A PICTORIAL FIELD GUIDE FOR THE RAPID IDENTIFICATION OF LAMINIFLIES (RITRIPA: PITCHERIDAE), COMMONLY ENCOUNTERED IN PARÁ STATE, BRAZIL.

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SUMMARY

A pictorial field guide to the 30 species of sandfly most commonly encountered in Pará State is presented, based on the easily recognized external characters of the length of the 5th palpal segment, thoracic impression, abdominal colour and head and body size. In most cases this allows identification to the species. In others, especially with females, it gives an indication of the species, which may then be confirmed with data from more detailed zoological studies. This type of field guide helps in teaching, rapid sorting of flies prior to dissection and in acquainting visitors with the variety of species present in a given area.

A rapid technique for the taxonomic sorting of unmounted, freshly killed female sandflies is required, prior to the dissection of large numbers of a particular species. Such a method is useful in areas where numerous species occur in studies on natural flagellate infections, age determination and for ecological studies. The above points in mind a pictorial field guide has been designed that enables the identification of unmounted, unparasitized specimens of the 30 more commonly encountered species of phlebotomine sandflies (**) in Pará State, North Brazil. It is based on the easily recognized external characters of the length of the 5th palpal segment, thoracic impression, abdominal colour and protarsus and body size.

Taxonomy of male phlebotomine sandflies is based on the structure of the genitalia and, as most of this is external, a wholly external character key is readily made. Female taxonomy, however, is based on the internal characters of the coxite and spermathece. In order to produce an external character key we therefore return to an unsophisticated "sieve tometry" (see Martins et al., 1978 p. 3 for review), using relative

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(***) Authorizations for all phlebotomines mentioned in the text are given by Martins et al. (1978).}

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lengths of the proboscis, palp segmentation and body, along with the degree of infuscation. This idea is not new; indeed many sandfly specialists presently use external characters to separate certain species (W. Fleck, R. P. Line, P. D. Ready, D. G. Young and R. P. Ward personal communications 1980 & 1981).

A key used to separate five anthropophilic sandflies by Bang (1966), in Mexico, was based mainly on palp segment length and infuscation. Fleck and Aboukheile (1952) stressed the use of relative lengths of palp segments in their keys to the sandflies of French Guiana, and four members of the Phlebotomus group have been similarly separated according to the degree of infuscation by Horodyski et al. (1982). The use of thoracic infuscation as a reliable character seems to be gaining favour, having been used by Young & Fairchild (1974) and Ready & Fleck (1981). Indeed Chassot (1934) showed the usefulness of thoracic infuscation to separate 7 anthropophilic species, during studies on vesicular aemophilism in Panama. Identification using external characters is essential for work on non-isolations from sandflies, where both samples of whole sandflies are used.

Perhaps the major advantage of a simple visual guide is for teaching purposes. Technical staff in this Institute are able to identify most of the species they encounter without having to use the standard, more unwieldy (and in many cases unavailable) in-
text characters keys, and the guides presented below have allowed rapid species sorting prior to the dissection of sandflies in our etesiosciadis study areas (Ryan et al., 1985).

DISCUSSION

This field guide to the sandflies of Pará has been found to work during the period between June 1983 and December 1984, in our study sites of marajó (Lainson et al., 1983) Belém (Lainson & Shaw, 1968), Carajás (Hard et al., 1973), Santarém (Lainson et al., 1984 & 1985), Tucuruí, Porto Trombetas, Buritizal, Presidente Médici and Paragominas. The phlebotomine fauna must first be studied in a given area; and a field guide for the common species may be produced which speeds the work rate and allows identification of the sandflies without mounting or maceration. Smaller samples may be examined in greater detail to check the validity of the identification made with the field guide.

We stress that this is not an alternative to the accepted characters in use at present in the few available keys, but rather an aid to field work in a given region. Where, for example, one already known Ps. davisi is to be present in a given work area the pictorial guide immediately reminds the field worker of its appearance. Again a relatively untrained dissector may give his opinion that a sandfly is Ps. davisi, and this can then be confirmed by the person of the dissecting team who is examining the spermathecae and guts.

In addition, for teaching purposes, this guide provides a useful starting point, or introducing to the sandflies of Pará. The small and medium 5th palp segment groups function well, fortunately, as most of the anthropophilic flies belong to these groups. Even so difficulties may arise in separating Ps. amazonensis from Ps. clastrelli and the

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Trichophoronya subgenus generally. Within the series squamine transport it is at present impossible to separate female Ps. squamine transport squamine transport, Ps. s. morpaeensis, Ps. complexus; Ps. changai and as yet undescribed members of the series found in Pará State: the males of these species, however, are all characteristic (Ready et al., 1982). Only Ps. wellcomrei and Ps. complexus are figured in this guide as they are both present at our study site in the Serra dos Carajás, where recent studies (Ryan et al., 1989) have confirmed without doubt that the former is the proven vector of Lu. s. brasiliensis. We use Lu. guayanesis assuming that Lu. geniculata is the junior synonym. We use here Lu. trinidadensis although this ray eventually prove to be Lu. vilissai, should the latter be resurrected (M. Fraiba personal communication, 1985).

The long 5th palpal segment group contains many of the species that are encountered only as twigs and/or that are captured rarely. Anthropophilic species include Lu. gom si, Lu. carvalhoi and Lu. longiplaplis, and these are all characteristic. It is difficult to distinguish between females of species in the subgenus Pressatia, as well as between Lu. dasylophoroton and Lu. longiplaplis females. Another recent complication is the discovery of a Lu. longiplaplis complex (Ward et al., 1985), where note must be made of the presence of one two abdominal, white spots on males.

All the characters used are constant, but caution should be exercised when dealing with Lu. longiplaplis, as this species exhibits wide morphological range. A small, white form encountered in Cararé, Marajó Island and Santanã, Pará, is fortunately uncommon in our samples (1 = 1000).

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RESUMO

É apresentado um "reconhecimento ilustrado" dos 50 gêneros e espécies mais comuns encontrados no estado do Pará, Brasil, usando-se características externas, com as medidas do quinto segmento dos palpos, cor do fêmur e do abdomen, e medidas de cabeça e do corpo. Com isto é possível, na maioria dos casos, levantar a identificação até a espécie. Eles têm algumas espécies, entretanto, que são mais diferentes e serem identificadas, particularmente as fêmeas, havendo neste caso, necessidade de um exame taxonômico mais detalhado para que se possa concluir a identificação. Esta orientação ilustrada é particularmente útil a técnicos de laboratório, estudantes e entomólogos visitantes.

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Fig. 3b. Field guide to the 30 most commonly encountered species of barnacles in Para State, north Brazil.

A. Venation.

1. The key initially divides into 2 columns according to the relative length of the 5th palp segment, where the ratio of the 5th to 4th palp segments is as follows:

- (short) ≤ 0.5; > 0.5: 4th palp genus Psychobrachya. 

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M (medial) > (dorsal) & < (ventral) subgenera Viama-
myia, P-trephomyia, Hypomyia, Paetamyia and groups
beastiliornis, lanasi and drieschii.
1. (tong) 5th>3rd>2nd>1st & > (3rd>4th) on other subgener
and groups.
11. Using number 6, Pw. Lainconae as an example: The left figure
indicates the degree of infuscation, represented by shading
(from white; light = medium = dark).
The letters in the figures refer to:
5: Size of probasus (from the typeus to the right proportion).
the size of the area (shown as being equal in length to
antennal segments 1 to 2) and:
6: Overall size of the thorax and abdomen, excluding the head
and male genitalia. This category is subjective in that
the observer will consider Ps. wellcomei as a large fly because
of its long legs. However, as a guide we give the equivalent
size in millimeters:
LH (large) > 2.2mm & = 1.8mm.
M (medium) = 2.0-2.2mm & 1.6-1.8 mm.
S (small) > 2mm & < 1.6cm for females) and males res-
pectively.
7: Colour of the abdomen when W = white, L0 = light, M =
medium and D = dark infuscation, Y = yellow, B = black.
8: When mounted or dissected the spermathecae (figured for
each species) allow confirmation. Where (a) is the length of
the spermathecal body, such that the common spermathecal duct
is twice the length of (a) i.e., 2a.

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Fig. 18. As for females with the additional parameters of: (as in examples 31 Lo. dassypodogeton and 22 Lo. gomezi).

1: The overall size of the genitalia, this is only used when obviously LR (large) or S (small).
2: The arrangement and number of spines on the style.
3: The presence or absence of a basal tuft.
4: The structure of the parameres and, in some cases, the (lateral) lobe.
5: The formula 2P/1/C is such that the genital filaments are 2x the length of the (a) small sized (P) pump which in turn is 1/2 the length of the (C) corixite. It may be determined after mounting or dissection.

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