: head. Orig.

Culicoides (Oacacta) paraensis (Goeldi, 1905)

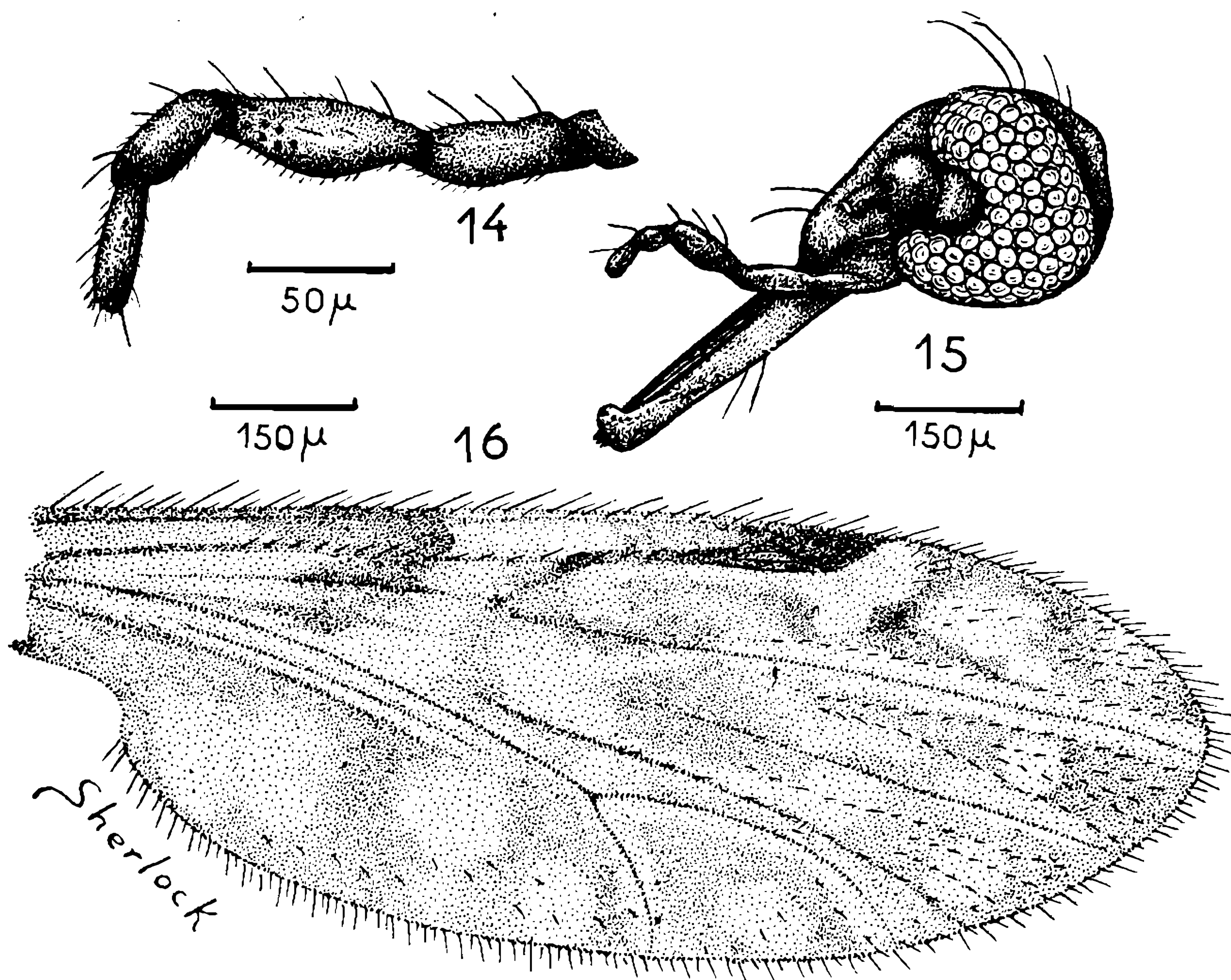
The female length is about 1.2 mm. The eyes have sparing hairness. The antennal segments show clear transition between the first eight and the last five (Fig. 7). Palpus has the third segment with sensorial organ rounded, clearly differentiated. The fourth segment is longer than the fifth (Fig. 6).

Anterior and median legs with femurs having sub-apicals light rings. Distal ending of the tibia is light, with four permanent setae (Figs. 3 to 5).

Culicoides (Oacacta) limonensis Ortiz & Leon, 1955

This species is closely related to *C. paraensis* although it is bigger than this one. Its female length is about 1.5 mm.

The eyes have scarce pilosity. Antennal segments do not show clear transition between tenth and eleventh. Third palpal segment has sensorial organ rounded, well delimited. Fourth palpal segment is as long as the fifth (Fig. 12).



Culicoides (C.) flavivenula Costa Lima, 1937 — Fig. 14: Palpus; fig. 15: head; fig. 16: wing. Orig.

Anterior and median legs have pale rings on distal ending of the femurs and basal of the tibiae. Joints are darkened. Hind tibia has pale rings on the endings; there are five permanent setae on its distal extremity (Figs. 9 to 11).

The wing has light spots well delimited, which are distributed as figured (Fig. 8).

Culicoides (Culicoides) flavivenula Costa Lima, 1937

Female length is about 2 mm. The eyes are dark, without pilosity (Fig. 15). There is visible transition between the first eight and the last five segments. There is no sensorial organ delimited on the third palpal segment; it is made up of slight depressions (Fig. 14). The fourth segment is as long as the fifth.

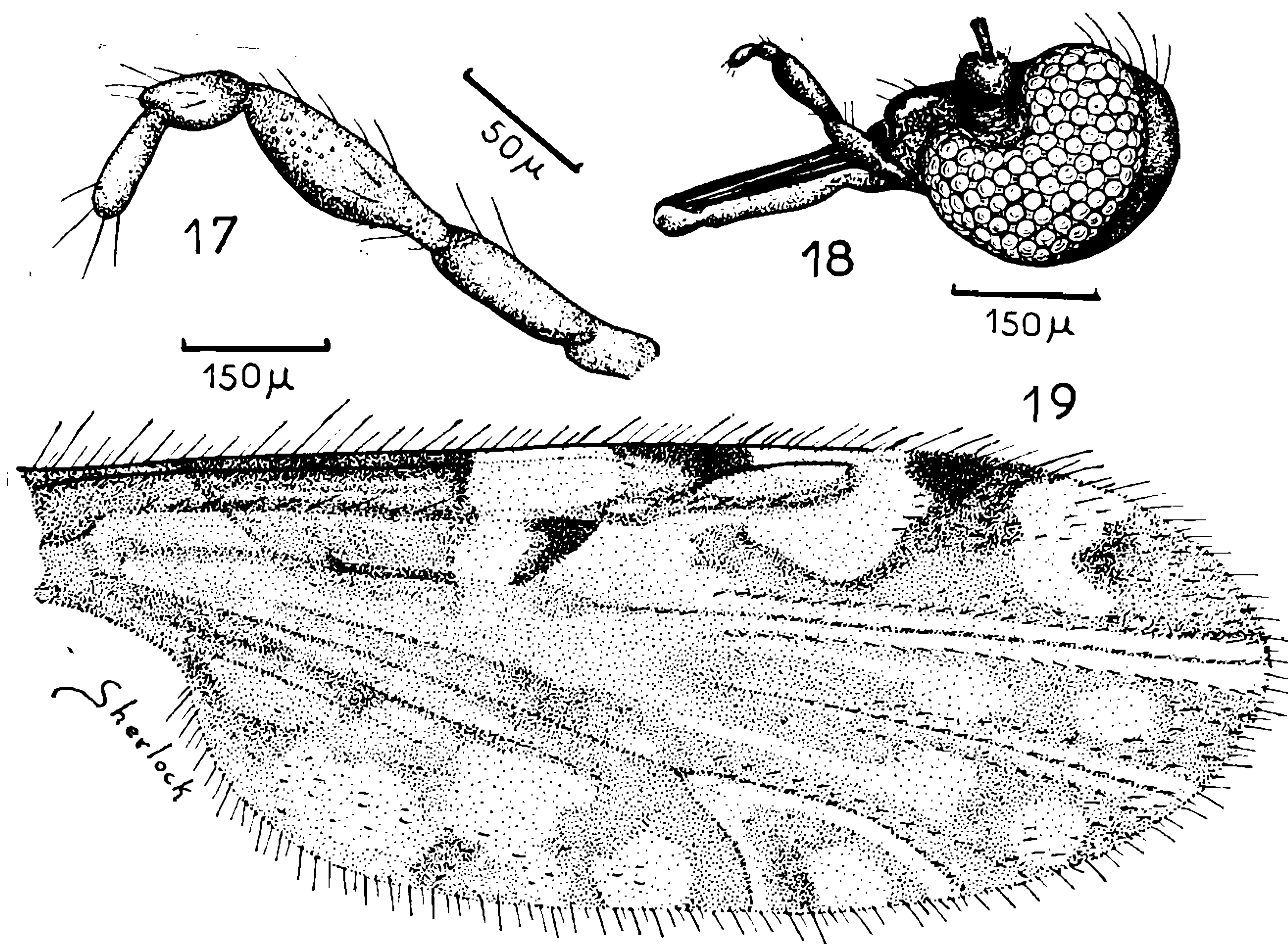
The legs are dark and have no pale rings.

Wing (Fig. 16) does not have well delimited light spots and it is as figured.

Culicoides (Culicoides) insignis Lutz, 1913

Female length is about 2 mm. The eyes have no hairness (Fig. 18). Sensorial organ is not delimited, corresponding to sparse depressions (Fig. 17). The fifth palpal segment is longer than the fourth. The legs are dark, without pale rings.

Wings (Fig. 19) have macrotrichiae only on distal third. The light spots are well delimited, distributed as figured.



Culicoides (C.) insignis Lutz, 1913 — Fig. 17: Palpus; fig. 18: head; fig. 19: wing. Orig.

Culicoides (Culicoides) maruim Lutz, 1913

AS WIRTH & BLANTON (1956) and Fox (1948) found this species in the District of Itapagipe, in Salvador, we think it is interesting to give its main morphological characteristics, which are based on FORATTINI (1957).

The eyes have no pilosity. There is clear transition between the first eight and the last five antennal segments. Palpi without delimited sensorial organ, corresponding to sparse depressions. Fourth palpal segment equal to fifth.

Legs do not have pale rings. Wing has two distinct radial cells. Macrotrichiae present on distal half of the wings. Light and dark spots well delimited. Cross vein r-m is dark, included in a not well delimited pale area. Vein M 2 crossing a pale area. An cell with sparse light spots and not well delimited.

SUMÁRIO

Os autores iniciam com êste, uma série de trabalhos sôbre a Dermatozoonose provocada pela picada de *Culicoides*, em Salvador, Bahia, Brasil.

No presente, tratam das espécies de *Culicoides* encontradas em Salvador, baseados na coleta de 2.947 exemplares, durante os anos de 1959 a 1963.

Encontraram as 4 espécies seguintes: *C. (O.) paraensis* (Goeldi, 1905) *C. (O.) limonensis* Ortiz & Leon, 1955 *C. (C.) insignis* Lutz, 1913 *C. (C.) flavivenula* Costa Lima, 1937.

Não reencontraram o *C. (C.) maruim*, Lutz, 1913 assinalado por Fox (1948) e WIRTH & BLANTON (1956) para Salvador.

Dessas espécies o *C. (C.) paraensis* se mostrou a predominante, abrangendo 98% de exemplares coletados.

Apresentam a distribuição das espécies por bairros e respectivas quantidades coletadas. Finalizando, dão as principais características morfológicas das espécies, ilustrando essas com desenhos do material por êles estudado.

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