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The Haemagogus of South America (Diptera--Culicidae)

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INTRODUCTION

The genus *Haemagogus*, Williston 1896 is one of the most important genus of mosquitoes, from the sanitary point of view, due to the fact that nearly all of its members are able to transmit the yellow fever virus, becoming the definitive hosts in the epidemiological cycle of Jungle Yellow Fever.

These mosquitoes were incriminated as vectors of yellow fever by Antunes & Whitman in 1937, this incrimination being confirmed in 1938 by Shannon, Whitman & França who proved that the *Haemagogus* were effective vectors of Yellow Fever in the jungles of Brazil.

All the specimens here photographed and described are from the collection of the author or loaned from the collections of other fellow entomologists (see acknowledgement) and are representative of the regions where described, **all this paper is original and nothing has been taken from any other publications.**

The female characters have a very slight difference among the members of the genus *Haemagogus*, thus the only differing ones are the male terminalia and the larvae, that have specific characters

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for each species, so in my work these are the ones that will receive the most important discussion.

Genus Haemagogus, Williston 1896.

This genus is formed by medium sized, mosquitoes that are coated with blue, green or coppery scales, of a metallic appearance and of changeable colors on the striking of the sunlight rays. The only way how to difference the species is by the larval and male characters, as the females look like the members of the genus *Sabethoides* of the tribe *Sabethini*.

The male terminalia looks like the *Aedes* mosquitoes of the subgenus **Gualteria** (Lutz 1904) Vargas 1949, showing a typical structuration of the subgenus, but differing from it by the presence of large, elongated and foliaceous scales, that are present on the coxites in the inner and upper margin, but this character is general for the genus, not being important enough to separate the species among them. The mesosome, the claspette and the tenth sternites are the only characters by which species can be determined accurately.

The larvae and pupae are very much like the *Aedini*, but the scales in the scale patch of the eighth abdominal segment and the pecten of the air tube, give the accurate description of all the species.

The adults differ from the *Aedini* because the prothoracic lobes are formed like a large collar, thus appearing by this detail as members of the genus *Sabethoides*, then the whole body is covered by colored scales with a metallic appearance. With a great amplification an observer is able to see in some species two or three small setae nearly imperceptible in the postnotum, located in that portion that is nearer the first abdominal segment.

Taxonomic Division.

The genus *Haemagogus* is divided into two subgenus; based on the length of the male palpi. The mosquitoes with **short palpi in the male** are grouped in the subgenus **Haemagogus**, Williston 1896, meanwhile **the ones with long male palpi** are grouped under the special subgenus **Longipalifer** Levi-Castillo 1.951.

Genus Haemagogus, Williston 1896
Subgenus Haemagogus, Williston 1896.

1. *Haemagogus splendens*, Williston 1896
2. *Haemagogus albomaculatus*, Theobald 1903
3. *Haemagogus capricornii*, Lutz 1904
4. *Haemagogus spegazzinii*, Brethes 1912
5. *Haemagogus spegazzinii falco*, Kumm, Osorno Mesa & Boshell Manrique 1946.
6. *Haemagogus lucifer*, Howard, Dyar & Knab 1913
7. *Haemagogus anastationis*, Dyar 1921
8. *Haemagogus chalcospilans*, Dyar 1921
9. *Haemagogus uriartei* Shannon & Del Ponte 1927
10. *Haemagogus andinus*, Osorno-Mesa 1944
11. *Haemagogus boshelli*, Osorno-Mesa 1944.

Subgenus Longipalifer Levi-Castillo 1951.

1. *Haemagogus equinus*, Theobald 1903
2. *Haemagogus panarchys*, Dyar 1921
3. *Haemagogus tropicalis*, Cerqueira & Antunes 1938.

ECOLOGY AND BREEDING PLACES

The *Haemagogus* mosquitoes are jungle, anthropophilic, and daytime mosquitoes, being an epidemiological problem when found in large numbers, in a given place in the Amazon or the coastal jungles of South America.

In the jungles of South America the species of this genus have a zoophilic tendency while living in the virgin forests where no man-penetration has been effected, looking always for the tree-tops as a refuge, fleeing from the excessively humid zones in the lower stratos of the jungle. This tendency is one of the factors that determines their orientation in flight, tending always to fly from the shadows into the light, for those species that are heliophilic, meanwhile the opposite is found in those species that are heliophobic. In the tree-tops the species have a density in direct relation with the luminic intensity, this being due to the changes in the incidence of the solar rays, that changes also the atmospheric temperature and the environmental humidity, and

as these mosquitoes are very sensible to the most minimum change in temperature and relative humidity, they try to avoid such changes with their displacement. In the laboratory the author has observed a great mortality in some species when the temperature went up or down excessively under the optimum point. This condition is probably what makes that in the jungles of South America the species are located according to their environmental characteristics, this being what some authors call the "Microclima" of the species.

One of the most interesting characteristics observed with these mosquitoes are the displacements that are effected daily from East to West, as the day advances, because in the morning and the meridian hours they are located in the sunny spots of the jungles, migrating always into these spots from the shadowy ones, being more difficult to find them in the lower levels of the jungle as the day goes by; but if the light is found in a lower level they advance from a higher shadowy one or viceversa, this being a very interesting fact of great importance in a study of the epidemiology of Jungle Yellow Fever.

The bright metallic colors of the *Haemagogus* species possibly play a very important role in the nuptial flight, serving as an attractive among the sexes, in difference of the other species of mosquitoes that are not so conspicuous in their reflection upon the striking on the body of the sun rays.

Observations have been effected on the fact that *Haemagogus* mosquitoes migrate in search of food, this migration occurs on the presence of animals or man, whether they are located above the lower jungle stratae or at ground level, the persecution sometimes continues at considerable distance taken by bounds. The bites of some species are extremely painful, producing a local inflamed reaction, that itches very much, this may become urticant if the person bitten is allergic to mosquito bite.

Haemagogus mosquitoes fly long distances by bounds, with a maximum flight in straight flight of 500 meters, as the mosquitoes advance they stop for a while probably to rest, then continue their flight. This is important because it accounts for the fact of the epidemiological waves of Jungle Yellow Fever, that reach sometimes places where the disease was never known before to have occurred (Santo Domingo de

los Colorados, Pichincha-Ecuador Outbreaks in 1951). In the jungles *Haemagogus* are never found at the ground level, this accounted for the long time spent until they were found and incriminated as vectors of the yellow fever virus. During the dry season the mosquitoes disappear from sight and take to the tree-tops, where if the tree is cut down and falls, they immediately attack the persons around, this accounting for the fact that Jungle Yellow Fever is an occupational disease proper of those persons living or working in or near the jungle. In some species females fly into the lower stratae looking for tree holes or hanging Bromeliaceae or bamboo receptacles filled with water, where to shed their eggs, disappearing afterwards into the upper stratae upon ovipositing. Once the pupae develop into adults, these fly into the upper stratae too, disappearing from sight. Oviposition is effected during the rainy season when the rains force the females away from the tree-tops. The first weeks are for mating and a great quantity of males are found, being then most *Haemagogus* species sexually active.

The nuptial flight is effected by some species in a very small relative space, this fact facilitating colonization of such species, then there exist other species that mate by flying at high altitudes above the tree-tops, while there are others that mate in flight and then fall to the ground, finishing copulation at ground level and in the rest position.

The lifetime of this mosquitoes is very variable, in the laboratory they may live up to three weeks in some species or three days, as a maximum of adult life and minimum of the same under laboratory conditions. Species distribution is regulated in nature by the environmental conditions, differing by this from other genus and tribes. The extension of a species is delimited sometimes by the obstacles that appear to their horizontal displacement, such being as rivers and clears in the jungle. This accounts for the fact that *Haemagogus* mosquitoes are never found away from the virgin jungles of the primitive type. Thus accounts for the great difficulty in mosquito control over the great extension of virgin jungles covering a vast part of the Amazon Basin. The adult flight is very much like in the *Aedes* mosquitos, that is in spirals and going up by bounds, straight flight is never observed with *Haemagogus*. The *Haemagogus* mosquitoes have their breeding places in Bromeliaceae that are usual parasite epiphitic plants in the tropical jungles, filling their bases with water during the rainy season and keeping it there by absorbing water from the evaporating jungle hu-

midity, due to tree perspiration. *Haemagogus* are also found as larvae in rotting tree-holes filled with rain water, in bamboo stumps and receptacles made by cutting bamboo and leaving the pieces to be filled by rain water; after they rot become alive with larvæ of *Haemagogus* and other mosquitoes, some species have been found in ground holes filled with water and others in coconut shells filled with rain water. The larvae and pupae are photophobic and look for breeding places for those shaded spots made by the shadow of the jungle trees surrounding the breeding place. In the laboratory in order to breed in a very small space as in nature, larvae and pupae keep an up and down current, as to allow all the specimens to respire.

TAXONOMIC SYNOPTIC DESCRIPTION OF HAEMAGOGUS ESPECIES

1. *Haemagogus splendens*, Williston 1896.

Williston S. W.—1896—On the diptera of St. Vicent—Tras Royal Ent. Soc. London; 271.

Larva.— Head, rounded anterior head hairs simple, sometimes double; posterior head hairs double; ante-antennal tuft triple. Patch of scales of the eighth segment formed by 16 to 25 scales in three irregular rows. Pecten with 16 to 23 small spines and a tuft of two hairs. Anal segment with the lateral plate rugous in the postero-dorsal surface. Dorsal tuft of one long hair and a brush of 4 elements. Lateral tuft double and ventral brush with seven ramified elements.

Adult.— Proboscis long, dark blue. Occiput and prothoracic lobes with blue-green brilliant metallic scales. Mesonotum with metallic blue-green scales. Pleuræ and coxæ with silver white scales in patches. Abdomen is blue-green, much bluer than the mesonotum, all abdominal segments with basal bands of mother of pearl coloured scales that contrast with the ultramarine-blue of the abdominal scales, this pearl coloured scales become larger in the tergites and in the sternites, while they are narrow in the lateral spots. Legs are of a blue metallic colour, that is more violet like. Wings are of no taxonomical importance whatsoever.

The male has the palpi as in the female, quite short.

Male Terminalia.—The coxite is longer than wide, conical, with scales and hairs in the external surface. The inner upper surface has scales of variable size, long or short, elongated, foliaceous; basal lobe with hairs and filament-like setae. Clasper long, narrow, curved, spine subterminal about $2/4$ the length of the arm. The claspette has the stem stout, with micropilae, turning abruptly into a filament in the form of a half-moon, with one of the extremes turned outside and down, foliaceous. The mesosome is stout, divided into two conical formations at each side, forming a pear-like organ, with the base of it becoming the tip, slightly notched and with a middle, chitinized rib from base to tip. Tenth sternites are long narrow with rounded chitinized tips. Ninth tergites undeveloped.

Breeding Places.—In nature are found breeding in Bromeliaceae such as: *Bromelia pinguin* and *Karatas plumieri*.

Sanitary Importance.—This species has been found to be an effective transmitter of jungle yellow fever virus in laboratory passages, being a potential vector of the disease.

Geographical Distribution.—In the Departments of Arauca, Atlántico, Magdalena and Santander del Norte in Colombia. In the States of Zulia, Táchira, Merida and Bolivar in Venezuela.

2. — *Haemagogus albomaculatus*, Theobald 1903.

Theobald F. W. — 1903—A monograph of the Culicidae or Mosquitoes of the World: Vol. 3:308.

Larva: Unknown.

Adult.—Prosbocis long dark metallic blue. Occiput and prothoracic lobes with blue-green brilliant scales. Pleurae and Coxae with silver-white scale patches. Mesonotum with blue-green metallic scales. Abdomen with bluegreen scales, darker than in mesonotum, posterior segments with silvery bands that are narrow laterally, forming more or less confluent patches, that are larger ventrally and dorsally, being more prominent in the basal portion. The venter has dark blue scales. Legs are dark metallic-blue. Wings dark and without taxonomic importance.

The male and female have short palpi.

Male Terminalia.—Coxite longer than wide, conical, small basal lobe with strong filament-like setae. Clasper is medium size, strong, curved with a long terminal spine $1/3$ the length of the stem. The claspette is strong and equal basally setaceous, becoming thinner in the central portion with an engrossed tip, triangular and truncated; terminal filament is small becoming inserted well in the vertex, projecting outside as a short stout spine. Tenth sternites stout, with recurved and chitinous tips. Mesosome is elongated elliptic and well chitinized, with a pointed tip.

Breeding places.—Unknown.

Sanitary Importance.—Unknown

Geographical Distribution.—Originally described from the Demerara and Pomeroon rivers region in the British Guiana, advancing into Venezuela, being found in Bolivar State; in French Guiana is found in Gd. Pont.

3.—*Haemagogus capricornii*, Lutz 1904.

Lutz, A.—1940—(In Bourroul's; *Mosquitos do Brasil—Facultad de Medicina de Baia Thésis*): 66.

Larva.—Head rounded. Anterior head hairs simple; posterior head hairs long and simple; ante-antennal tuft with 3 or 4 elements. Scale patch of eighth abdominal segment formed by 8 fringed scales. Pecten with 12 to 14 spines with a basal spur and a tuft of 2 elements. Anal segment with posterior border spinulated. Lateral tuft with 2 to 4 elements; dorsal tuft with a long hair and a triple brush; ventral brush formed by seven pairs of double hairs.

Pupa.—Pupal trumpet strong and sclerosed, funnel-like. Hair 2 well developed in the I segment; hair 8 large and ramificated in VIII segment, spine-like in VII segment.

Adult.—Prosobocis ultramarine metallic blue. Occiput and prothoracic lobes with blue-green scales. Pleurae and Coxae with

patches of silver-white scales. Mesonotum with blue-green metallic scales with coppery reflection in the center of disc. Abdomen is covered with dark blue scales, darker than mesonotum. Posterior segments with bands of silver-white scales, forming lateral patches more or less confluent, more prominent in the base of each segment, except in the last one that is dark-blue; venter is also dark-blue. Legs with dark blue-green scales. Wings with no taxonomic value.

The male and female palpi are short.

Male Terminalia.— Coxite strong, three times longer than wide, setous, scaled in the external surface. Inner upper surface covered with three kinds of long, lanceolated, foliaceous scales mixed with smaller ones; basal lobe with thin and long setae. Clasper is short, strong, widened in the middle; terminal spine is long, blunt more or less $\frac{1}{2}$ as long as the arm. Mesosome pear-like, chitinized with a terminal protuberance. Claspette with a narrow stem, short, with micropilae and two strong setae, with the terminal filament large, foliaceous, as long as the stem, striated and pointed. Tenth sternite long, strongly schlerotized, with a rounded end with two rows of small teeth and some small setae in the membranous portion. Ninth tergite rudimentary with no setae.

Breeding Places.— Larvae are found in Bromeliaceae, among the trees, and holes in rotten trees filled with rain-water.

Sanitary Importance.— This species has been found to be able to transmit the jungle yellow fever virus in the laboratory and it has been found naturally infected in Southeastern Brazil.

Geographical Distribution.— This species has been found so far only in that region of Brazil comprising the States of Sao Paulo Bahía, Rio de Janeiro Sta Catarina, Espirito Santo, Minas Gerais, Rio Grande Do Sul, and Parana.

4.— *Haemagogus spegazzinii*, Brethes 1912.

Brethés J.— 1912—Los mosquitos de la República Argentina—Bol. Inst. Ent. Pat. Veg. 1: 39.

Larva. — Head rounded with slight latero-frontal depression. Anterior head hairs simple; posterior head hairs long and simple; ante-antennal tuft formed by 3 or 4 elements. Patch of scales of the eighth segment formed by 8 to 14 scales, margined by micropilae. Pecten formed by 9 to 12 spines with a basal spur formed by 2 or 3 elements with a 2 elemented tuft. Anal segment with the posterior end spiculated. The dorsal tuft has one long hair and a brush of 4 elements; lateral tuft of 2 to 6 elements; ventral brush of 8 double tufts.

Adult. — Prosbocis long dark-blue, metallic with green reflections. Occiput and prothoracic lobes with blue green scales; sometimes the prothoracic lobes are covered by patches of silver-white scales. Eyes margined with silver-white scales. Mesonotum with blue-green scales, that have coopery reflections in the center; scutellum and upper postnotum with blue green scales and dark setae. Pleurae and Coxae with patches of silver-white scales. With sterno-pleural setae. Abdomen with purple-blue scales with metallic reflections, first five segments with continuous white scale patches in the tergites, while the sixth and seventh tergites have oblique bands of silver-white scales. The venter is covered with purple blue scales, with bands of silver-white scales. Legs with the posterior margin of femurs covered with silver-white scales, the rest are metallic-blue. Wings with scales that have no taxonomic value. The male and female palpi are short.

Male Terminalia. — Coxite three times longer than wide, very setaceous in the external surface; covered with long ovate, foliaceous scales in the inner upper surface of superimposed scales of three sizes; basal lobe mamelonated and covered with long and strong setae. Clasper about a third as long as the coxite nearly straight, narrower near the point with one or two sub-terminal hairs and a few smaller ones basally; the terminal spine strong as long as stem in form of an italic S, curved with mamelonated tip. Claspette tall, with pilous stem in the basal portion, curved and turned distally outwards, with a narrow filament, elongated, striated, compressed sub-apically in the form or a bird's beak. Mesosome chitinous romboide-like, with a truncated distal portion, with a crest revetted with very fines spicules in the terminal external margin, very chitinous and sideways gives a bird-like look. Tenth sternite tall, schlerotized with a row of small teeth and some spicules in the membranous terminal portion. Ninth tergites with 2 to 5 small setae very rudimentary.

Breeding Places.— In Bromeliaceae filled with rain-water and in tree-holes with rain-water.

Sanitary Importance.— It is the most important vector of jungle yellow fever in South America.

Geographical Distribution.— In Brasil is found in the States of Amazonas, Amapa Alagoas Pará, Maranhao, Ceara, Bahia, Espirito Santo, Goiaz, Minas Gerais, Rio de Janeiro, Sao Paulo, Matto Grosso, Parana and Pernambuco. In the Argentine Republic it is found in Jujuy, Salta, Formosa, Tucuman, Catamarca, Santiago del Estero, Territory of Chaco and the Gobernación of Misiones. In Bolivia it has been found in the Departments of Santa Cruz, Chuquisaca, La Paz, Tarija Cochabamba and Colonias Territory. It is found in Paraguay too.

5. **Haemagogus spegazzinii falco, Kumm; Osorno-Mesa & Boshell-Manrique 1946.**

Kumm, Osorno--Mesa & Boshell—Manrique—1946—Studies on mosquitoes of the genus Haemagogus in Colombia—Amer. Jn. Hyg. 43: 13—28.

Larva.— As in *H. spegazzinii*, Brethés.

Adult.— As in *H. spegazzinii*, Brethés.

Male Terminalia.— As in *H. spegazzinii*, Brethés with the exception that the mesosome shows a long crest like a falcons's beak, that is curved dorsally, being covered with numerous spicules in the membranous portion of the ventral surface, that is above the beak-like appendix.

Breeding Places.— In tree-holes and Bromeliaceae filled with rain-water.

Sanitary Importance.— Is one of the most important vectors of Jungle Yellow Fever in South America, it has been found naturally infected and transmission with the yellow fever virus has been effected in the laboratory with success using this species as vector.

Geographical Distribution.— In Colombia is found in the Departments of Amazonas, Antioquia, Bolivar, Boyacá, Caldas, Caquetá, Cundinamarca, Magdalena, Meta, Putumayo, Santander, Santander del Norte, and Vaupés. In Ecuador it is found in the provinces of Esmeraldas, Pichincha (coastal), Manabi, Guayas, El Oro, Los Rios, Cañar (coastal), Napo-Pastaza and Santiago--Zamora. In Venezuela it is present in the States of Bolivar, Táchira and Trujillo. In Peru it has been found in the Departaments of Loreto, Junín, Huánuco and Cuzco. In Brazil it has been found in the States of Amazonas, Acre, Rio Branco, Pará, Guaporé and Matto-Grosso. In Bolivia it has been found in the Departments of Santa Cruz, La Paz, Colonias, Beni, Chuquisaca and Tarija. In the Güianas it has been only reported its existence in French Güiana.

6. — Haemagogus lucifer, Howard, Dyar & Knab 1913.

Howard L. O., Dyar H. G. & Knab F. — Mosquitoes of North and Central America and the West Indies—Part II: Plate 23, Fig. 164 (1913).

Larva.— Head rounded; anterior head hairs doble; posterior head hairs long and simple; ante-antennal tuft with 4 or 5 elements. Scale patch in the eighth segment with 22 to 24 scales in three irregular rows. Pecten with 13 to 15 sharp spines and a tuft with 3 elements. Anal segment with large dorsal plate and posterior border spinulated; lateral tuft with 2 to 4 elements; dorsal tuft formed by 6 elements and a long hair; ventral brush with 7 pair of ramified, long hairs.

Adult.— Prosbocis long and dark-blue scaled. Occiput and prothoracic lobes with patches of blue-green scales. Mesonotum coated with blue-green scales of metallic reflection. Abdomen ultramarine-blue, segments basally coated with silvery white scales around nearly all of the segments, forming more or less confluent spots. Venter dark-blue, united to the abdominal silvery bands. Pleurae and Coxae with patches of silver-white scales. Legs dark-blue with metallic reflections. Wing scales without taxonomical importance.

The male and female palpi are short.

Male Terminalia.— Coxite strong, conical, shows basal patch with long setae; the inner upper surface coated with lanceolate, long scales, very setaceous; covered with small scales and long setae in the external surface, giving a hairy appearance to the observer. Clasper medium sized, rounded, a little curved and expanded distally, with a subterminal, short, rounded, sclerotized spine. Claspette with a sinuous stem, becoming narrow distally and basically, with the tip expanded in the form of a cup, with a small thin filament, that comes out of the external angle of the tip. Mesosome is a cylinder, with ovoid tip, strongly chitinized at the tip and the base. Tenth sternites narrow, becoming engrossed in the tip, denticulated, very chitinized, engrossed basally.

Breeding Places.— This species is found in nature in tree-holes filled with water, in Bromeliaceae and in bamboo containers.

Sanitary Importance.— This species has not been found infected in nature, has no role in jungle yellow fever transmission in South America.

Geographical Distribution.— It has been found in Colombia only in the Departments of Antioquia, Bolivar, Cundinamarca and Santander, located along the valleys of the rivers Magdalena and Sinú in Central Colombia.

7.— *Haemagogus anastationis*, Dyar 1921.

Dyar H. G.— 1921—New Mosquitoes from Costa Rica. *Ins. Ins. Mens.* 9: 155.

Larva.— Head rounded; anterior head hairs simple; posterior head hairs simple and long; ante-antennal tuft long, strong and formed by 6 to 8 very sharp, long, fringed in the tip scales. Pecten with 12 to 16 spines, short with small spur in the base, followed by a double tuft. Anal segment with posterior border spinulated with some long and strong spicules, dorsal plate large, lateral tuft with 3 to 4 elements; dorsal tuft with one 4 elemented hair, other with 3 elements and other long and simple. Ventral brush with approximately 10 ramified hairs.

Adult.— Prosbocis long, narrow, coated with dark- blue metallic scales. Occiput and prothoracic lobes with blue-green scales. One border of occiput with patches of silver-white scales under the eyes, bordered with black setae. Mesonotum coated with blue-green scales over dark integument. Pleurae & Coxae with patches of silver- white scales. Abdomen with silver spots, more noticeable in segments sixth and seventh, with lateral spots more or less confluent along the abdomen, forming bands that are silvery in the base and purple-blue in the distal portion, the rest of the venter and abdomen is coated with purple-blue scales. Legs coated with semi-erect dark-blue metallic scales. Wings with no taxonomic importance.

The male and female palpi are short.

Male Terminalia.— Coxite conical, hirsute, coated with medium scales and hairs in the outer surface. Inner upper margin is coated with long, lanceolated, variable sized scales, basal lobe with strong setae. Clasper short, narrow, with terminal medium, sharp spine. Claspette with a narrow stem, engrossed and abruptly turned subapically, with long setae one basal and one in turn, the rest of stem coated with micropilae, tip round and bordered with stout filament, curved like a sickle. Mesosome is a wide plate, chitinous, like a globe, with small central prominence, basally is well chitinized. Tenth sternites strong basally, becoming narrow apically with a rounded, chitinized, hooked tip.

Breeding Places.— The larvae of this species have been found in tree-holes, Bromeliaceae and artificial containers filled with rain-water.

Sanitary Importance.— This species is quite scarce in South America and has not been found infected with yellow fever virus in nature.

Geographical Distribution.— This species has been found in Colombia in the Departments of Cundinamarca and Santander del Norte. In Venezuela it has been found in the State of Zulia.

8.—**Haemagogus chalcospilans, Dyar 1921.**

Dyar H. G.— 1921.— **The Genus Haemagogus Williston—Ins. Mens. 9: 110.**

Larva. — Head rounded; anterior head hairs simple; posterior head hairs double or triple. Ante-antennal tuft of 3 or 4 elements. Scale patch of eighth segment with 24 to 28 scales in three rows, pointed and fringed with small hairs in the tip. Pecten with 12 to 15 spines long, sharp, with rounded base and a tuft of 3 elements. Anal segment with posterior border spinulated, strong spicules. Dorsal plate extending laterally. Lateral tuft with 4 elements. Dorsal tuft with one hair of five elements, another of 4 elements and a long and simple hair. Ventral brush with seven ramified elements.

Adult. — Prosbocis long, strong and dark metallic-blue. Occiput and prothoracic lobes with blue-green metallic scales. Mesonotum with blue-green scales. Pleurae and Coxae with patches of silver-white scales; postnotal setae present. Abdomen on dorsum with blue-green scales, darker than mesonotum, ventrally with dark violet scales. Posterior abdominal segments with basal bands and lateral spots of silver-white scales. Legs metallic dark blue. Wings without taxonomical importance.

The male and female palpi are short.

Male Terminalia. — Coxite conical, strong, in the external surface with small scales and long and strong setae. Inner upper surface with long and lanceolated scales of many sizes, mixed with setae; basal lobe with long and strong setae. Clasper short, triangular, wider basally than distally, slightly curved with terminal spine short and blunt. Claspette with the stem cup-like, curving and expanding distally in the outer part; the filament becomes inserted distally like a wide leaf in front, oval, posteriorly becomes narrower and forms a fish tail-like process that is united with the foliaceous portion in front; basally the stem of the claspette has large and small setae. The mesosome is an oval, cylindrical, plate chitinized and medium sized. Tenth sternites narrow, medium, elongated, rounded distally and with a nail-like formation. Ninth tergites undeveloped.

Breeding Places. — This species has its breeding places in tree-holes, small bodies of tranquil waters, rock-holes filled with rain-water, artificial containers and rotting mangrove-tree-holes.

Sanitary Importance. — To date it has never been found infected in nature.

Geographical Distribution.— In South America it has only been found in the Department of Antioquia in Turbo, by the Gulf of Uraba in the Pacific Coast of Colombia.

9. — Haemagogus uriartei, Shannon & Del Ponte 1927.

Shannon R. C. & Del Ponte E. — 1927—Los Culicidos de la Argentina. — Rev. Inst. Bact. Bs. As. 5: 69.

Larva.— Head rounded. Anterior head hairs simple. Posterior head hairs long and simple. Ante-antennal tuft with 4 to 6 elements. Group of scales of the eighth segment formed by 10 scales, long, with elongated ovoid base, with fine microtrichea; the tip seems like a rose thorn, very sharp. Pecten with 18 to 20 small spines and a tuft with 3 long hairs. Anal segment with the posterior border with large and medium spines and spicules, with lateral plate chitinized and occupying nearly all of the extension of the segment. Dorsal tuft with a fine hair, a brush of 10 elements and another brush with 3 elements. Lateral tuft with 5 elements from a chitinized base. Ventral brush formed by 2 quadruple tufts, that are terminal and slightly separated from the rest and 6 other double or triple tufts.

Pupa.— Pupal trumpet strong and sclerosed, funnel like. Hair 2 dendritic in 1 abdominal segment; hair 8 large and formed by 10 to 12 spinulated elements in the VII abdominal segment and double in segment VII.

Adult.— Prosbocis dark-blue. Occiput with blue-green scales, mentum with spots of silver-white scales. Prothoracic lobes with silver-white scales in their $3/4$ and $1/4$ of blue-green scales. Pronotum with silver-white scales. Mesonotum with golden scales that have a coppery reflex. Pleurae and Coxae with silver-white scales; prealar setae present. Abdomen ultramarine-blue, tending to black with metallic reflection, the dorsum of the first segments with basic spots of silver-white scales, that become scarcer in the last segments. Lateral patches of silver-white scales, the division of segments marked by lateral dark-blue bands of scales. The venter is nearly all occupied by silver-white scales exception made of a central line of dark scales. Legs metallic blue with silver white scales in the inner femora, being larger in the posterior legs. The wings have no taxonomic value.

The male and female palpi are short.

Male Terminalia.—Coxite medium, conical, with outer surface covered with foliaceous scales, short and blunt. Inner upper surface with lanceolated scales of different sizes and a revetment of small hairs; basal lobe with long, filament-like setae. Clasper short, narrow, curved with a terminal spine long, more or less about a half of the length of the clasper, sharp and slightly curved sub-apically. Claspette strong, uniform in size, with stem slightly curved hirsute in all its extension, with two small setae, larger than the others; filament short, curved and sharp-pointed, with external margin chitinized and long like a bird's nail. Mesosome large, engrossed outwards, pyramid-like, becoming reduced towards the tip, that is short and chitinized, with a rib that goes from base to tip, tenth sternites large, becoming narrower sub-apically with an enlarged tip, blunt in one side with two rows of small teeth nearly imperceptible and some setae.

Breeding Places.—The larvae of this species are found in Bromeliaceae and in tree holes with rain water.

Sanitary Importance.—The females of this species have been found in large numbers in areas where yellow fever is rife, but haven't been found naturally infected, nor have been experimented in the laboratory.

Geographical Distribution.—This species is found in Brazil, being limited to the Northeast in the states of Goiás, Matto-Grosso, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Baia and Recife. In the Argentine Republic is found in Tucumán, Jujuy, Territory of Chaco Salta, Corrientes, Santa Fe, Cordoba, Catamarca, Misiones and Formosa, due to the proximity to the Paraguayan frontier, is probable that this species is found in all of Paraguay. In Bolivia it is present in the Departments of Sta. Cruz, Chuquisaca La Paz, Cochabamba and Tarija.

10.—Haemagogus andinus, Osorno-Mesa 1944.

Osorno-Mesa E.—1944—Two new species of Haemagogus from Colombia, H. andinus and H. boshelli—Proc. Ent. Soc. Wash. 46 (7): 165—175.

Larva.— Head rounded, wider than longer. Anterior head hairs simple. Posterior head hairs double; ante-antennal tuft with 8 elements. Scale patch of eighth segment formed by 10 blunt scales. Pecten of air tube with 15 to 17 spines sharp with rounded base and a small basal tooth, with tuft of 3 elements. Anal segment with posterior margin with small spicules and a series of large and terminal spicules. Dorsal tuft formed by a long hair and a pair of short hairs; lateral tufts with 5 elements. Ventral brush with 5 double or triple hairs.

Adult.— Prothorax curved dark-blue, metallic. Occiput with brilliant-green scales eyes bordered with silver-white scales, present also in mentum. Prothoracic lobes with metallic-blue intermixed with silver-white scales in anterior margin. Mesonotum with blue-green scales. Pleurae and Coxae with silver-white scales. Sterno-pleural setae present. Abdomen dorsally with blue-green scales with lateral patches of silver-white scales. Venter with blue-green scales. Legs dark-blue metallic; femora of anterior and median legs with the upper inner half covered with silver-white scales, sometimes the posterior pair is included in the silver-white patches; incomplete silver-white rings observed at tip of median and posterior femora. Wings without taxonomic value.

Male and female palpi short.

Male Terminalia.— Coxite longer than wide, with a basal expansion, covered with long setae in all its extension with the exception of a longitudinal zone in inner surface. In the upper inner surface is covered with long foliaceous scales, striated and sharp, of various sizes; basal lobe well defined covered with long filament-like setae. All the outer surface covered with long truncated, striated scales. Clasper is more or less half the length of coxite, tapering apically with terminal spine $1/3$ its length. Claspette with stout stem, pilous, turned in the outer third, becoming expanded at the tip near filament, that is striate, foliaceous, sickle-shaped in lateral aspect, with slightly curved tip. Mesosome lightly sclerotized, narrow at the base, becoming expanded terminally and then tapering abruptly to a reduced chitinized crista that is beak-like. Tenth sternites heavily sclerotized, with a few scales in the inner surface. Ninth tergites with 3 strong setae to each side.

Breeding Places.— It has been found in tree-holes and at an altitude of 1.746 meters above sea level in the Colombian Andes.

Sanitary Importance.— Due to the scarceness of this species it has no importance in the transmission of yellow fever.

Geographical Distribution.— It has been only found in the Department of Cundinamarca in the Colombian Andes at an altitude of 1.746 meters above sea level being the highest *Haemagogus* ever found in South America.

11. — *Haemagogus boshelli*, Osorno--Mesa 1944.

Osorno-Mesa E. — 1944—Two new species of *Haemagogus* from Colombia, *H. andinus* and *H. boshelli*—Proc. Ent. Soc. Wash. 46 (7): 165—175.

Larva.— Head rounded wider than long. Anterior head hairs double; posterior head hairs simple and long. Ante-antennal tuft with five long elements. Scale patch of eighth segment with 34 blunt and finely spinulated scales in three irregular rows. Pecten with 12 to 14 spines sharp and with two small or one large basal tooth, with tuft of four hairy elements. Anal segment with lateral tuft of two elements; each. Ventral brush formed by twelve ramified hairs.

Adult.— Proboscis long, curved of dark-blue metallic colour with coppery reflexes. Occiput with dark-blue scales, some iridescent on vertex and posterior margin of eyes. Prothoracic lobes with dark-blue scales and black bristles on anterior edge. Mesonotum covered with bright emerald-green scales, with dark-blue scales in pre-alar region. Pleurae and Coxae with patches of silver-white scales. Abdomen purple with bronzy reflections. Dorsum of sixth and seventh segments with silver-white scales basally; the first three abdominal sternites with silver-white scales; the rest of abdomen with lateral patches of silver-white scales. Legs are violet-metallic-blue, with a mother of pearl luster patch covering the median aspect of the apical third of the fore legs, the inner edge of middle legs and inner and lateral aspects of apical half of hind legs. Wings without taxonomical importance.

The male and female palpi are short.

Male Terminalia.— Coxite slightly conical and truncate, bearing numerous strong and slightly hooked setae of variable length, intermixed with spatulated ones with scales of the median upper surface crowded, striated, lanceolated and of different shapes and lengths. Apical lobe clearly cut, thumb-like, with numerous fine setae. A very peculiar detail in this species is that in the middle of the dorsal surface there is an almost circular area formed by small, short scales bordered by saber-like larger ones. An oblique row of setae with curved tips can be observed on inner aspect with high magnification. Clasper is about 2/3 as long as coxite, greatly hypertrophied, expanded and curved at a right angle near middle with the tip spatulated and divided into two spatulate appendices, this detail being unique for this species. Claspette with long arm, curved and narrower in the middle, finely setose in the base with three stout setae. Filament large, leaf-like, striated flexed at a right angle towards its middle forming an upright pointed portion while the anterior margin is widened, somewhat concave, with short reflexed tip. Mesosome looks at first sight orquide-like being a hollow cilinder, slightly constricted in the middle, expanded apically with small appendage erect and chitinized, arising from the middle along the ventral line, with the tip formed by a short, sharp point projecting dorsally. Tenth sternites long, strongly sclerotized, pointed with some sub-apical setae.

Breeding Places.— This species has been found in tree-holes and coconut-shells filled with rain-water.

Sanitary Importance.— This species is very scarce and has not been found infected in nature, nor in the laboratory.

Geographical Distribution.— This species has been only found in Intendencia del Chocó in the Pacific Coast of Colombia.

12.— Haemagogus equinus, Theobald 1903.

Theobald F. W.— 1903.— Two New Jamaica Culicidae.— The Entomologist 36: 282.

Larva.— Head rounded, Aedini-like. Anterior head hairs simple; posterior head hairs long and simple; ante-antennal tuft long and strong formed by 3 elements. Scale patch of eighth segment with 8

to 12 scales, bordered by minute spinulae. Pecten with 10 to 12 spines engrossed basally with a small basal spur with a two element tuft. Anal segment with dorsal tuft formed by long simple hair and a brush with 4 elements. Posterior margin spinulated; lateral tuft formed by 4 elements. Ventral brush formed by 7 to 9 small tufts of 3 to 4 elements.

Adult.— Prosbocis long, with dark-blue metallic scales. Occiput with metallic blue-green scales, near mentum are spots of silver-white scales. Prothoracic lobes with patches of silver-white scales. Abdomen with scales of a blue-green metallic reflection. Posterior segments with basal bands of silver-white scales forming lateral patches; venter with blue-green scales intermixed with silver-white patches of scales.

Male palpi thin, scaly and of the same length as prosbocis.

Male Terminalia.— Coxite strong, conical, with basal lobe with strong hairs fanlike; distal inner margin with long, thin, lanceolated and compact scales, all nearly of equal size. External margin and body of coxite with truncated tip scales and long, thin and conical setae, in the distal portion. Clasper thin, uniformly engrossed in the middle, becoming thinner apically with a conical, slightly curved and sharpened terminal spine, about half as long as stem of clasper. Claspette with a wide stem outwards, long, with one setae and micropilum; the terminal filament is wide, foliaceous, striated, inserted sideways in the stem, with the terminal section slightly turned inwards. Mesosome triangular, with the base forming the tip, rounded angles, with a chitinized formation at the tip, with a central rib very chitinized that goes from tip to base. Tenth sternites long, strong, columnar, very chitinized at the tip, forming a beak-like process.

Breeding Places.— In tree-holes, bamboo stumps, Bromeliaceae and any containers with rain-water.

Sanitary Importance.— This species has been proved to be an efficient vector of the yellow fever virus in the laboratory, being a possibility that this *Haemagogus* becomes a natural vector under certain conditions, but to date it has never been captured infected in nature.

Geographical Distribution.— This species is found in the Departments of Antioquia, Bolivar, Cundinamarca, Magdalena and Santander in Colombia. In the states of Táchira, Zulia, Bolivar and Trujillo in Venezuela. In the Guianas it has been reported in all of them, extending Eastwards into the French Guiana, being reported as far as Cayenne.

13. — Haemagogus panarchys, Dyar 1921

Dyar H. G. — 1921—The genus Haemagogus Williston—Ins. Ins. Mens. 9: 104.

Larva — Head rounded, with slight latero-frontal depression. Anterior head hairs simple; posterior head hairs long and simple; antennal tuft with 3 elements. Scale patch of eighth segment with 10 to 14 scales. Pecten with 12 to 16 spines followed by a 3 element tuft. Anal segment with posterior margin spiculate. Dorsal tuft with one hair of 3 elements and other of 6 long elements. Lateral tuft with 2 to 4 elements. Ventral brush with seven pairs of ramified tufts.

Adult. — Prosbocis metallic dark-blue. Occiput with blue-green scales with rose reflex, the collar has silver-white scales. Prothoracic lobes with patches of silver-white scales. Mesonotum in the center with blue-violet scales and in the margins blue-green scales. Laterally in the disc of mesonotum blue-green scales intermixed with dark metallic scales and dark setae. Pleurae and Coxae 3/4 with patches of silver-white scales and 1/4 with blue-green scales, coming up to the mesonotal suture, that is covered with silver-white scales. Abdomen in dorsum with violet-blue dark metallic scales. From second segment on is coated with silver-white bands, that number six, laterally from them there is a brilliant-blue portion, that externally becomes reddish-purple. The last segments become narrower becoming bluer, intermingled sub-apically with silver-white scales, covered with dark setae. Legs are metallic violet-blue. Wings have no taxonomical importance.

Male palpi are about the same size of proboscis.

Male Terminalia. — Coxite is longer than wide, with basal lobe with long and foliaceous, filament-like setae. Internal upper surface with long, foliaceous scales of various sizes in the external surface are

found filamentous and long scales and piliform setae. Clasper becomes narrower distally and wider basally, being curved at the tip, with the terminal spine that is thin, long, tapering, approximately $1/3$ the length of clasper. Claspette becomes thick basally becoming curved and narrower, sickle-like, straightening apically to end in a foliaceous filament, being setaceous along the stem and sub-apically. Mesosome is longer than wide, with two V shaped processes and a very chitinized tip, that is separated from both processes by small cut-out holes. Tenth sternites columnar with one engrossed margin and strong, chitinized round tip.

Breeding Places.— This species is found breeding in tree-holes and bamboo artificial containers, filled with rain-water.

Sanitary Importance.— This species is localized in a region that is free of jungle yellow fever, so it has no role in the epidemiology of this disease.

Geographical Distribution.— This species is only found located in the coastal Chongón or Colonche Mountain range in Ecuador.

14. — *Haemagogus tropicalis*, Cerqueira & Antunes 1938.

Cerqueira N. & Antunes P. C. A. — 1938—*Haemagogus tropicalis* a new species from Pará—Proc. Ent. Soc. Wash. 40 (1): 1-5.

Larva.— Head rounded. Anterior head hairs long and double. Posterior head hairs long and simple. Ante-antennal tuft with 4 to 6 elements. Scale patch of eighth segment triangular with 24 to 28 fringed, spinulated scales in irregular rows. Pecten with 12 to 17 spines with a 3 to 4 element tuft. Anal segment with short denticulated spines. Dorsal tuft with a long hair and a three-element brush; lateral tuft with 3 elements. Ventral brush with seven tufts of six elements each.

Adult.— Proboscis long, curved of a dark brown color with violet reflections. Occiput with blue-green metallic scales with some silver-white scales in vertex and border of the eyes, with lateral patches of same scales, slightly visible. Prothoracic lobes with blue scales with coppery reflexes, darker than in occiput. Mesonotum covered

with blue metallic scales with coppery reflections. Pleurae and Coxae with silver-white scale-patches extending up to the sternopleurae into the border of the mesonotum and sub-alar region. Abdomen covered with metallic blue scales with violet and coppery reflections. Dorsum of third to seventh segment with basal spots of silver-white scales very conspicuous, disappearing in the last segment. In the first segments this silver-white spots extend from anterior border to posterior of tergite, in the next five segments these become basal spots, running approximately half the length of the tergites; ventrally are observed blue-violet scales, with segmentary basal narrow bands of silver-white scales; eighth sternites with spine-like setae, intermixed with scales, and some long and short setae. Legs are blue-violet with metallic reflections. Wings have no taxonomic importance whatsoever.

The male palpi are approximately $2/3$ the length of proboscis.

Male Terminalia.—Coxite longer than wide, with setae covering all the surface, exception made of triangular zone that occupies all inner margin; the basal half of this zone with short hairs, delicate and inserted in small tubercle. The basal lobe inconspicuous, well chitinized with many long filament-like setae. External surface of coxite with many long and spatulated scales. Inner upper margin with scales of different sizes and shapes. Clasper is short, a little more than half the length of coxite; terminal spine long, approximately half the length of clasper, with a few very short hairs in the basal third of stem. Claspette with the stem narrow, long, curved, slightly hairy in its basal $2/3$, specially in the inner margin, where are observed some long setae. Filament is terminal with $3/4$ the length of arm, wide, foliaceous, with a knot that divides it into two parts, being one angulated with respect of the other, one of them in the same direction as stem, while the other looks downwards, being smaller and sharper. Mesosome is wide, round in the distal half, becoming narrower towards the base, taking a globe-like form, with a small pointed tip and a longitudinal strongly chitinized line in the middle from tip to base. Tenth sternites long, strong, very chitinized, with rounded tip, inner surface near the tip with transversal row of small teeth. Ninth tergites undeveloped, in some specimens show a curved and short setae.

Breeding Places.—This species is found breeding in tree-holes and Bromeliaceae being quite possible that success will be found in breeding them in artificial containers.

Sanitary Importance.— This species is quite scarce, even in the type-area and has not been found infected in nature, nor has been experimentally infected in the laboratory.

Geographical Distribution.— This species has been found only in the Municipality of Curralinho in the Island of Marajó in Brasil, this being the type area of the species.

SUMMARY

The taxonomics of the Genus *Haemagogus*, Williston 1896 are discussed by the author and all species found in South America are described in a synoptic form, giving the journal where original description was effected for each one and original microphotographs of all species discussed in this paper.

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PHOTOGRAPHS

Notice to readers: All photographs here presented are **original** from **actual specimens** in the collections of Centro Ecuatoriano de Investigaciones Entomológicas or loaned by colleagues and friends listed in the acknowledgement. This is necessary in order to make clear that these pictures are part of the more than 5.000 negatives in our files taken from actual specimens, their geographical location is listed with each photograph.

- Nº 1. — Head of the larva of *Haemagogus splendens*, Williston 1896 from Zulia Santander del Norte, (Colombia)
- Nº 2. — Air tube, scale patch of eighth segment and part of anal segment of larva from *H. splendens*, Williston 1896 from Zulia, Santander del Norte (Colombia)
- Nº 3. — Air tube with detail of pecten and the postero-dorsal part of anal segment of a larva of *H. splendens*, Williston 1896 from Rondon, Arauca (Colombia)
- Nº 4. — Head of larva of *Haemagogus capricornii*, Lutz 1904 from "Fazenda Santa Clara", Río de Janeiro (Brasil)
- Nº 5. — Air tube and patch of eighth segment from a larva of *H.*

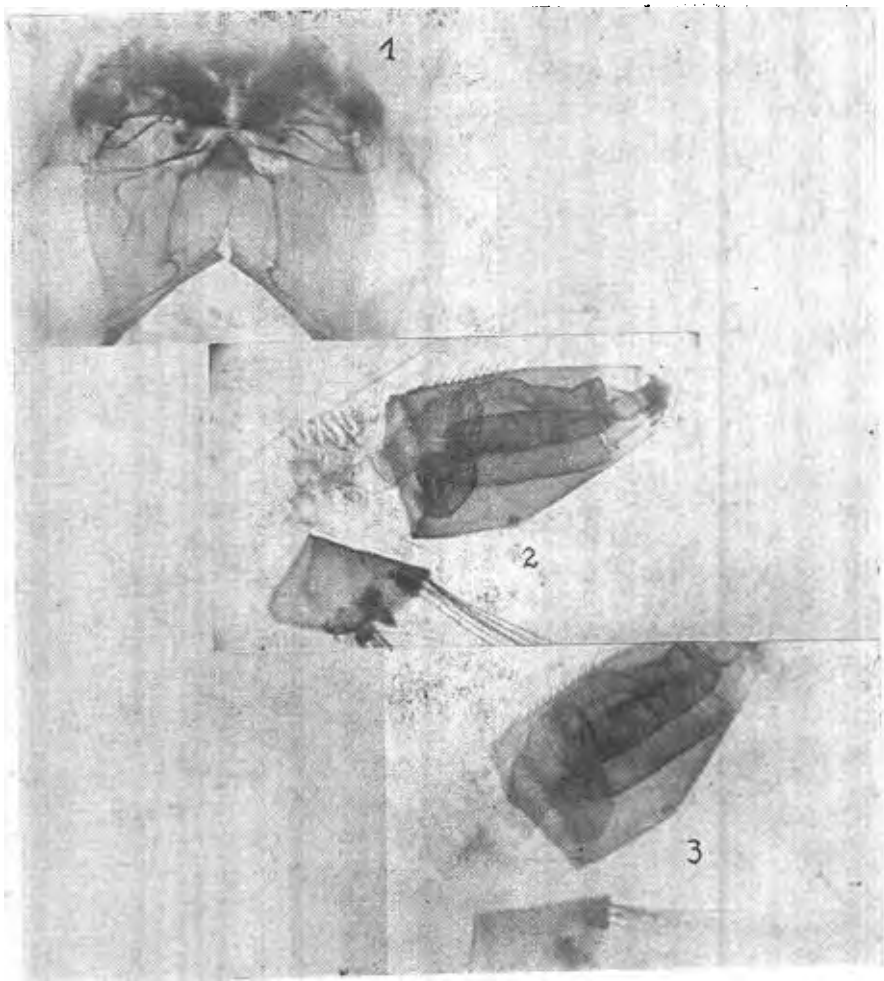
- capricornii, Lutz 1904 from "Fazenda Santa Clara", R o de Janeiro (Brasil)
- N^o 6.— Anal segment and eighth segment scale patch of a larva from "Fazenda Santa Clara", R o de Janeiro (Brasil)
- N^o 7.— Hair N^o 2 of the first abdominal segment of a pupa of *H. capricornii*, Lutz 1904, from Horto Florestal, Serra da Cantareira, Sao Paulo (Brasil)
- N^o 8.— Head of larva of *Haemagogus spegazzinii*, Breth s 1912 from S. Encantadinho, Matto Grosso, (Brasil)
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- N^o 10.— First abdominal segments of a pupa of *H. spegazzinii*, Breth s 1912 from Ilheus, Baia, (Brasil)
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- N^o 13.— Air tube with pecten and scale patch of eighth segment from *H. spegazzinii falco*, Kumm, Osorno-Mesa & Boshell-Manrique 1946 from Mont. Tigre (Guyane Francaise)
- N^o 14.— Anal segment of larva of *H. spegazzinii falco*, Kumm. Osorno-Mesa & Boshell-Manrique 1946 from Mont Tigre, (Guyane Francaise)
- N^o 15.— Hair N^o 2, from the first segment of the pupa of *H. spegazzinii falco* Kumm, Osorno-Mesa & Boshell Manrique 1946 from Victoria, R o de la Miel Caldas, (Colombia)
- N^o 16.— Caudal Segment of the pupa of *H. spegazzinii falco*, Kumm. Osorno—Mesa & Boshell-Manrique 1946 from Victoria, R o de la Miel, Caldas, (Colombia)
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- N^o 19.— Head of larva of *H. anastationis*, Dyar 1921 from Villeta, Cundinamarca (Colombia)

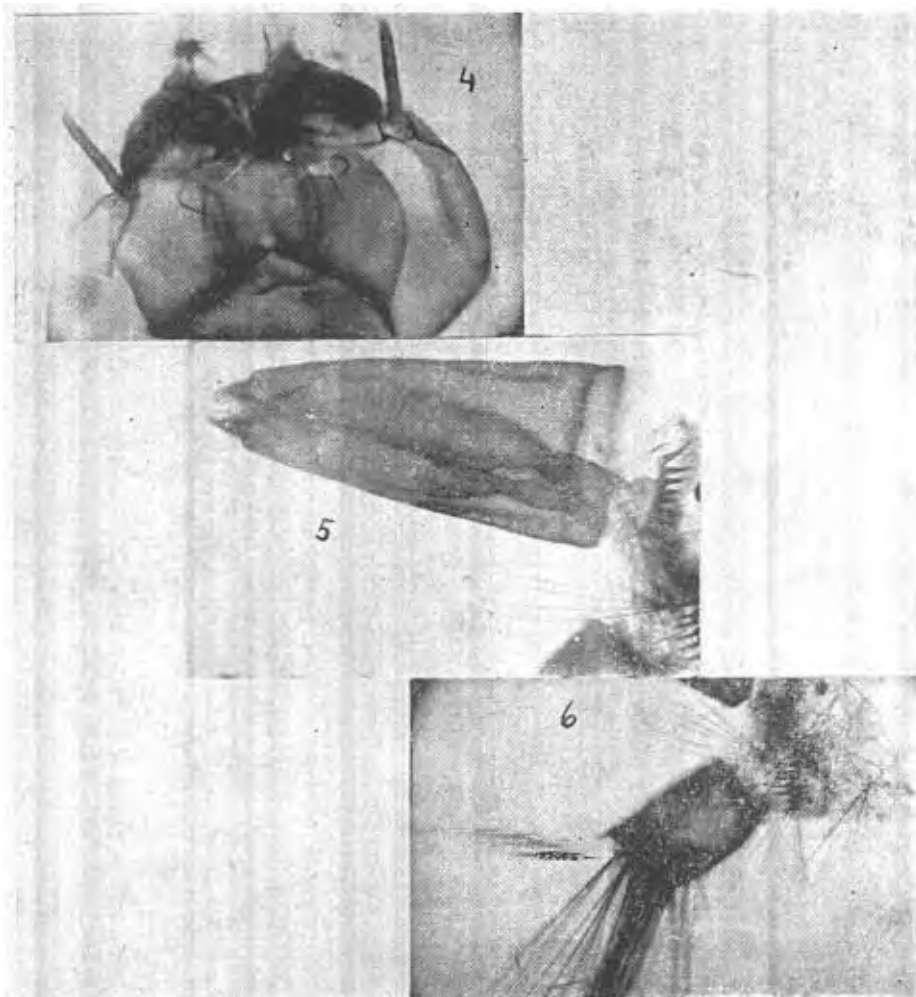
- Nº 20.— Air tube with pecten, eighth segment scale patch and anal segment of the larva of *H. anastationis*, Dyar 1921 from Villeta, Cundinamarca, (Colombia)
- Nº 21.— Anal segment of *H. anastationis*, Dyar 1921 from Villeta, Cundinamarca, (Colombia)
- Nº 22.— Head of the larva of *H. chalcospilans*, Dyar 1921 from Turbo, Antioquia, (Colombia)
- Nº 23.— Air tube with pecten, eighth segment scale patch and anal segment of the larva of *H. chalcospilans*, Dyar 1921 from Turbo, Antioquia, (Colombia)
- Nº 24.— Head of larva from *H. andinus*, Osorno-Mesa 1944, from Santandercito, Cundinamarca, (Colombia)
- Nº 25.— Air tubes, with pecten, eighth segment scale patch and anal segment of the larva of *H. andinus*, Osorno-Mesa 1944 from Santandercito, Cundinamarca, (Colombia)
- Nº 26.— Head of larva of *H. boshelli*, Osorno-Mesa 1944, from Bahía Solano, Intendencia del Chocó, (Colombia)
- Nº 27.— Air tube and anal segment of larva of *H. boshelli*, Osorno-Mesa 1944 from Bahia Solano, Intendencia del Chocó, (Colombia)
- Nº 28.— Head of larva of *H. equinus*, Theobald 1903 from El Retiro, Magdalena, (Colombia)
- Nº 29.— Air tube with pecten, eighth segment scale patch and anal segment of a larva of *H. equinus*, Theobald 1903 from El Retiro, Magdalena, (Colombia)
- Nº 30.— Head of larva of *H. panarchys*, Dyar 1921 from "Hacienda Experimental Cuatro Hermanitos", Guayas, (Ecuador)
- Nº 31.— Air tube with pecten, eighth segment scale patch and anal segment of a larva of *H. panarchys*, Dyar 1921 from "Hacienda Experimental Cuatro Hermanitos", Guayas, Ecuador)
- Nº 32.— Coxite and claspette of *H. splendens*, Williston 1896 from Guárico, (Venezuela)
- Nº 33.— Claspette of *H. splendens*, Williston 1896 from Rondón, Arauca, (Colombia)
- Nº 34.— Mesosome of *H. splendens*, Williston 1896 from Guárico, (Venezuela)
- Nº 35.— Tenth sternites of *H. splendens*, Williston 1896 from Guárico, (Venezuela)
- Nº 36.— Coxite of *H. capricornii*, Lutz 1904 from Horto Florestal, Serra da Cantareira, Sao Paulo, (Brasil)

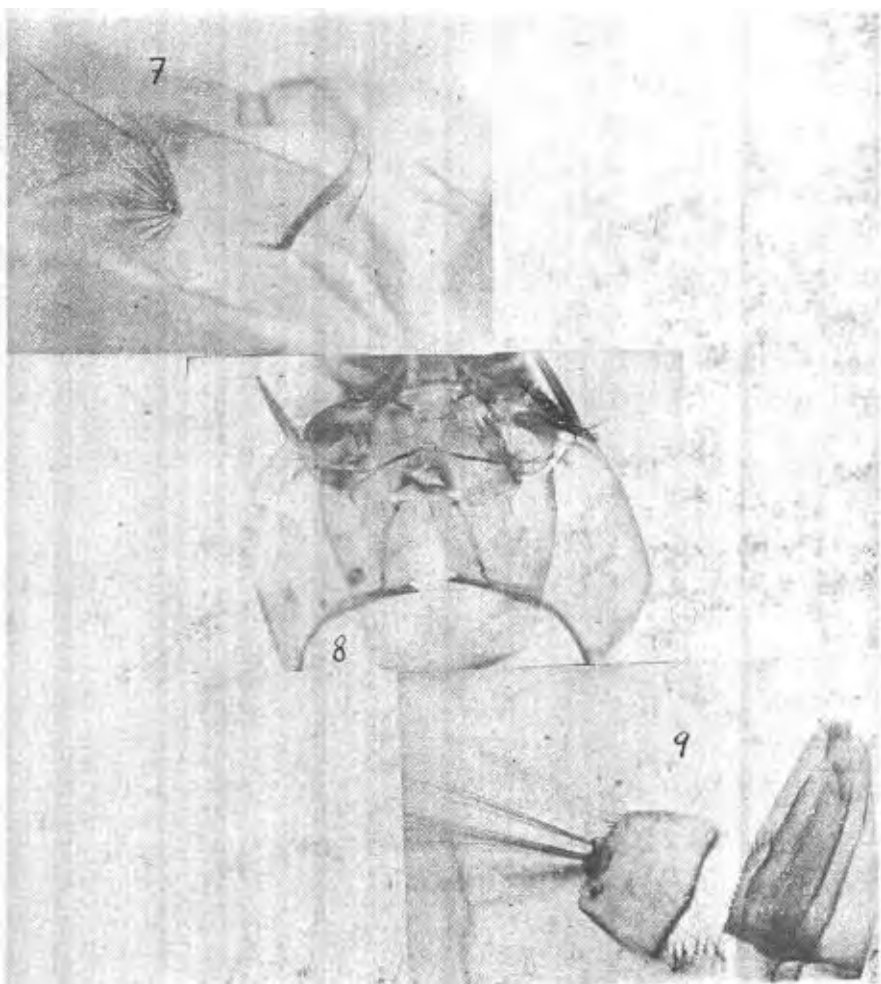
- Nº 37.— Claspette of *H. capricornii*, Lutz 1904 from Horto Florestal, Serra da Cantareira, Sao Paulo, (Brasil)
- Nº 38.— Mesosome of *H. capricornii*, Lutz 1904 from Horto Florestal, Serra da Cantareira, Sao Paulo, (Brasil)
- Nº 39.— Tenth sternites of *H. capricornii*, Lutz from Horto Florestal, Serra da Cantareira, Sao Paulo, (Brasil)
- Nº 40.— Terminalia from *H. spegazzinii*, Brethés 1912 from Ledesma, Jujuy, (Argentina)
- Nº 41.— Coxite from *H. spegazzinii falco*, Kumm, Osorno-Mesa & Boshell-Manrique 1946 from Villavicencio, Meta, (Colombia)
- Nº 42.— Mesosome from *H. spegazzinii falco*, Kumm, Osorno-Mesa & Boshell-Manrique 1946 from Villavicencio, Meta, (Colombia)
- Nº 43.— Claspette from *H. spegazzinii falco*, Kumm, Osorno-Mesa & Boshell Manrique 1946, from Villavicencio, Meta, (Colombia)
- Nº 44.— Tenth sternites from *H. spegazzinii falco*, Kumm, Osorno-Mesa & Boshell-Manrique 1946 from Villavicencio, Meta, (Colombia)
- Nº 45.— Coxites of *H. lucifer*, Howard, Dyar & Knab 1913, from Pescadera, Rio La Horta, Santander, (Colombia)
- Nº 46.— Claspette and tenth sternites of *H. lucifer*, Howard, Dyar & Knab 1913 from Pescadera, Rio La Horta, Santander, (Colombia)
- Nº 47.— Lateral view of the terminalia of *H. lucifer*, Howard, Dyar & Knab 1913 from Casabe, Antioquia, (Colombia)
- Nº 48.— Terminalia of *H. lucifer*, Howard, Dyar & Knab 1913 from Casabe, Antioquia, (Colombia)
- Nº 49.— Coxites of *H. anastationis*, Dyar 1921 from Bachaquera, Zulia, (Venezuela)
- Nº 50.— Claspette of *H. anastationis*, Dyar 1921 from Villeta, Cundinamarca, (Colombia)
- Nº 51.— Mesosome and Tenth Sternites of *H. anastationis*, Dyar 1921 from Bachaquera, Zulia, (Venezuela)
- Nº 52.— Coxite and Claspette of *H. chalcospilans*, Dyar 1921 from Turbo, Antioquia, (Colombia)
- Nº 53.— Terminalia of *H. chalcospilans* Dyar 1921 from Turbo, Antioquia, (Colombia)

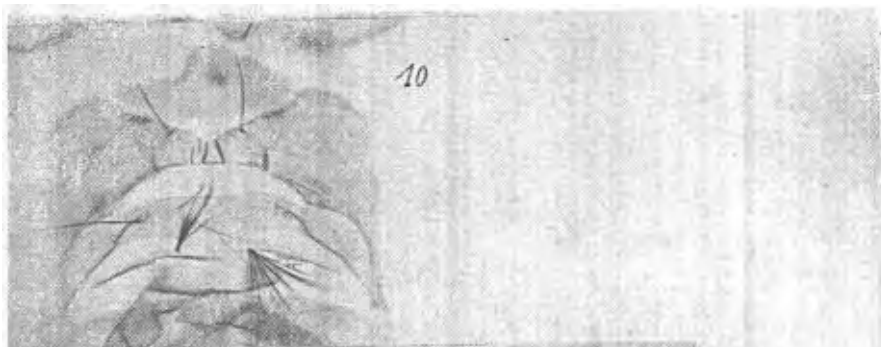
- Nº 54.— Tenth sternites of *H. chalcospilans*, Dyar 1921 from Turbo, Antioquia, (Colombia)
- Nº 55.— Coxite, Mesosome & Tenth Sternites of *H. uriartei*, Shannon & Del Ponte 1927 from Aguas Blancas, Zona Oran, Salta, (Argentina)
- Nº 56.— Claspette of *H. uriartei*, Shannon & Del Ponte 1927, from Aguas Blancas, Zona Oran, Salta, (Argentina)
- Nº 57.— Coxite of *H. uriartei*, Shannon & Del Ponte 1927 from Aguas Blancas, Zona Oran, Salta, (Argentina)
- Nº 58.— Coxite of *H. boshelli*, Osorno-Mesa 1944 from Bahia Solano, Intendencia del Chocó, (Colombia)
- Nº 59.— Coxite and Claspettes of *H. boshelli*, Osorno-Mesa 1944 from Bahia Solano, Intendencia del Chocó, (Colombia)
- Nº 60.— Mesosome of *H. boshelli*, Osorno-Mesa 1944 from Bahia Solano, Intendencia del Chocó, (Colombia)
- Nº 61.— Tenth sternites of *H. boshelli*, Osorno-Mesa 1944 from Bahia Solano, Intendencia del Chocó, (Colombia)
- Nº 62.— Coxite from *H. andinus*, Osorno-Mesa 1944 from Fusagasuga, Cundinamarca, (Colombia)
- Nº 63.— Claspette and tenth sternite of *H. andinus*, Osorno-Mesa 1944 from Fusagasuga, Cundinamarca, (Colombia)
- Nº 64.— Mesosome, Claspette and tenth sternite of *H. andinus*, Osorno Mesa 1944 from Fusagasuga, Cundinamarca, (Colombia)
- Nº 65.— Terminalia of *H. equinus*, Theobald 1903 from San Esteban, Carabobo, (Venezuela)
- Nº 66.— Claspette of *H. equinus* Theobald 1903 from El Retiro, Magdalena (Colombia)
- Nº 67.— Mesosome, Tenth Sternites and eighth tergite from *H. equinus*, Theobald 1903 from San Esteban, Carabobo, (Venezuela)
- Nº 68.— Terminalia of *H. panarchys*, Dyar 1921 from "Hacienda Experimental Cuatro Hermanitos", Guayas, (Ecuador)
- Nº 69.— Terminalia of *H. tropicalis* Cerqueira & Antunes 1938 from Curralinho, Para, (Brasil)
- Nº 70.— Coxite and mesosome of *H. albomaculatus*, Theobald 1903 from Grand Pont Guyane Francaise.
- Nº 71.— Coxite and Claspette of *H. albomaculatus*, Theobald 1903 from Grand Pont, Guyane Francaise.
- Nº 72.— Detail of Claspette and tenth sternites of *H. albomaculatus* Theobald 1903 from Grand Pont, Guayane Francaise.

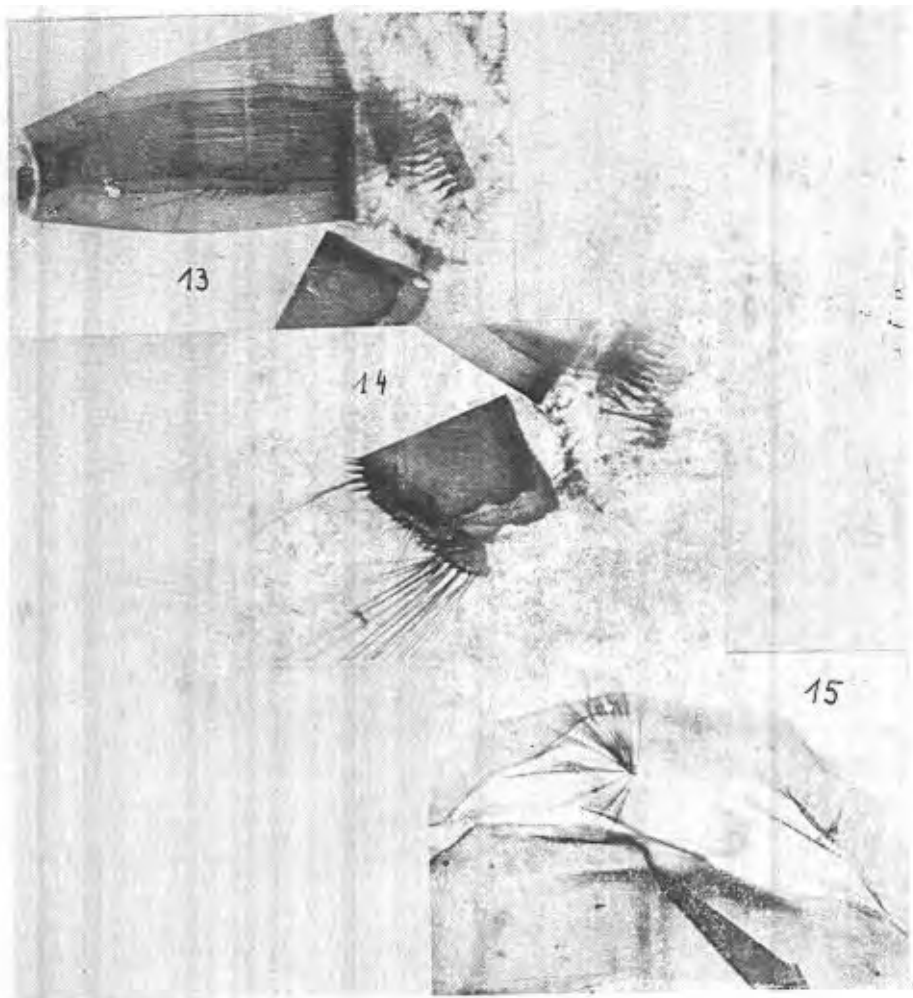
- Nº 73. — Head of the larva of *Haemagogus uriartei*, Shannon & Del Ponte 1927 from Iracema, Fortaleza, Ceara, Brazil
- Nº 74. — Caudal terminal part of larva of *Haemagogus uriartei*, Shannon & Del Ponte 1927 from Iracema, Fortaleza, Ceara Brazil
- Nº 75. — Pupal trumpet of pupa of *Haemagogus uriartei*, Shannon & Del Ponte 1927 from Iracema, Fortaleza, Ceara, Brazil
- Nº 76. — Dorsal first segment of Pupa of *Haemagogus uriartei*, Shannon & Del Ponte 1927 from Iracema, Fortaleza, Ceara, Brazil
- Nº 77. — Terminal Segments and pupal paddles of a pupa of *Haemagogus uriartei*, Shannon & Del Ponte 1927 from Iracema, Fortaleza, Ceara, Brazil
- Nº 78. — Head of larva of *Haemagogus spegazzinii falco*, Kumm et Al. 1946 from Juan Montalvo, Los Ríos, Ecuador
- Nº 79. — Caudal part of larva of *Haemagogus spegazzinii falco*, Kumm et Al. 1946 from Juan Montalvo, Los Ríos, Ecuador
- Nº 80. — Pupal trumpet of pupa of *Haemagogus spegazzinii falco*, Kumm et Al. 1946 from Juan Montalvo, Los Ríos, Ecuador
- Nº 81. — Dorsal first segments of pupa of *Haemagogus spegazzinii falco* Kumm et Al. 1946 from Juan Montalvo, Los Rios, Ecuador
- Nº 82. — Coxite, Clasper and Claspette of *Haemagogus spegazzinii falco* Kumm et Al. 1946, from Juan Montalvo, Los Ríos, Ecuador
- Nº 83. — Claspette of *Haemagogus spegazzinii falco*, Kumm et Al. 1946 from Juan Montalvo, Los Ríos, Ecuador
- Nº 84. — Mesosome and tenth sternites of *Haemagogus spegazzinii falco* Kumm et Al. 1944 from Juan Montalvo, Los Ríos, Ecuador.

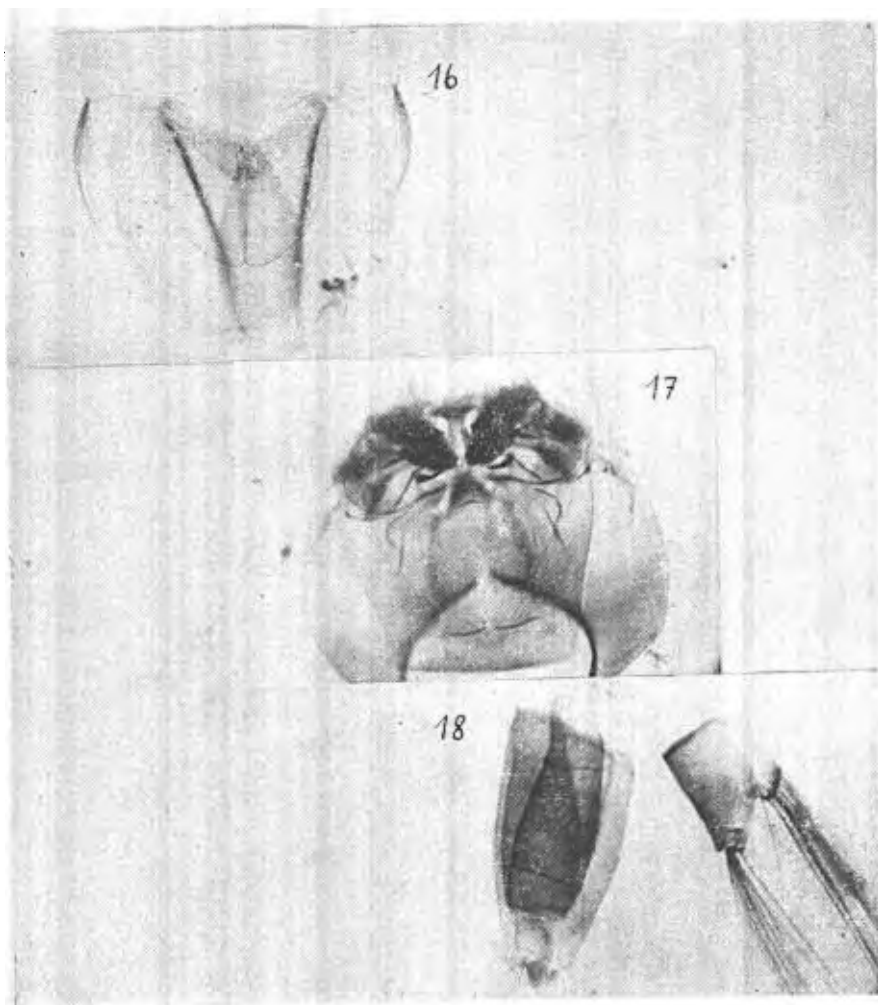








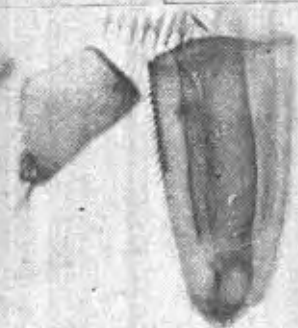




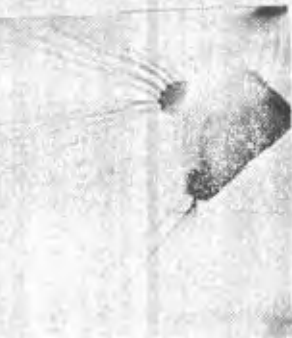
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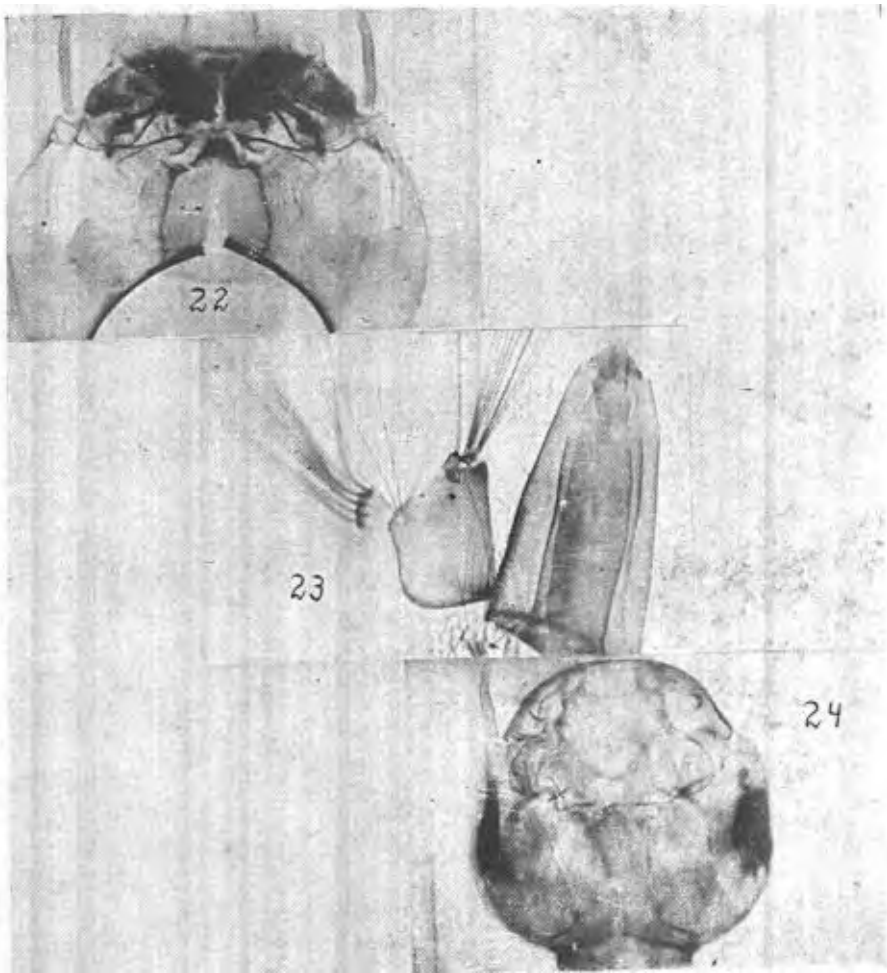


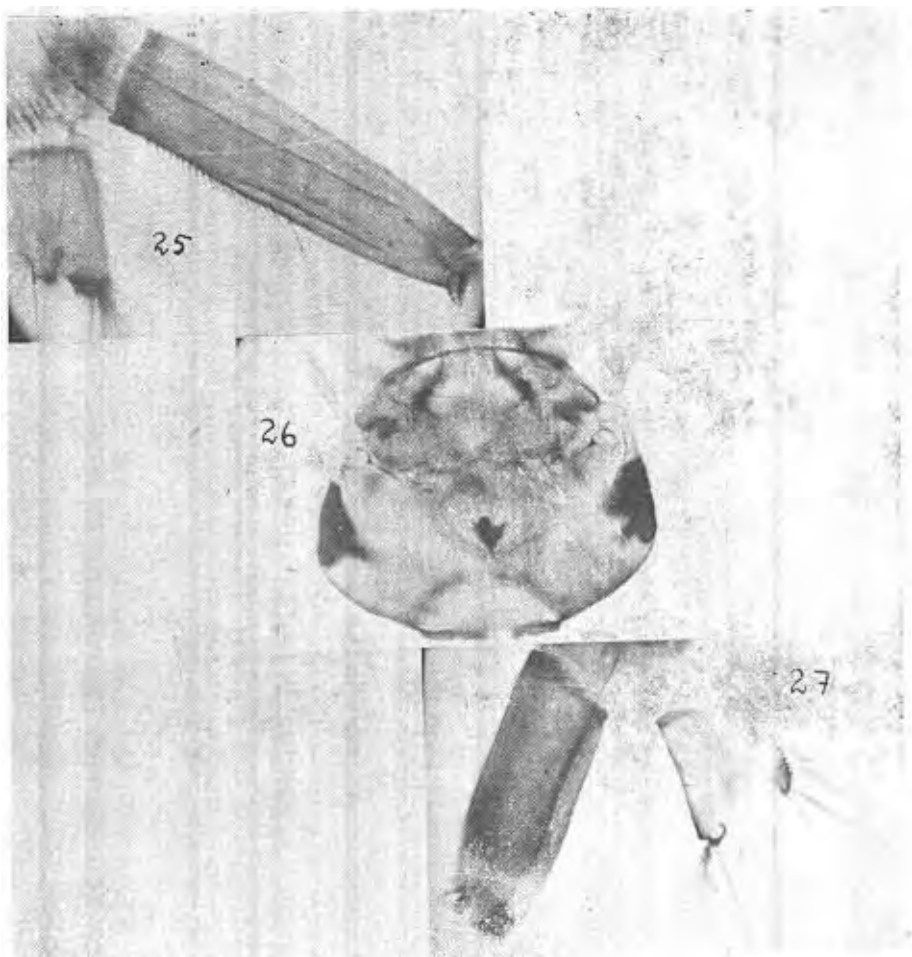
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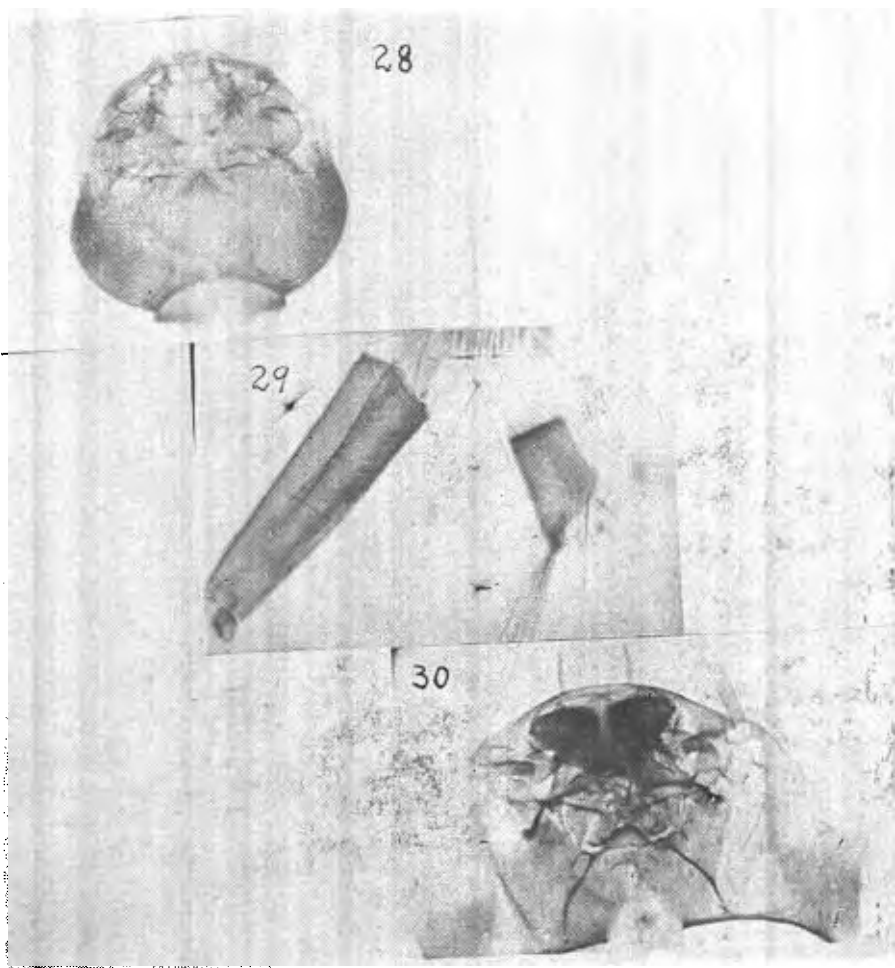


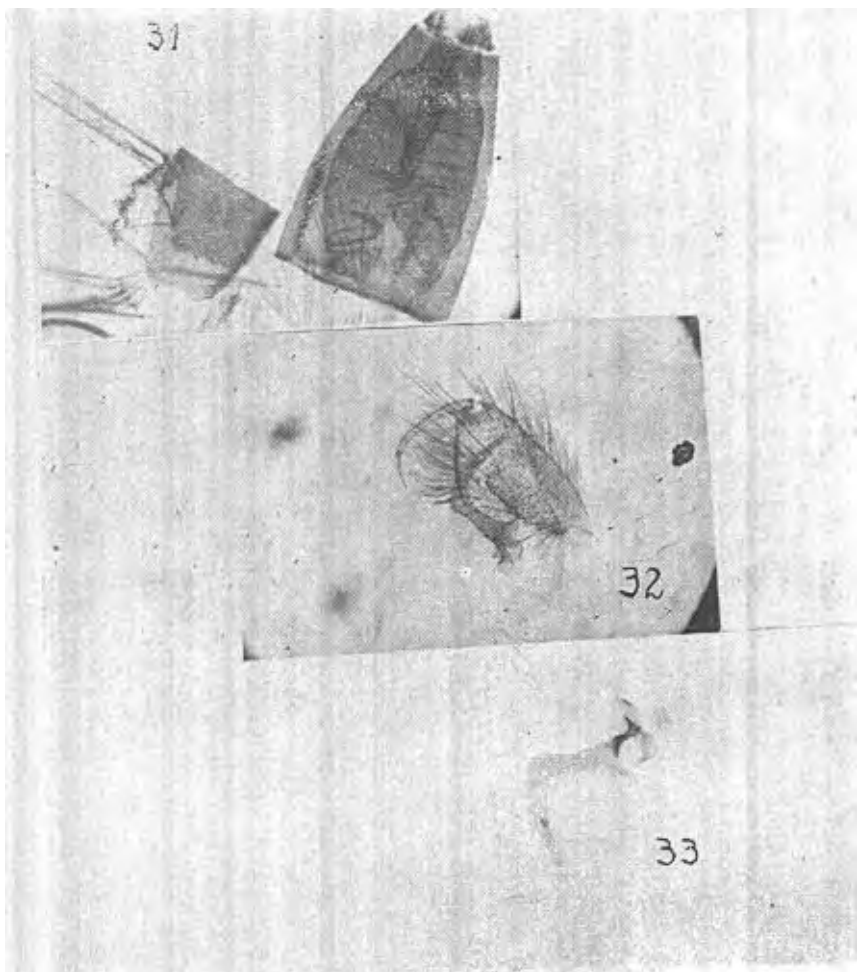
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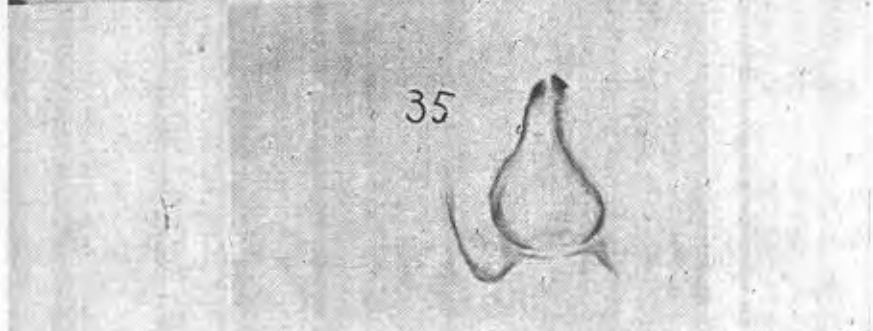




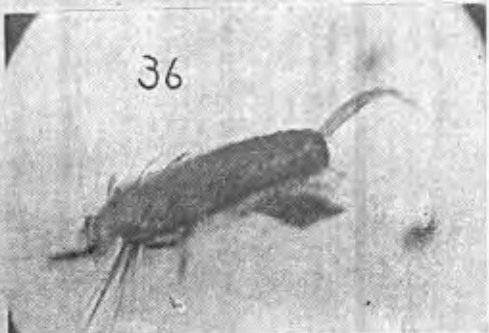




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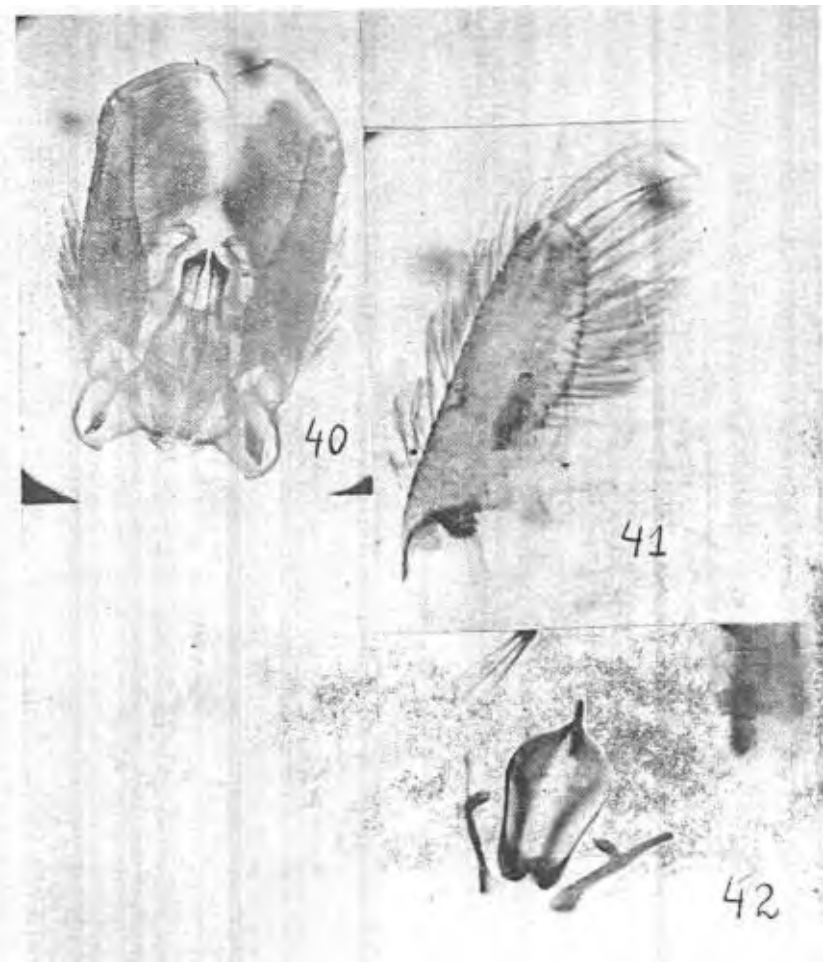


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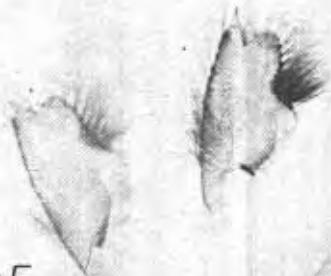
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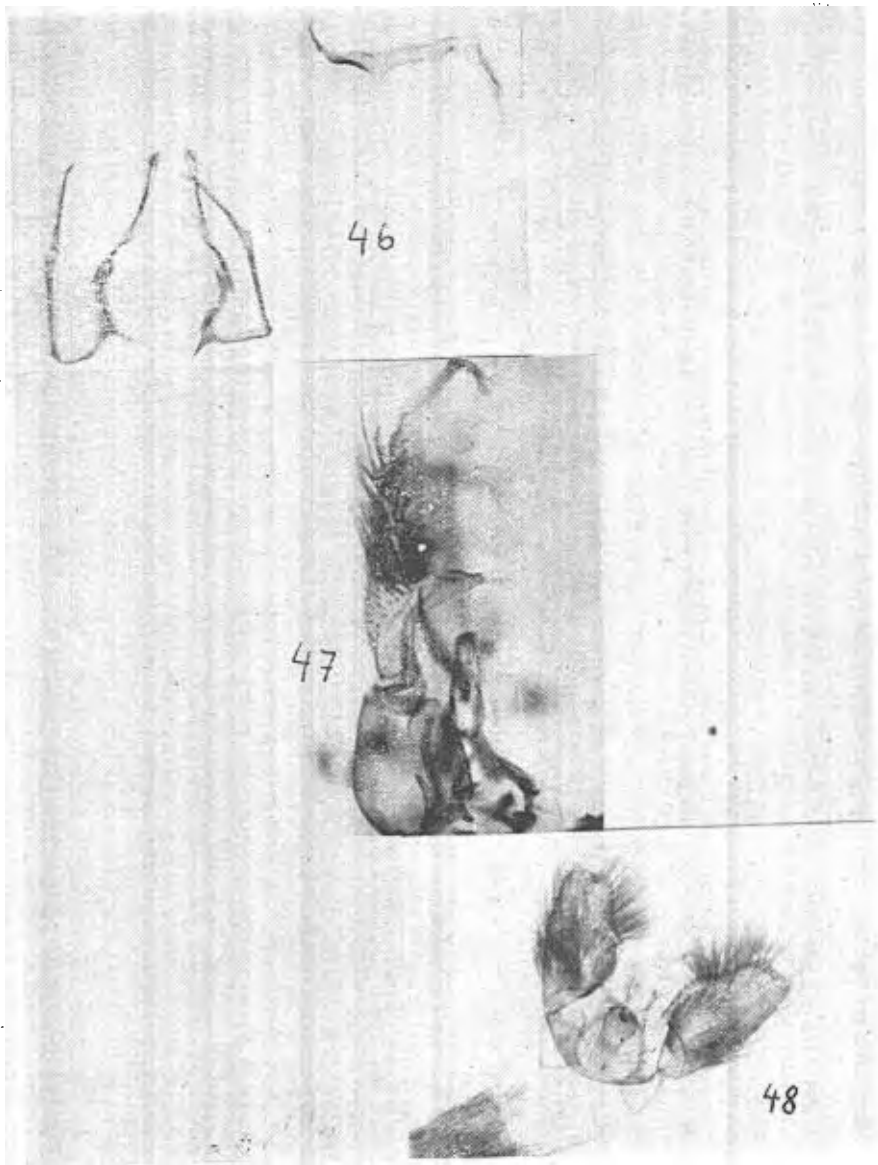


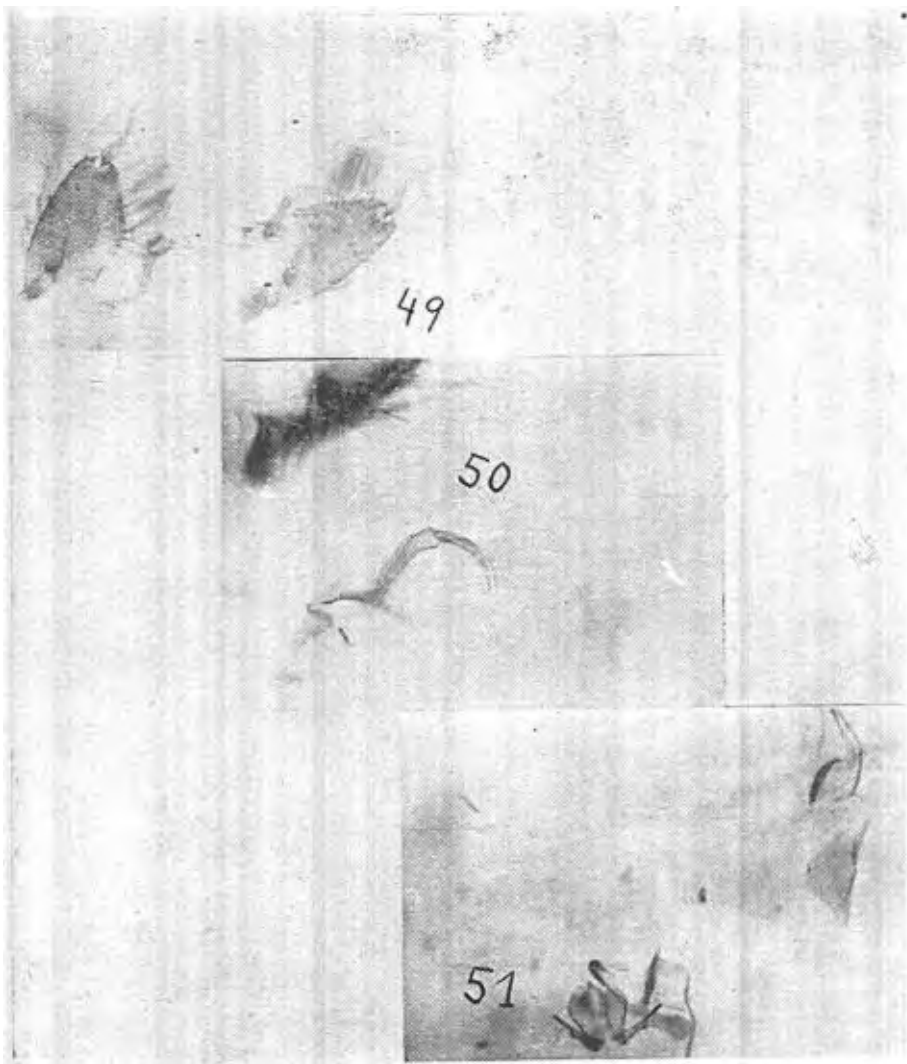
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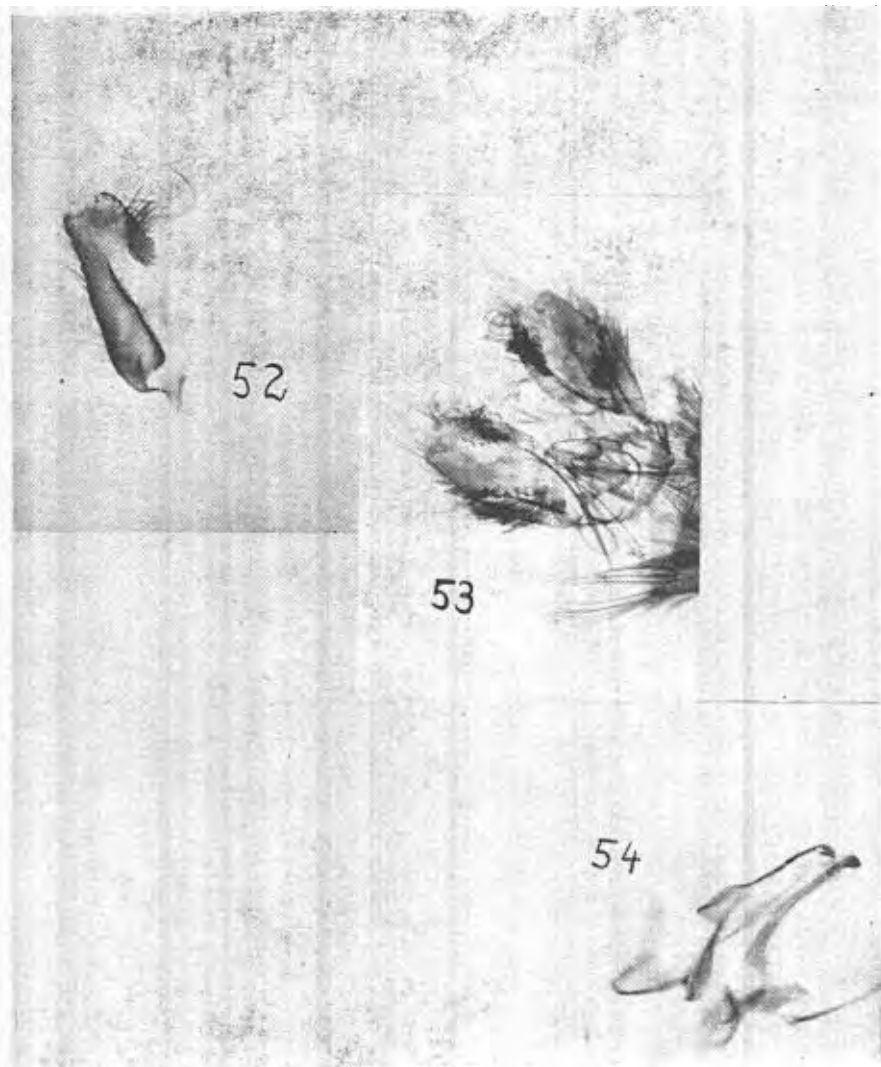


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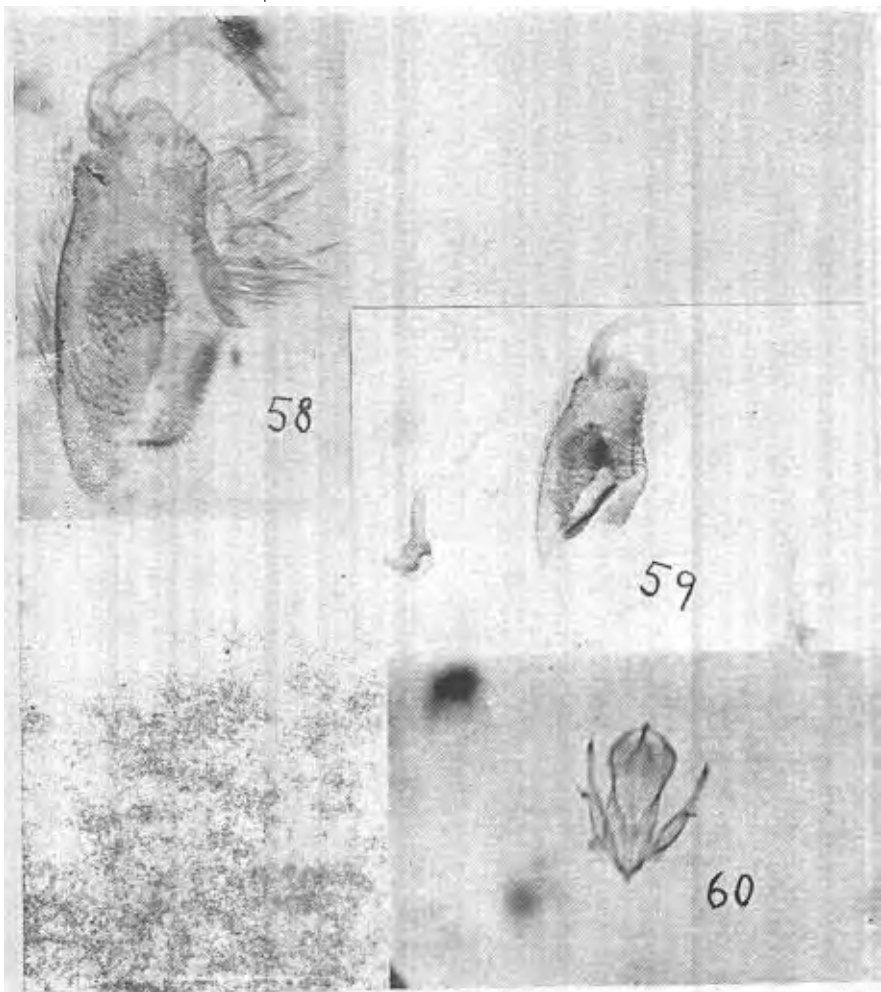
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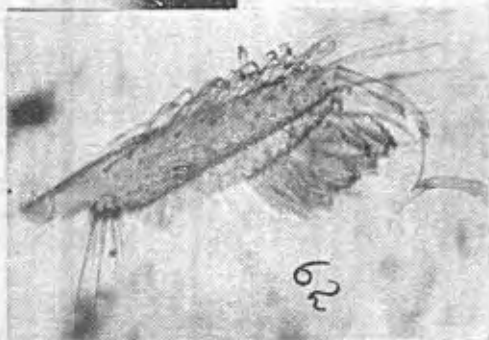
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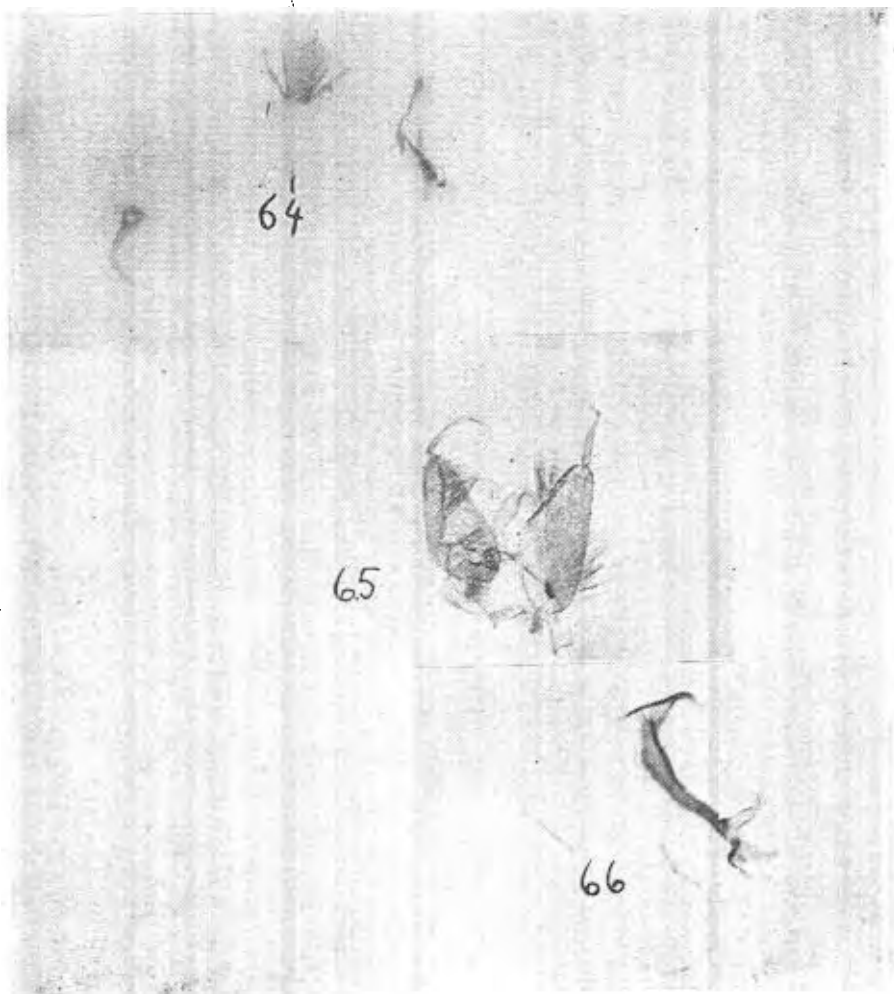


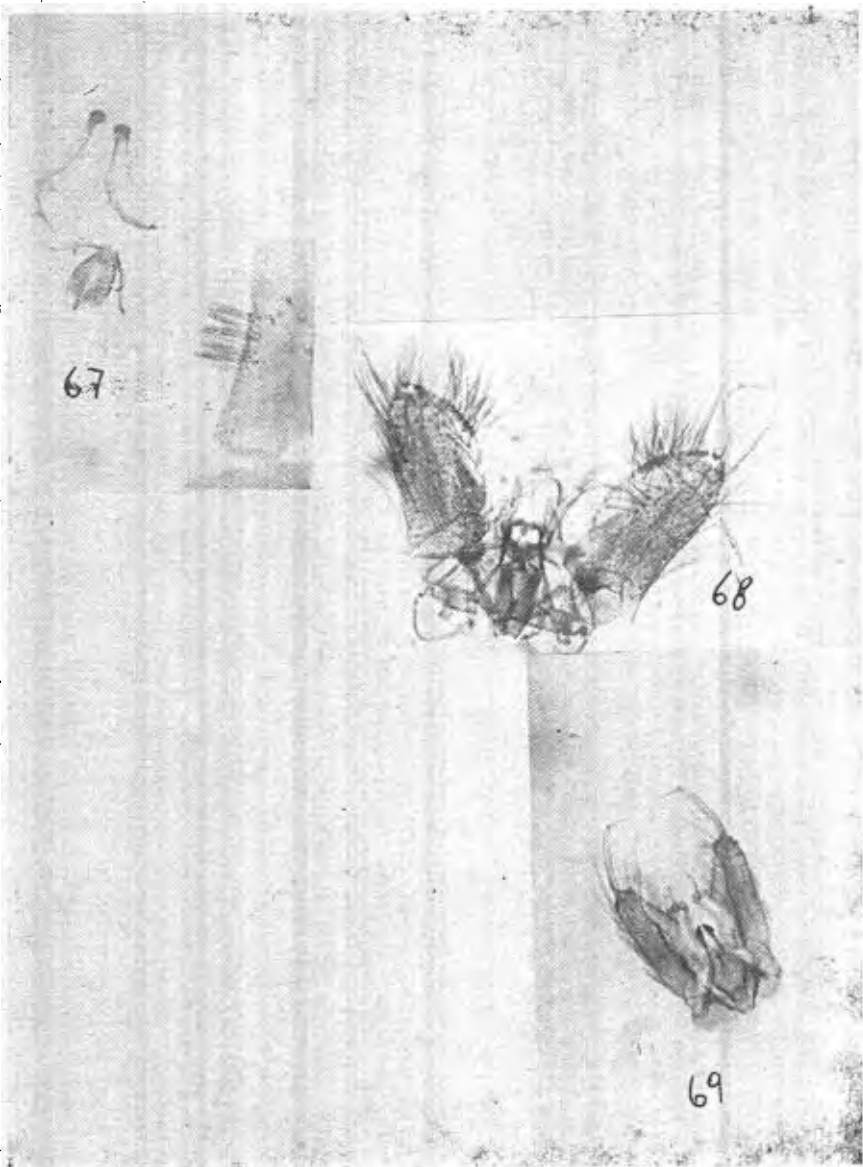
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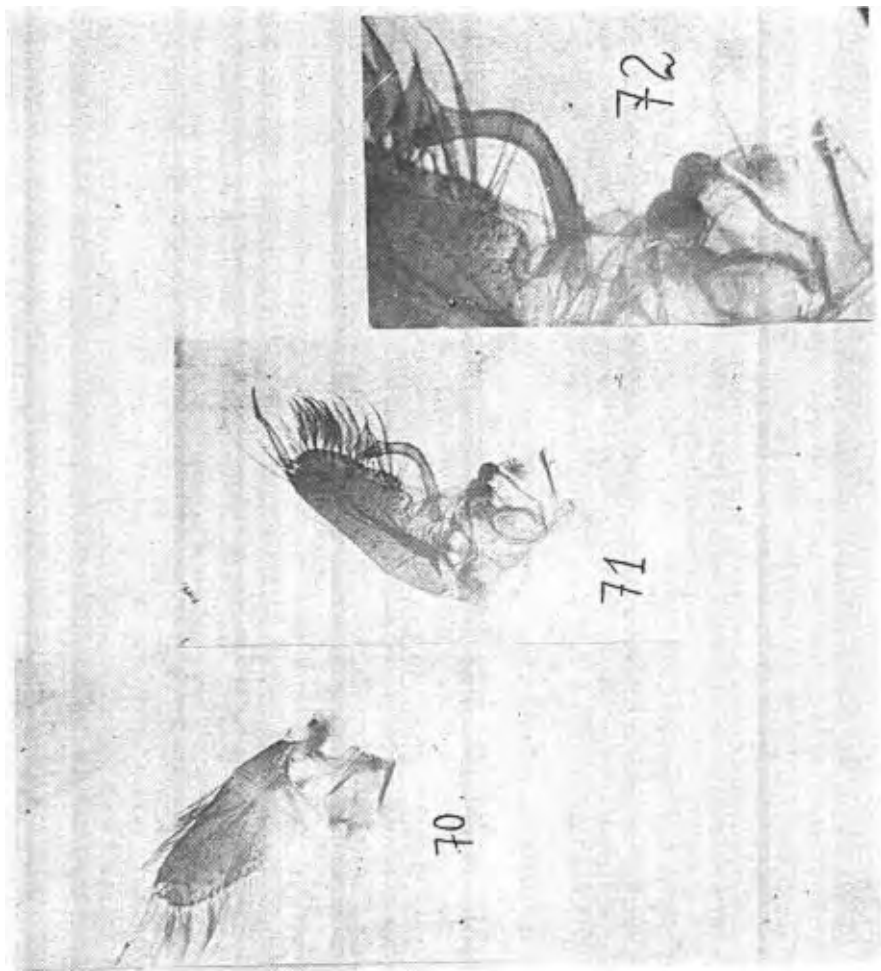


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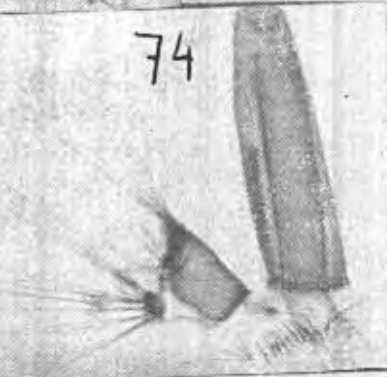




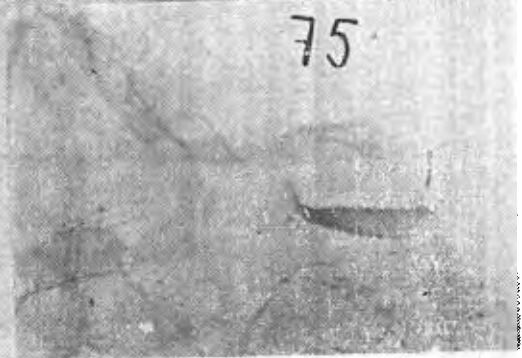
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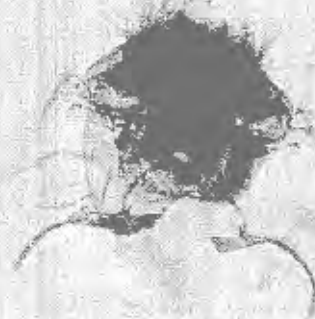
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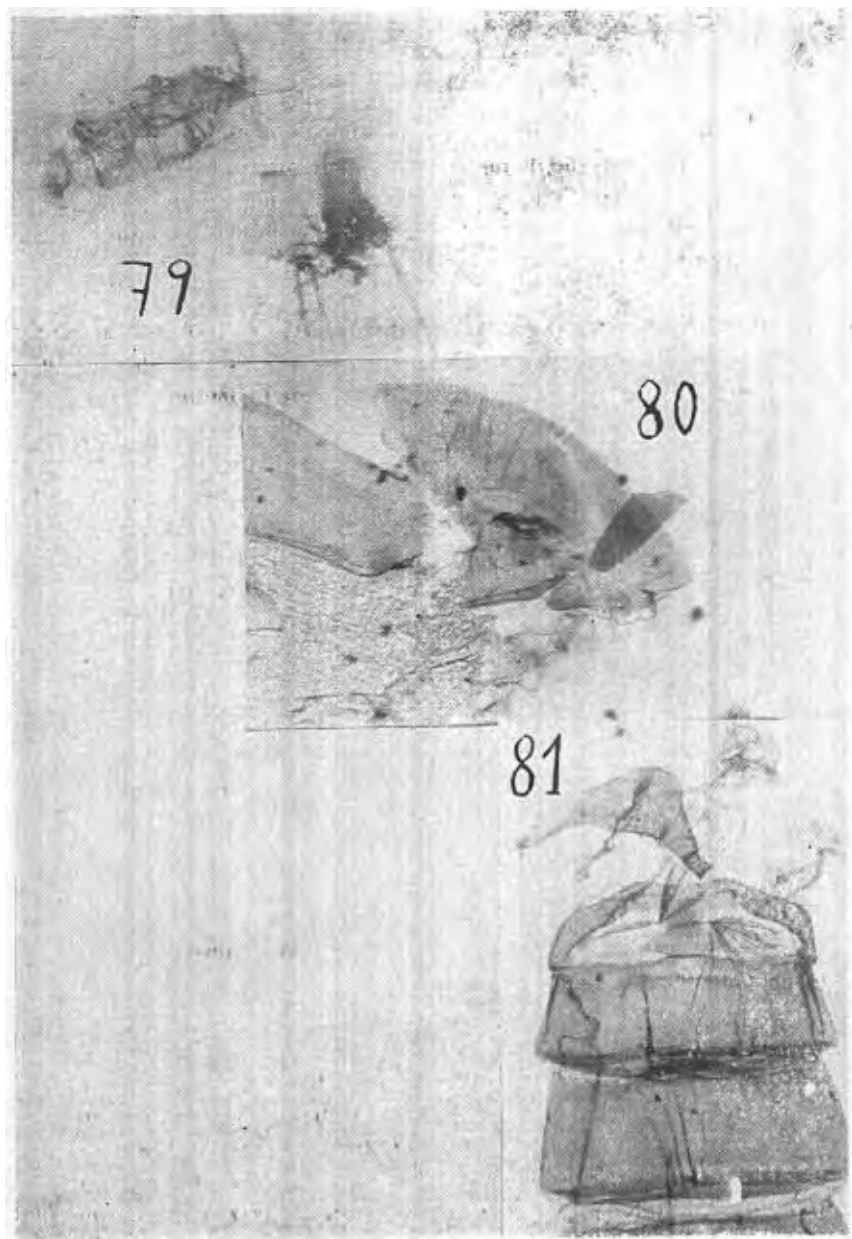


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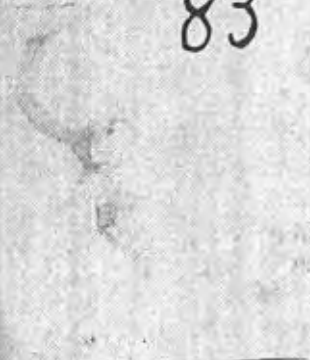




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