

## A NEW SUBGENUS OF THE GENUS *SABETHES* (DIPTERA: CULICIDAE)<sup>1</sup>

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**ABSTRACT.** A new subgenus, *Peytonulus*, of the genus *Sabethes* Robineau-Desvoidy is established for seven species previously included in the subgenus *Sabethinus* Lutz. The subgenus is contrasted with the other subgenera of *Sabethes* and the type species is illustrated.

### INTRODUCTION

Because mosquitoes of the genus *Sabethes* Robineau-Desvoidy are known to harbor and transmit arboviruses (Galindo et al. 1959, Mattingly et al. 1973), information on their identification and phylogenetic relationships is of great importance. This is the third in a series of papers that deals with taxonomic problems involving nominal taxa within this genus. The first paper dealt with the transfer of a species from *Sabethes* to a new subgenus in *Wyeomyia* Theobald (Harbach and Peyton 1990a). The second dealt with the transfer of the subgenus *Davismyia* Lane and Cerqueira and its type species from *Wyeomyia* to *Sabethes* (Harbach and Peyton 1990b).

On reviewing the genus *Sabethes*, it became apparent that the species presently included in the subgenus *Sabethinus* Lutz actually belong to two separate phyletic lines. In this paper, a new subgenus is introduced for seven of these species: *aurescens* (Lutz), *fabricii* Lane and Cerqueira, *gorgasi* Duret, *identicus* Dyar and Knab, *soperi* Lane and Cerqueira, *undosus* (Coquillett), and *whitmani* Lane and Cerqueira. This action leaves only *intermedius* Lutz, the type species, and *melanonymphe* Dyar within the subgenus *Sabethinus*.

The new subgenus is uniquely characterized by several autapomorphic features, the highly modified larval seta 1-VII and its missing pupal homolog being the most notable and conspicuous. Based on these distinctive features, the subgenus *Peytonulus* is erected for the seven species listed above, and the following information is provided for its separation from the other subgenera within the genus *Sabethes*.

The descriptive terminology and abbreviations follow Harbach and Knight (1980, 1982) and Harbach and Peyton (1990a, 1990b). The illustrations are based on specimens deposited in the National Museum of Natural History, Smithsonian Institution.

### TAXONOMIC TREATMENT

#### *Sabethes* subgenus *Peytonulus*, New Subgenus

**Type species** (Figs. 1-3). *Sabethinus aurescens* Lutz, 1905.

*Sabethes* (*Sabethinus*) in part of Lane and Cerqueira, 1942: 481, 659-662, 676, 679-688; Lane, 1953: 1055-1060, 1082-1096; Stone et al., 1959: 93-94; Knight and Stone, 1977: 307-308; and authors.

*Sabethoides* (*Sabethinus*) in part of da Costa Lima, 1931: 56, 59, 60-61, 62-63; and authors.

*Sabethinus* in part of Theobald, 1907: 618; Theobald, 1910: 586; Howard et al., 1915: 31-37; and authors.

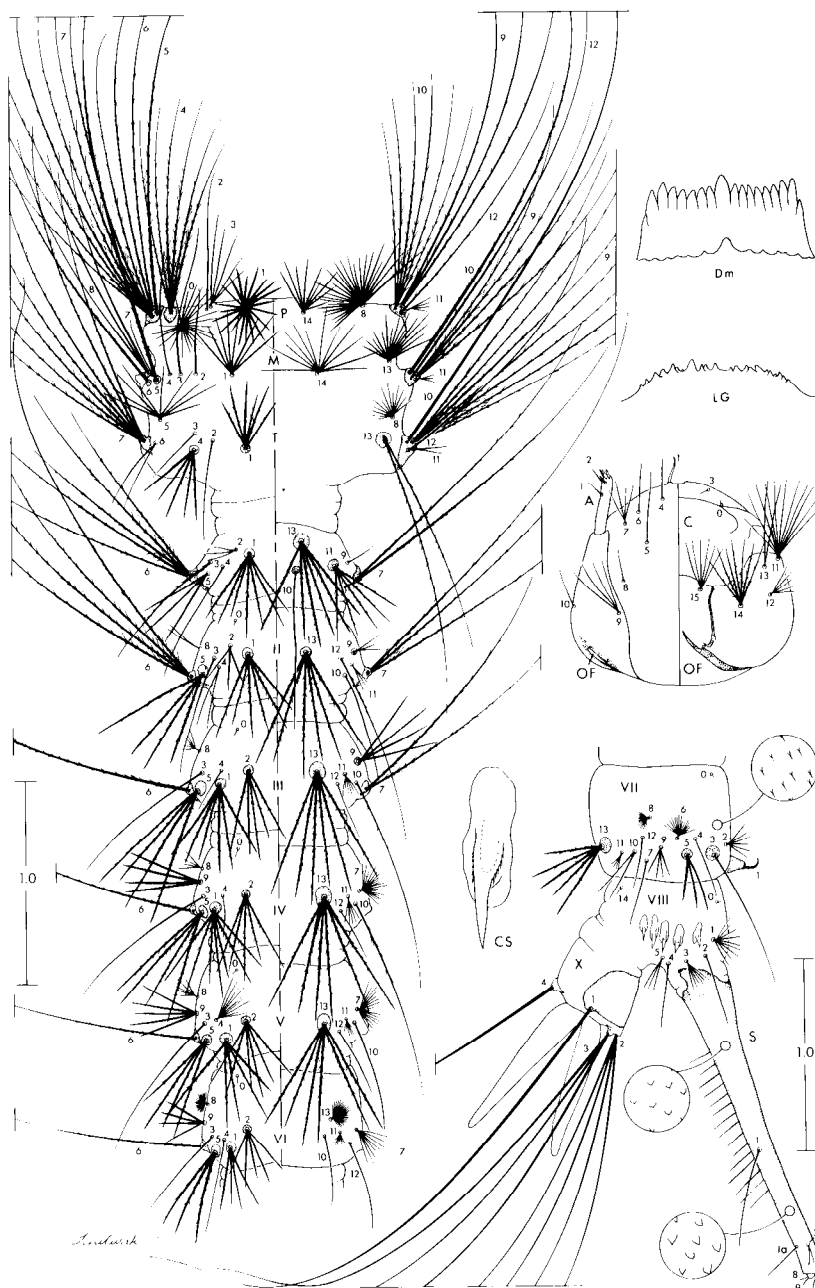
*Sabethes* (*Sabethoides*) in part of Dyar, 1924: 97-98; and authors.

<sup>1</sup>The views of the author do not purport to reflect the views of the Department of the Army or the Department of Defense.

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(Facing Page) Fig. 1. Adult habitus of *Sabethes (Peytonulus) aurescens* (based on specimens from the State of Sao Paulo, Brazil). Coloration is characteristic of all but one undescribed species of the subgenus. The presence of lower mesokatepisternal setae (MkSL) distinguish species of *Peytonulus* from those of *Sabethinus*.

(This page) Fig. 2. Fourth-instar larva of *Sabethes (Peytonulus) aurescens* (based on specimens from the State of Sao Paulo, Brazil). The modified seta 1-VII is diagnostic for the subgenus.

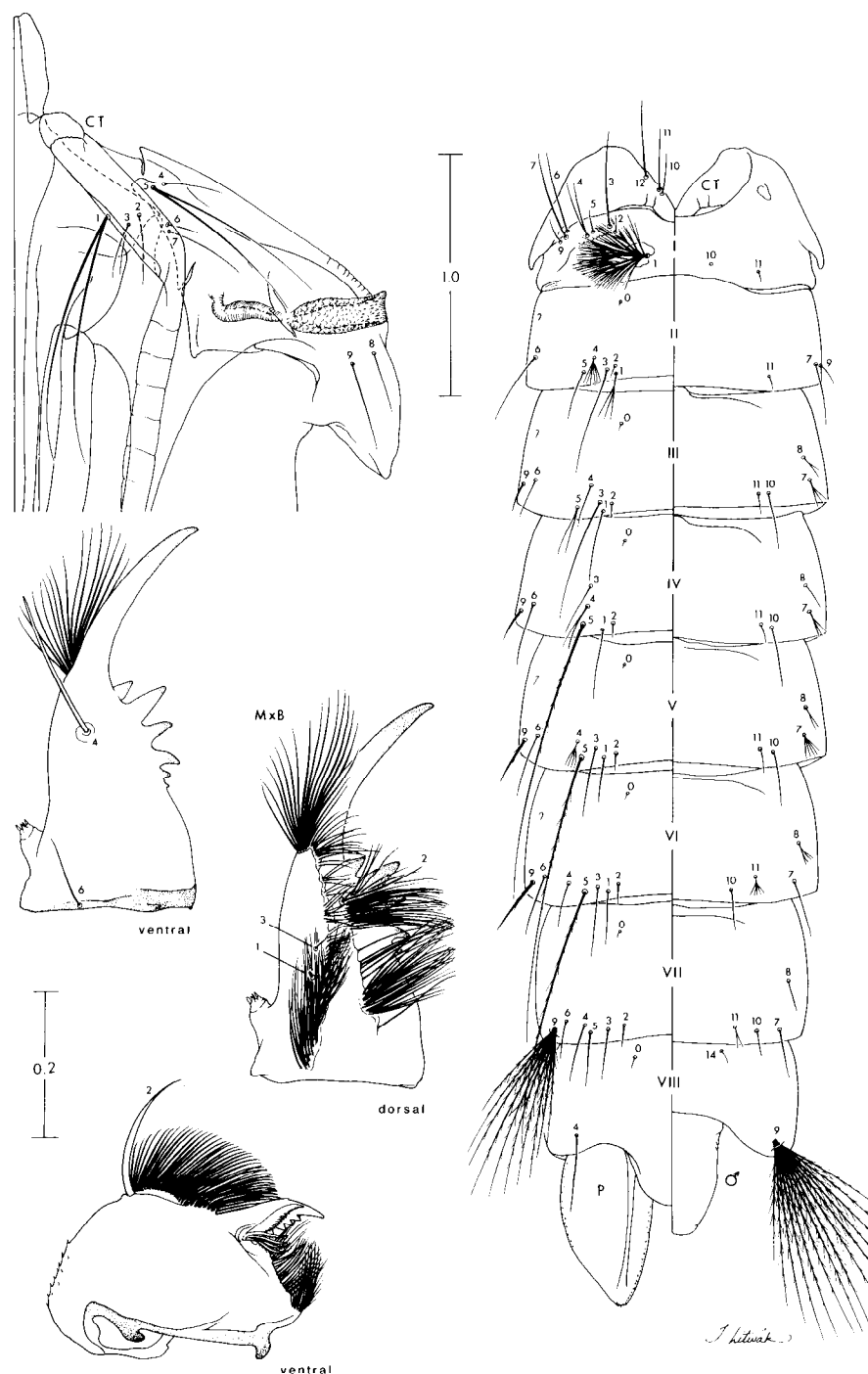


Fig. 3. Pupa and mouthparts of the fourth-instar larva of *Sabethes (Peytonulus) aurescens* (based on specimens from the State of Sao Paulo, Brazil). The absence of seta 1-VII is diagnostic for the subgenus. The large, elongate maxilla with its well developed teeth and long terminal clawlike process are characteristic of all species within this group.

*Sabethoides* in part of Theobald, 1910: 584; Bonne and Bonne-Wepster, 1925: 22, 37-41; Dyar, 1928: 6, 16-17, 21-24; Edwards, 1932: 80-81; and authors.

Except for the adult stage of one undescribed species which lacks metallic scutal scaling and bears certain other stasimorphic characters, this subgenus possesses the general characteristics of the genus *Sabethes* as noted by Harbach and Peyton (1990b). It differs from the other subgenera in the diagnostic and differential features given below. These features are illustrated in figures 1-4 and contrasted with homologous features in the other subgenera in Table 1.

**Adult.** Adults of the subgenus *Peytonulus* are readily recognized by the following combination of characters: thorax with upper proepisternal and lower mesokatepisternal setae; legs without paddles, midleg entirely dark-scaled; most species with conspicuous white scaling on ventral surface of hindtarsomere 5.

**Larva.** Maxilla large, with well developed teeth (= laciniastrum 1) and long terminal clawlike process; seta 4-C in line with or lateral to 1-C, normally lateral; seta 8-T anterior or anteroventral to pleural setal group; seta 1-I mesal to 2-I; seta 10-I in line with or mesal to 13-I, usually mesal; seta 9-II,III anterior or anteroventral to seta 7; seta 12-IV,V lateral to seta 13; seta 1-VII uniquely developed into a stout spine-, hook- or clawlike process borne on a prominent tubercle, apparently not innervated, without pupal homolog (Fig. 4); comb with relatively few large spines, without comb plate; setae 1a,2a-S not duplicated; auxiliary seta 4b-X absent.

**Pupa.** Seta 5-III much smaller than 5-IV-VI; seta 9-III-VI often spinelike; seta 1-VII absent; seta 8-VII ventral, small; paddle normal, without differentiated membranous dorsal area at base.

**Etymology.** The subgeneric name is a Latinized diminutive patronym to recognize E.L. Peyton for his special knowledge of sabethine mosquitoes and his many contributions to the field of mosquito systematics. The three-letter abbreviation *Pey.* is recommended for this subgenus.

**Discussion.** *Peytonulus* exhibits the most divergent morphology of any subgenus of *Sabethes*. Larvae of this group possess a uniquely specialized seta 1-VII which reaches terminal development in the fourth instar, i.e., it does not develop in the pupal stage. This ontogenetic distinction represents a synapomorphy for *Peytonulus*. Nevertheless, species of this group, like many other groups of mosquitoes, are mosaics of primitive and derived characters. The undescribed species mentioned above is a good example of this. It shares a plesiomorphy with *Wyeomyia* in the retention of dull scutal scaling, yet bears the autapomorphic immature characters diagnostic of *Peytonulus*.

The species included in *Peytonulus* were formerly placed in *Sabethinus*. These subgenera, however, have very little in common other than overt similarities in the ornamentation of the adults. Based on character agreement, *Peytonulus* appears to be more closely related to *Sabethoides* and *Davismyia*. Nevertheless, these three subgenera differ rather markedly in all stages as indicated in Table 1. Particularly noteworthy is the presence of prealar setae in the adults of *Davismyia*. Prealar setae are plesiomorphic for *Sabethes* and represent a clear case of symplesiomorphy with *Wyeomyia*.

Although *Peytonulus* seems to show affinities with *Davismyia* and *Sabethoides*, the morphological data have not been thoroughly compared against all species of the subgenus *Sabethes*. This subgenus is poorly known at present and appears to be a rather heterogeneous assemblage of species. Thus, the relationships suggested here are tentative and await further analysis of the entire genus.

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**Table 1.** Comparison of diagnostic and differential characters for the five subgenera of *Sabethes*.

| Stage | Character                                                                | <i>Peytonulus</i>            | <i>Sabethes</i>                                       | <i>Sabethoides</i>                | <i>Sabethinus</i>                              | <i>Davismyia</i>                                        |
|-------|--------------------------------------------------------------------------|------------------------------|-------------------------------------------------------|-----------------------------------|------------------------------------------------|---------------------------------------------------------|
| Adult | Prealar setae                                                            | No                           | No                                                    | No                                | No                                             | Yes                                                     |
|       | Upper proepisternal setae                                                | Yes                          | No, except <i>batesi</i>                              | Yes                               | Yes                                            | Yes                                                     |
|       | Lower mesokat-episternal setae                                           | Yes                          | Yes/no, variable                                      | Yes                               | No                                             | Yes                                                     |
|       | Leg paddles                                                              | No                           | Yes, but not all species                              | No                                | No                                             | No                                                      |
|       | Midtarsus largely white-scaled on ventral side                           | No                           | No, but some species with white scaling on both sides | Yes                               | No                                             | No, but females with some white scaling on ventral side |
| Larva | Seta 4-C lateral to 1-C                                                  | Yes, rarely in line with 1-C | Yes/no, usually mesal to 1-C                          | No, mesal to 1-C                  | Yes, occasionally in line with 1-C             | Yes                                                     |
|       | Seta 8-T anterior or anteroventral to 9-T                                | Yes                          | No, dorsal or anterodorsal to 9-T                     | No, dorsal or anterodorsal to 9-T | Yes/no anteroventral or ventral to 9-T         | No, dorsal to 9-T                                       |
|       | Seta 1-I mesal to 2-I                                                    | Yes                          | Yes                                                   | Yes                               | No, lateral to 2-I                             | No, lateral to 2-I                                      |
|       | Seta 10-I in line with or mesal to 13-I, usually mesal                   | Yes                          | No, in line with or lateral to 13-I, usually lateral  | Yes                               | No, in line with or lateral to 13-I            | No, far lateral to 13-I                                 |
|       | Seta 9-II,III anterior or anteroventral to seta 7, usually anteroventral | Yes                          | No, anterior or anterolateral to 7                    | Yes                               | Yes/no, sometimes anterolateral on segment III | Yes                                                     |

|      |                                                         |     |                                                                                          |                                                                      |                               |                             |
|------|---------------------------------------------------------|-----|------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------|-----------------------------|
|      | Seta 12-IV,V<br>lateral to seta 13                      | Yes | Yes/no, usually<br>mesal to 13                                                           | Yes                                                                  | Yes                           | Yes                         |
|      | Seta 1-VII modified,<br>on tubercle, mesal<br>to seta 2 | Yes | No, normal,<br>lateral to 2                                                              | No, normal,<br>lateral to 2                                          | No, normal,<br>posterior to 2 | No, normal,<br>lateral to 2 |
|      | Comb scales large,<br>separated                         | Yes | No, smaller,<br>close-set                                                                | No, smaller,<br>close-set                                            | Yes                           | Yes                         |
|      | Comb plate<br>present                                   | No  | No                                                                                       | No                                                                   | Yes                           | No                          |
|      | Setae 1a,2a-S<br>each represented<br>by one seta        | Yes | Yes/no,<br>each usually<br>duplicated                                                    | Yes, except<br><i>chloropterus</i>                                   | Yes                           | Yes                         |
|      | Auxiliary seta<br>4b-X present                          | No  | No                                                                                       | No                                                                   | Yes                           | No                          |
|      | Siphon long<br>and slender                              | Yes | No                                                                                       | No, except<br><i>chloropterus</i>                                    | Yes                           | No                          |
| Pupa | Seta 5-III much<br>smaller than<br>5-IV-VI              | Yes | Yes, except<br><i>shannoni</i> and<br><i>purpureus</i>                                   | Yes                                                                  | Yes                           | No, as large<br>as 5-IV-VI  |
|      | Seta 1-VII<br>present                                   | No  | Yes                                                                                      | Yes                                                                  | Yes                           | Yes                         |
|      | Seta 8-VII normal,<br>ventral                           | Yes | Yes                                                                                      | Yes                                                                  | No, very large,<br>dorsal     | Yes                         |
|      | Paddle normal                                           | Yes | Yes/no, some<br>species with<br>differentiated<br>membranous<br>area at base<br>dorsally | No, with<br>differentiated<br>membranous<br>area at base<br>dorsally | Yes                           | Yes                         |

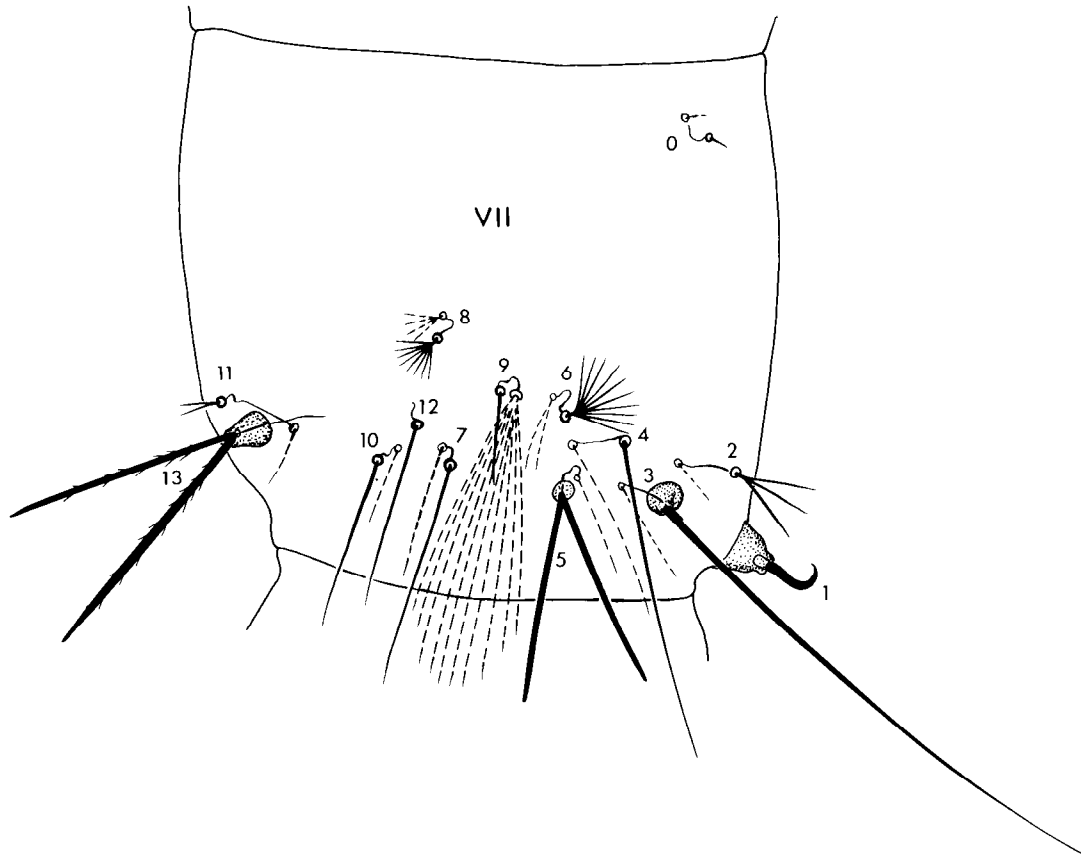


Fig. 4. Lateral view of abdominal segment VII of the prepupal stage of *Sabethes (Peytonulus) undosus* showing the neural connections between larval and developing pupal setae. Note that seta 1 is not innervated in the larva and absent in the pupa. Setae 12 and 13 are innervated in the larva but their structural homologs are absent in the pupa. Illustration is based on specimen number TR 700-1A (from Trinidad) in the NMNH.

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