

To Dr. Allan Stone
Cordial regards
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MANSONIA INDUBITANS DYAR AND SHANNON—A NEW MOSQUITO ADDITION TO THE UNITED STATES FAUNA

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Mansonia indubitans Dyar and Shannon was originally described (3) in 1925 from females collected in several localities in central Brazil and later from males and females from central Brazil and Iquitos, Peru, by Shannon (5). Tulloch (6) first described the larvae and pupae from specimens found attached to the roots of *Pistia Stratiotes* Linnaeus in Lake Cartagena, Puerto Rico, on November 16 and 22, 1935. He was able to rear an adult male which is now in the United States National Museum.

Since that time males and females have been found by the writer in light trap collections at Fort Buchanan and Camp Tortuguero, P. R., chiefly in the winter months. The maximum collection contained 3 males and 36 females and was made on the night of November 29, 1942 at Fort Buchanan, P. R.

In 1943, 1944, and 1945 adult females were collected in light traps in South Clarendon Parish, Jamaica, B. W. I., by C. E. Peres, A. E. Pritchard, G. A. Thompson, and the writer. On January 17, 1945, G. A. Thompson and H. D. Pratt also collected larvae and pupae attached to the roots of *Pistia* in this same locality.

D. G. Denning, and W. W. Wirth of the U. S. Public Health Service collected larvae, pupae and reared adults from the roots of *Pistia Stratiotes* Linnaeus in Boca Raton, Florida, August 16, 1944. These specimens sent to the writer are the first definitely identified specimens of *Mansonia indubitans* Dyar and Shannon known to occur naturally in the United States.

The larvae and pupae of *Mansonia flaveolus* (Coquillett) illustrated and mentioned in the keys were collected at Carolina, P. R., September 19, 1943 on the roots of water spoon (*Hydromystria stolonifera* G. F. W. Meyer.)

As pointed out by Shannon (5), the adults of *Mansonia indubitans* Dyar and Shannon and *Mansonia titillans* (Walker) are very similar. The characters of length of female palpi and male genitalia used by Shannon appear to be valid, but are so slight as to make these determinations difficult. On the other hand perfectly good characters do exist for the separation of females using characters of female terminalia or, more specifically, of the arrangement of spines on the eighth tergite.

The genus *Mansonia* Blanchard is composed of four subgenera according to Edwards (4). In two of these subgenera: *Coquillettidia* Dyar and *Rhyn-*

chotaenia Brethes there are no spines on the eighth tergite and separation of the species on the basis of female terminalia is difficult. In the other two subgenera: **Mansonia** Blanchard and **Mansonioides** Theobald the eighth tergite is armed with sharp, heavily sclerotized hooks or spines which have a characteristic arrangement for each species. The arrangement of the spines has been shown for species in the Oriental subgenus **Mansonioides** by a number of workers including Barraud (1). The arrangement of spines on the eighth tergite for three Caribbean species: **flaveolus** (Coquillett), **indubitans** Dyar and Shannon, and **titillans** (Walker) is shown in figures 4, 5, and 6. The three species may be separated by the following key:

Key to Females using Characters of Eighth Tergite

1. Eighth tergite without a group of closely set spines in middle of posterior margin, spines separated by at least their own diameter, and arranged more or less in two irregular rows, fig. 6 **indubitans** Dyar and Shannon
 Eighth tergite with a group of six to nine closely set spines in middle of posterior margin 2
2. Six spines set closely to one another in middle of posterior margin of eighth tergite, fig. 4 **flaveolus** (Coquillett)
 Seven to nine spines set closely to one another in middle of posterior margin of eighth tergite, fig. 5 **titillans** (Walker)

The arrangement of the spines figured in **indubitans** (fig. 6) has been checked with a slide mount of the paratype from Rio Branco, Brazil, made for the writer by Alan Stone, U. S. National Museum. Specimens from Florida, Jamaica, and Puerto Rico show no intergradation between **indubitans** and **titillans**, although intergrades between **titillans** and **flaveolus** will probably be found by later workers. **Flaveolus** and **titillans**, however, are easily separated by other adult characters such as color and length of palpi.

Adult females of these three species may be separated by the following key adapted from Shannon (5):

Key to Adult Females

1. Abdomen covered entirely with bright golden scales; mesonotum generally yellowish brown, clothed with golden scales and isolated patches of dark scales; palpi of female exceeding one-half the length of the proboscis, fig. 1 **flaveolus** (Coquillett)
 Abdomen mostly dark scaled; palpi of the female less than one-half the length of the proboscis 2
2. Palpi about one-fourth the length of the proboscis; small species, 3-4 mm. long, fig. 3 **indubitans** Dyar and Shannon
 Palpi about one-third the length of the proboscis; small to moderate in size, 5-6 mm. long, fig. 2 **titillans** (Walker)

Larvae of the three species may be separated from *Mansonia* (Coquillettia) *perturbans* (Walker) by the toothed maxillary spine, the anal segment being ringed by a sclerotic plate and pierced by 4 precratal hairs, and the two long hairs arising from the median notch in the antennal shaft extending to or beyond the tip.

Larvae of the three Caribbean species may be separated by the following key:

Key to Larvae

1. Comb scales on eighth abdominal segment broad, with numerous coarse denticles, fig. 10 *indubitans* Dyar and Shannon
 Comb scales on eighth abdominal segment narrow, with fine denticles 2
2. Precratal hairs piercing sclerotic ring surrounding anal segment single, *gamma* hair of pentad group on eighth segment single or double; hairs on air tube single, fig. 11 *flaveolus* (Coquillett)
 Precratal hairs piercing sclerotic ring surrounding anal segment double or multiple; *gamma* hair of pentad group on eighth abdominal segment double or multiple; hair on air tube double or multiple, fig. 12 *titillans* (Walker)

The pupae of *Mansonia* differ from those of all other New World mosquitoes in lacking the dendritic tuft on the first abdominal tergite, and in the tapered, pointed trumpet adapted to piercing the soft tissues of aquatic plants in order to obtain their air supply. The paddles have a peculiar notch on the inner margins and no apical paddle hair. The trumpet of *indubitans* specimens from Florida and Jamaica is longer than that of *flaveolus* specimens from Puerto Rico and Bonne Wepster's (2) figure of *titillans* from Dutch Guiana. A key to the pupae of *indubitans* and *flaveolus* is given below:

Key to Pupae

1. Pupal trumpet long and slender, at least five times as long as greatest diameter; abdominal hairs B and C on segments IV, V, VI and VII conspicuously developed; paddle slender, 3 times as long as greatest width, with strong marginal denticulation, fig. 14
 *indubitans* Dyar and Shannon
 Pupal trumpet short and stout, about three times as long as greatest diameter; abdominal hairs B and C on segments IV, V, VI, and VII weak and poorly developed; paddle broad, twice as long as greatest width, with slight marginal denticulation, fig. 13 *flaveolus* (Coquillett)

At the present time *flaveolus* is known to occur in the Virgin Islands, Vieques, and Puerto Rico, Panama, and Brazil. All *titillans* records for the Virgin Islands, Vieques, and Puerto Rico probably should be referred to *flaveolus* on the basis of such characters as coloration, length of female palpi, and female genitalia. In Jamaica both *titillans* and *indubitans* are known to

occur. Shannon (5) has shown that many of the South American records of *titillans* refer either to species of *Psorophora* or to *M. indubitans*.

It is believed that some of the United States records of *Mansonia titillans* (Walker) reported in the literature actually are based on specimens of *Mansonia indubitans* Dyar and Shannon. It is hoped that a study of reared material will be made in the future and the specimens recorded in the literature will be re-examined to determine the distribution of these two easily confused species.

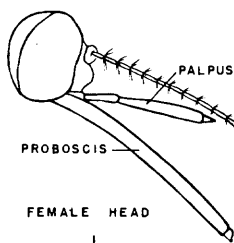
Acknowledgments

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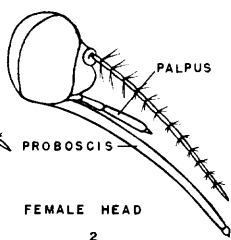
Literature Cited

1. Barraud, P. J., 1934, Fauna of British India, Vol. 5, Diptera, Tribes Megarhinini and Culicini, pp. 1-463. (Mansonioides, pp. 123-131).
2. Bonne-Wepster, J. and Bonne C., 1925, The Mosquitoes of Surinam, Roy. Col. Inst. Amst., Dept. Trop. Hyg., Med. N. 21, afd. Trop. Hyg. No. 13, pp. 588, 83 figs.
3. Dyar, H. G. and Shannon, R. C., 1925, New Mosquitoes from Brazil, Jn. Wash. Acad. Sci., 15 (2): 39-41.
4. Edwards, F. W., 1932, "Diptera, Family Culicidae," in P. Wytzman, *Genera Insectorum*, fasc. 194, Bruxelles: V. Verteneuil and L. Desmet, pp. 258, illus.
5. Shannon, R. C., 1934, The genus *Mansonia* in the Amazon Valley, Proc. Ent. Soc. Wash., 36: 99-110.
6. Tulloch, G. S., 1937, The Mosquitoes of Puerto Rico, Journ. Agr. U.P.R., Rio Piedras, 21: 137-168.

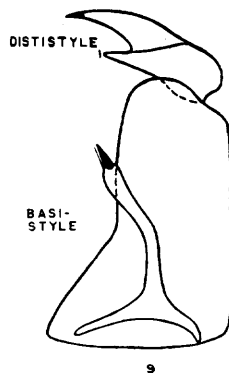
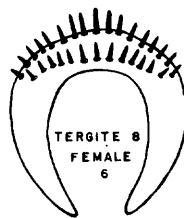
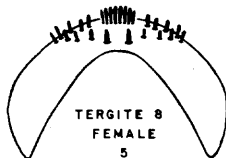
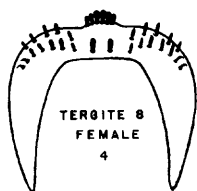
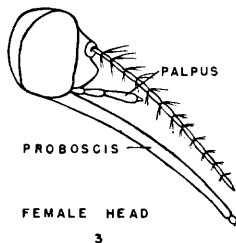
FLAVEOLUS

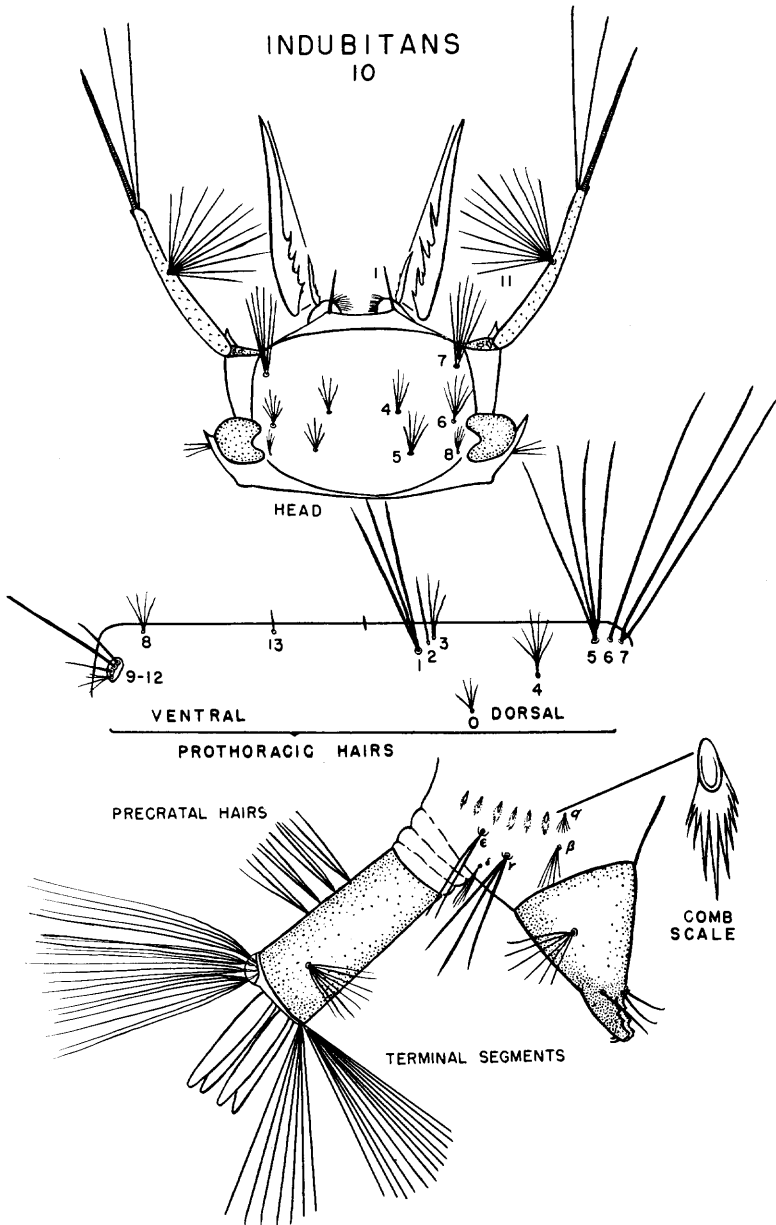


TITILLANS

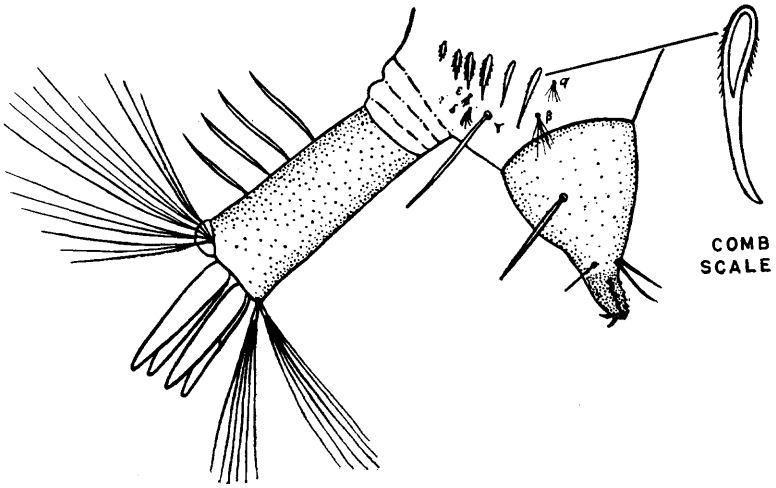
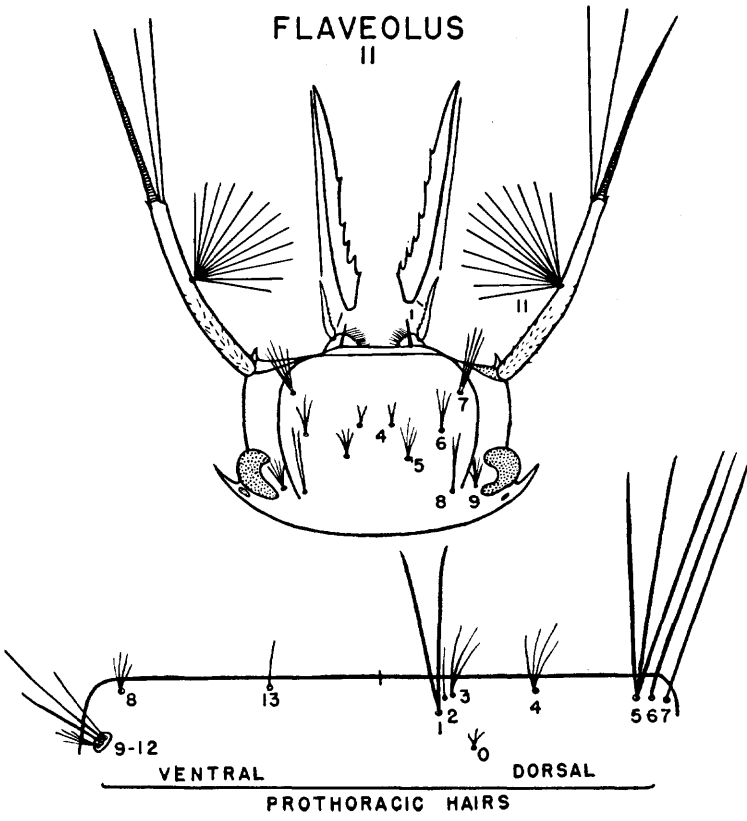


INDUBITANS

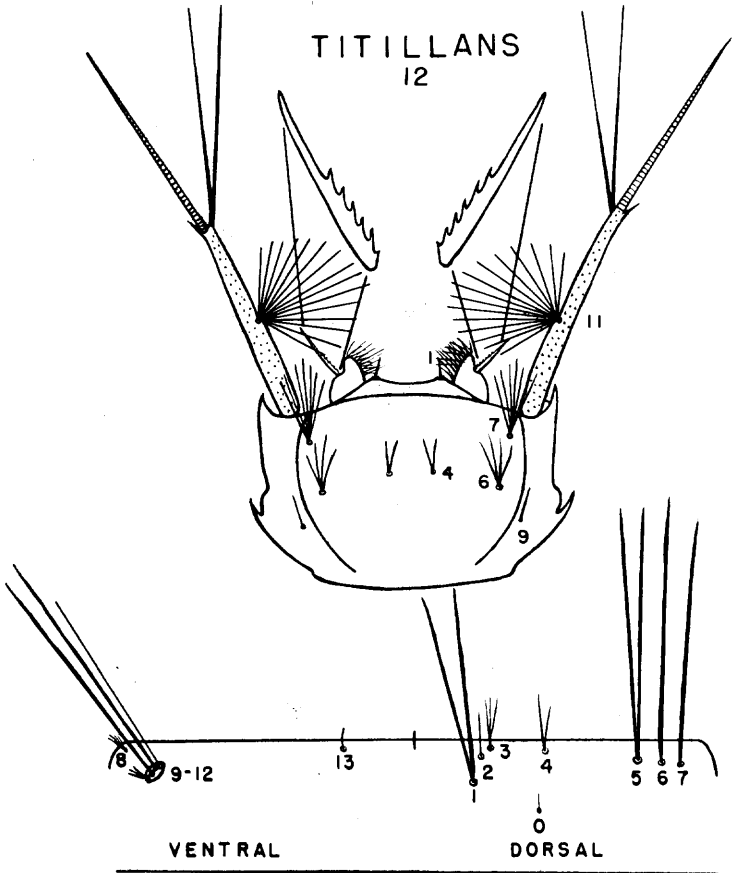




FLAVEOLUS
II



TITILLANS
12



PROTHORAGIC HAIRS

