GYNANDROMORPHS OF SOME *CULEX* (*MELANOCONION*) SPECIES[1]

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ABSTRACT. Gynandromorphs are described from *Culex bastagarius*, *Cx. intrincatus*, *Cx. sacchettae* and *Cx. taeniopus*, which were collected from natural populations in São Paulo state, southern Brazil, by a variety of collecting methods.

As in other sexually reproducing animals, mosquito gynandromorphism is a phenomenon where individuals have female and male characters. Nevertheless, they are not true sexual mosaics but are usually divided approximately half and half (Hall 1988). Although not uncommon in laboratory colonies, gynandromorphism is always of low occurrence in natural Culicidae populations. So far it has been observed in about 11 genera (Antunes and Forattini 1960, Brust 1966, Campbell and Service 1987, Hall 1987). Mosquito gynandromorphs are generally classified as polar (anterior/posterior) or bilateral (oblique) types. The genetic basis and several probable mechanisms of origin of this abnormality have been suggested, i.e., somatic crossing over, improper migration of chromosomes at an early mitotic division, double fertilization involving 2 sperm cells and either a binucleate egg or an egg and a polar body (Seal 1966). Binucleate eggs independently fertilized by male gametes, seems the more likely cause (Ahmad et al. 1985).

Mosquito gynandromorphism may be useful in experimental studies for investigating gene expression concerning tissue specificity, physiological differences between male and female mosquitoes, and differential dimorphic development of parasites in male and female hosts (Hall 1987).

This paper describes 6 gynandromorphs of *Culex* (*Melanoconion*) of which all except two, were collected in the field at the Experimental Station of Pariquera-Açú in the Ribeira Valley region of São Paulo State, southern Brazil. Collections were made using several techniques, i.e., hand net, human bait, CDC light trap and Shannon trap (the latter may be considered as human-baited).

The gynandromorphs are as follows:

1) *Culex bastagarius* Dyar and Knab (Fig. 1). Specimen collected inside patch forest, in Shannon trap (October 1978). Probably an oblique type, anterior female and posterior male. Right foretarsal claw simple, left foretarsal claw damaged; right midtarsal claw with subbasal tooth, the left one simple.

2) *Culex intrincatus* Brethes. Collected inside patch forest, in Shannon trap (February 1981). Head (Fig. 2) with antennae strongly plumose, (male pattern); maxillary palpus shorter than the proboscis, the left being shorter than the right; maxilla, mandible and cibarial armature (Fig. 3) normally developed. Left foretarsal claw with subbasal tooth, the right one damaged; right midtarsal claw simple, the left one with small subbasal tooth. Male genitalia (Fig. 4) lacking proctiger and with abnormal ninth tergal lobe. Female genitalia (Fig. 4) lacking insula, upper and lower vaginal lips and upper vaginal sclerite; cerci, postgenital lobe and one spermathecal capsule present. Dimorphism between the midtarsi and the genitalia suggests an oblique gynandromorphism.

3, 4) *Culex sacchettae* Sirivanakarn and Jakob. Two specimens. The first one collected indoor in Pariquera-Açú county in a CDC light trap (January 1980). Probably an oblique type, anterior female and posterior male. Foretarsal and right midtarsal claws damaged, left midtarsal claw with subbasal tooth.

The second specimen (Fig. 5) was collected inside of a primitive rain forest at Vilarinho, Cananéia County, in a CDC light trap (April 1983). Probably an oblique type, anterior female and posterior male. Left and right foretarsal claws simple; right midtarsal claw with subbasal tooth, the left one damaged.

5, 6) *Culex taeniopus* Dyar and Knab. Two specimens. The first one collected inside patch forest, with a hand net (October 1986). Head (Fig. 6) with antennae strongly plumose (male pattern); maxillary palpus abnormal, the right one different and shorter than the left, both shorter than the proboscis; left palpus damaged; maxilla and mandible present and normally developed; cibarial teeth abnormally developed. Right and left foretarsal claws simple; left midtarsal claw with subbasal tooth, right midleg

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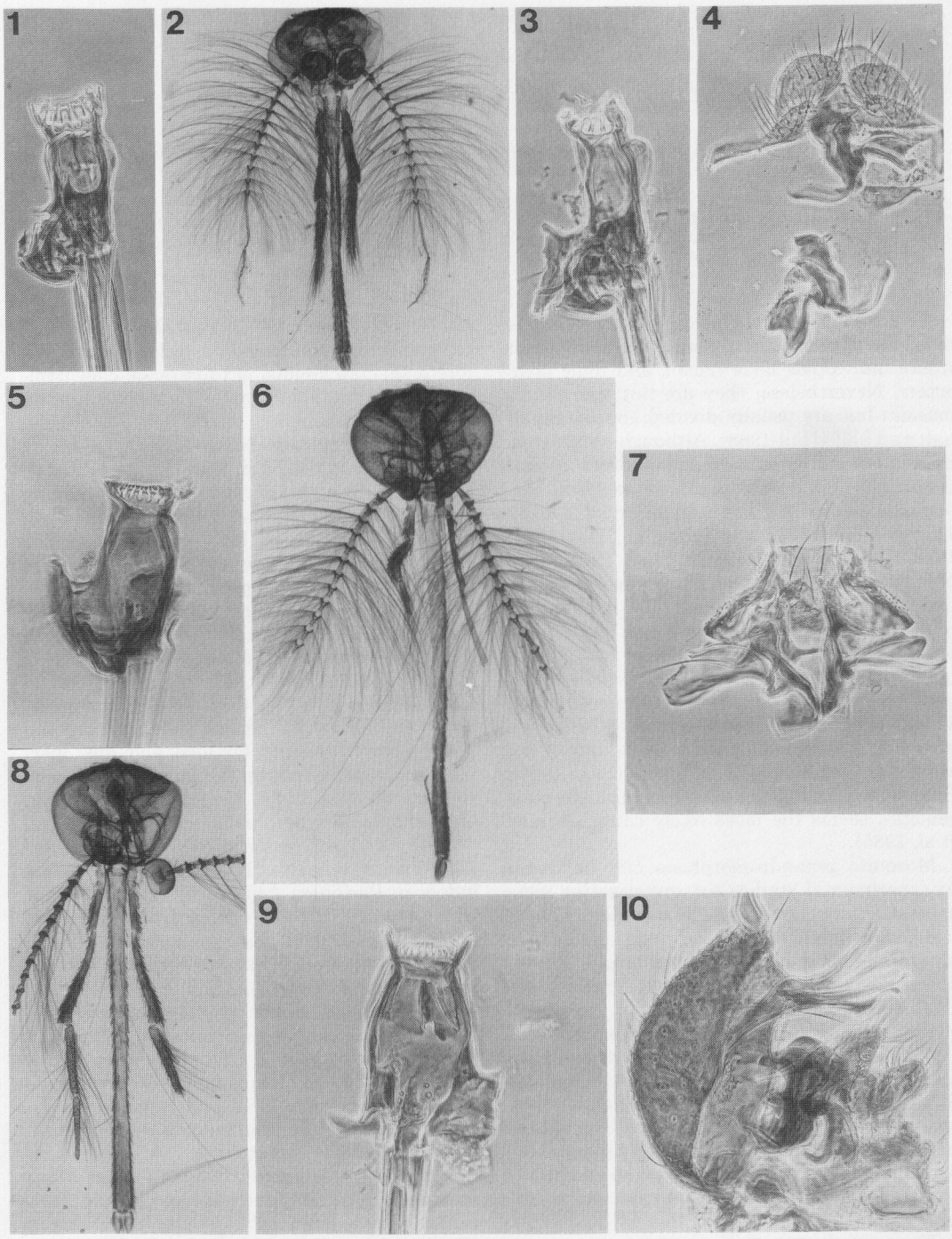

Fig. 1. *Culex bastagarius* cibarial armature; Figs. 2–4. *Culex intrincatus* head, cibarial armature, male/female genitalia; Fig. 5. *Culex sacchettae* cibarial armature; Figs. 6, 7. *Culex taeniopus* head, male/female genitalia; Figs. 8–10. *Culex taeniopus* head, cibarial armature, male/female genitalia.

lost. Male genitalia (Fig. 7) with abnormally developed basal piece, paraproct, tergum X, cercal setae, cercal sclerite and paraproct crown; tergum IX lobe abnormal. Female genitalia (Fig. 7) only with postgenital lobe present and abnormally developed; one spermathecal capsule present. Abdominal segment VIII abnormal.

The second specimen was collected on human

bait (December 1986). Head (Fig. 8) with antennae strongly plumose (male pattern); maxillary palpus abnormally developed and shorter than the proboscis; left palpus damaged; maxilla, mandible and cibarial armature (Fig. 9) present and normally developed. Left foretarsal claw simple, the right one with subbasal tooth; right and left midtarsal claws with subbasal tooth. Male genitalia (Fig. 10) with abnormally developed basal piece; proctiger absent; tergum IX lobe abnormal. Female genitalia (Fig. 10) with abnormally developed cercus and postgenital lobe; one spermathecal capsule present. Abdominal segment VIII abnormal.

The discovery of mosquito gynandromorphs in natural populations allows us to make a hypothesis concerning their feeding behavior. It was interesting to find maxillae and mandibles normally developed, even in females with a male head pattern. This does not mean that these individuals can take blood, but it suggests some potential for retaining the hematophagous habit. It is possible that males found near hosts may be "forced" to do this to locate females (Sivinski 1984). One of the gynandromorphs of *Cx. taeniopus* was collected on human bait and showed a normally developed cibarial armature. If this behavioral pattern supports a blood-taking hypothesis, it is a subject for future studies.

All specimens, mounted on slides, are deposited in the Entomological Collection of the School of Public Health, University of São Paulo, Brazil.

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