

Two New Species of the Subgenus *Peytonulus* of *Sabethes* (Diptera: Culicidae) from Colombia

Ralph E Harbach

Department of Entomology, The Natural History Museum, Cromwell Road, London SW7 5BD, U.K.

The adults and male genitalia of two new species of Sabethes subgenus Peytonulus are described from Colombia. The male genitalia are illustrated and the species are distinguished from one another and other members of the subgenus.

Key words: *Sabethes* – *Peytonulus* – new species – mosquitoes – Culicidae

Mosquitoes of the subgenus *Peytonulus* Harbach of the genus *Sabethes* Robineau-Desvoidy are found throughout the New World tropics. The individual species are very poorly known, and it is likely that many new species await discovery. Ten species, including the two described in this paper, are now recognized. Because of the phytotelmic requirements of the immature stages, the abundance of these mosquitoes may be a good indicator of the health of tropical forests.

This paper is part of a continuing effort to revise the genus *Sabethes*. The overall objective is to provide descriptions and keys to make identifications possible and to permit the study of these mosquitoes in relation to human health and biodiversity. Other papers which contribute to this goal include Harbach and Peyton (1990, 1991, 1992), Harbach (1991a, 1991b, 1992, 1994, 1995) and Harbach and Petersen (1992).

MATERIALS AND METHODS

The mosquitoes examined in this study were borrowed from the Smithsonian Institution, Washington, D.C. and the School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Maryland, U.S.A. Observations were made under simulated natural light. The form of presentation, descriptive terminology and abbreviations follow Harbach and Knight (1980, 1982) and recent papers in this series (see above).

TAXONOMIC TREATMENT

Sabethes (Peytonulus) xenismus sp. n.
(Fig. 1A-C)

Adult - Sexes essentially identical in body size and outward appearance, exhibiting slight second-

ary sexual differences in antennal structure only. Medium-sized mosquitoes with brilliant metallic-colored scaling; scales of head capsule, thorax and abdomen very broad and flat; scales of vertex and antepnotum with different combinations of metallic violet, blue and gold reflections, predominantly violet; postpronotum with gold scales; scales of postgena, thoracic pleura and coxae silvery white; scutal and scutellar scales dark with metallic blue, green and gold reflections; mesopostnotum without scales; proboscis and legs metallic blue and violet, legs predominantly violet, femora and anterior portions of tibiae with golden scaling ventrally; wing entirely dark-scaled with blue, gold, violet and green iridescence when viewed from certain angles; abdominal terga primarily metallic blue and violet, lateral margins broadly silvery white to pale gold, sterna with metallic golden-brown scales which appear silvery-yellow from certain angles.

FEMALE - Head: eyes joined above and below. Occiput with transverse row of short semi-erect scales at back of head. Ocular setae moderately long, black, close to margin of eye; 2 long, bronzy, approximated interocular setae present. Antenna dark; length about 1.9 mm, essentially same length as proboscis; pedicel large, pubescent, with minute setae on mesal side; flagellum moderately verticillate, whorls with 8 setae, longest setae about 0.25 antenna length, flagellomere 1 with inconspicuous cluster of dark scales on mesal side. Clypeus and frons without setae and scales, with dense covering of silvery pubescence. Proboscis short, straight, distal 0.3 distinctly flattened and expanded laterally; length 1.9 mm, about 0.8 length of forefemur, essentially same length as hindfemur; entirely dark-scaled; with 5,6 basal labial setae. Maxillary palpus short, about 0.2 length of proboscis; dark-scaled, ventral surface without scales. **Thorax:** integument generally pale

yellow to light brown; mesopostnotum medium brown with contrasting median longitudinal stripe of pale yellow integument, stripe widened posteriorly at level of mesopostnotal setae, integument of stripe slightly raised and keel-like before setae. Dorsum with dark setae on anterior promontory (8), anteprenotum (15,16), supraalar area (about 24), scutellum (4 on midlobe; 8-10 on each lateral lobe) and mesopostnotum (10-14). Pleura with prespiracular (2,3), upper proepisternal (1,2), lower mesokatepisternal (2,3) and upper mesepimeral setae (12,13); prespiracular setae dark, others yellow or golden. Lower part of proepisternum without scales, scales on upper part contiguous with scales on anteprocoxal membrane; scales absent from postprocoxal membrane; mesopleuron with scales except on lower anterior margin of mesokatepisternum, narrow upper posterior margin of mesepimeron and mesomeron; scales absent from metapleuron, metameron and postmetacoxal membrane. *Wing*: length 3.7 mm; scales on veins moderately broad and slightly asymmetrical, smaller on cubitus and anal veins; alula with fine piliform scales on margin distally; calypters without setae. *Halter*: scabellum without scales, integument pale; pedicel and capitellum dark-scaled. *Legs*: without paddles; coxae and trochanters with silvery-white scales, trochanters with some dark scales dorsally at apex; femora dark above and golden below; tibiae mainly dark with golden scaling on proximal portion of ventral surface; tarsi entirely dark-scaled (hindtarsomere 5 without ventral white scaling). Forefemur about 1.25 length of proboscis, essentially same length as midfemur, about 1.25 length of hindfemur; hindtibia essentially as long as hindfemur, hindtarsomere 1 longer than hindfemur. Ungues small, simple, dark. *Abdomen*: coloration as noted above, lateral pale areas of terga rather large and rounded.

MALE - Slightly smaller but otherwise like female except for sexual characters. *Head*: antenna more strongly verticillate, setae more numerous (14 in proximal whorls) and longer (about 0.33 antennal length). Proboscis with dorsal patch of white scales 0.5-0.8 from base and ventral patch of golden scales 0.5-0.9 from base. Maxillary palpus smaller, about 0.15 proboscis length. *Genitalia* (holotype, Fig. 1A-C): tergum VIII (ventral in position) (not figured) with shallow broadly V-shaped emargination at middle of posterior margin, posterolateral margins evenly rounded, posterior border lined with 5-6 rows of setae which are much longer and denser on posterolateral areas. Tergum IX without distinct lobes, 2,3 setae on either side widely separated by narrow bridge. Gonocoxite elongate, proximal 0.75 roughly rect-

angular in lateral view, distal 0.25 abruptly tapered to apex, approximately apical half of sternal surface covered with scales and short setae, bearing 2 long tergomesal setae below level of basal mesal lobe (only 1 seta present on right gonocoxite; 2 alveoli evident on each); basal mesal lobe roughly triangular, covered with small slender setae and bearing 2 large setae at caudolateral angle. Gonostylus (side view) large, about 0.75 length of gonocoxite; stem short, about half length of head, bearing a striated blade-like process (sl) on sternal side; head as figured, bearing 3 well developed lobes and a large membranous tergal process (tp); lobe A,E laterally flattened and slightly longer than wide, seta a short and stout and inserted on margin near apex, sternolateral edge of lobe with fringe of specialized setae which begin as short conical setae near seta a and become progressively longer and characteristically curved near base of lobe M, mesal side of sternal margin with small patch of fine spicules adjacent to bases of largest setae; a large curved saber-like seta projects from angle between lobes A,E and M; lobe M narrowed and slightly bent apically, with a short stout apical seta and 2 small conical setae on sternolateral margin; lobe C a proximally directed process arising from basal sternomesal margin of lobe M, sternal edge curled mesad and serratulate. Aedeagus (not figured) badly damaged on microscope slide, apparently longer than wide, apical tergal arms probably not fused. Proctiger (not figured) with large basal sclerotization (tergum X); paraproct with 4 apical teeth and 2,3 subapical cercal setae.

Egg, larva and pupa - Unknown. The type specimens were apparently reared from larvae or pupae, but the associated exuviae were either not retained or subsequently lost.

Systematics - *Sabethes xenismus* is easily distinguished from the other species of *Peytonulus* by the median longitudinal pale area of the mesopostnotum. Males of this species are also unique in having a patch of pale scales on the dorsal surface of the proboscis. The absence of white scaling on the ventral surface of hindtarsomere 5 is shared with *Sa. identicus* Dyar & Knab, *Sa. ignotus* sp.n. (see below) and *Sa. whitmani* Lane & Cerqueira. Besides this character, there are no clear synapomorphies linking *Sa. xenismus* to any other described species of *Peytonulus*. The male genitalia bear some resemblance to those of *Sa. whitmani*, but the individual lobes of the gonostylus are different. The affinities of *Sa. xenismus* remain obscure pending a revision of the subgenus.

Etymology - The specific name is a noun, derived from the Greek *xenismos*, meaning strangeness or novelty.

Bionomics - Label data indicate that the type

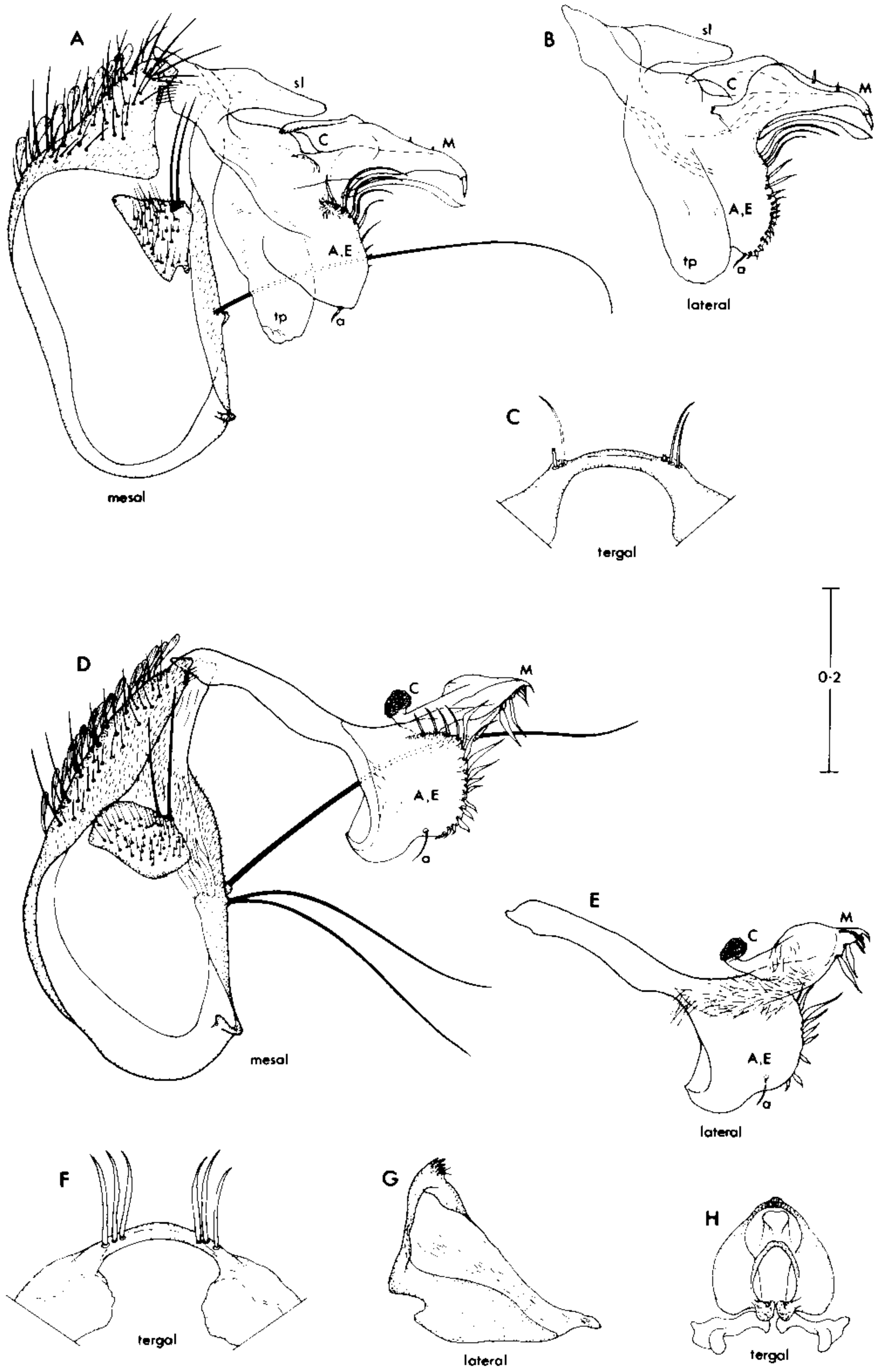


Fig. 1: male genitalic structures of *Sabethes (Peytonulus) xenismus* (A-C) and *Sabethes (Peytonulus) ignotus* (D-H). Aspects as indicated (A, D - gonocoxopodite and basal mesal lobe; B, E - gonostylus; C, F - tergum IX; G - proctiger; H - aedeagus, with parameres attached). Scale in mm.

specimens were reared from larvae or pupae collected in bamboo. Nothing else is known about the bionomics of this species.

Distribution - Known from the type locality.

Material examined - Holotype male ([C]-473.2) with dissected genitalia on microscope slide, COLOMBIA, Chichimene, 11-VIII-47; paratypes, 2 females (C-473.1 and C-473), VIII-1947, bamboo. Holotype in the Natural History Museum, London; paratypes in the School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Maryland.

Sabethes (Peytonulus) ignotus sp. n.
(Fig. 1D-H)

Adult - As described for *Sa. xenismus*; the female and male differ from that species as follows.

FEMALE - *Head*: proboscis shorter, slightly curved downward, distal 0.3 expanded laterally; length 1.7 mm, about 0.7 length of forefemur and 0.75 length of hindfemur; with 3,4 basal labial setae. *Thorax*: integument dark brown; mesopostnotum entirely dark, surface evenly rounded. Dark setae on anterior promontory (10-20), antepnotum (12-18), supraalar area (about 26), scutellum (4-6 on midlobe; 5 on each lateral lobe) and mesopostnotum (9-14); yellow or golden setae on prespiracular (3,4), upper proepisternal (1,2), lower mesokatepisternal (3-6) and upper mesepimeral (12,13) areas. *Wing*: length 3.6-3.8 mm. *Legs*: ventral surfaces of femora, tibiae and first tarsomeres with golden scaling; coloration otherwise the same as *Sa. xenismus*, including hindtarsomere 5 entirely dark-scaled. Forefemur about 1.5 length of proboscis, essentially same length as midfemur; hindfemur relatively longer than in *Sa. xenismus*, forefemur about 1.1 length of hindfemur; hindtibia same length as hindfemur.

MALE - *Head*: proboscis with small ventral patch of bright white scales 0.7 from base to base of labellae. *Genitalia* (Fig. 1D-H): tergum VIII (ventral in position) (not figured) with posterior margin deeply emarginate in middle, emargination reaching 0.5 length of tergum; posterolateral corners produced, rounded, imparting nearly oval shape to each lateral half of tergum; posterior margin on either side of emargination with 4-5 rows of prominent caudally directed setae, shortest setae near emargination, about same length as tergum, longest setae on lateral quarter, about twice length of tergum. Tergum IX lobes widely separated by narrow bridge, lobes slightly produced (not evident in Fig. 1F), each bearing 3 setae with apices bent slightly laterad. Gonocoxite elongate, tapered in distal half, distal part of sternal surface covered with scales and short setae, with a cluster of longer stouter setae on lateral side at apex (not

shown in Fig. 1D), bearing 1 long and 2 shorter tergomesal setae immediately below level of basal mesal lobe; basal mesal lobe with rounded margins, covered with small slender setae and bearing 2 large setae at caudolateral angle. Gonostylus (side view) about 0.75 length of gonocoxite; stem narrow, straight; head short and broad, about 0.7 length of stem, width about 1.8 length, with 3 lobes developed; lobe A,E large, laterally flattened, with tergal projection beyond base of seta a, seta a relatively long, slender and bent, with fringe of specialized setae which begin as short stout pointed setae near seta a and become progressively longer and flattened along sternoapical edge; lobe M a sternally directed lobe with a tapered and bent apex, bearing 2 relatively large flat setae on caudal margin and close row of small setae which diminish in size in proximal direction on lateral side near apex of lobe; lobe C a stemmed process arising from middle of sternolateral side of lobe M, bent slightly mesad, bearing a globular head covered with rows of minute decumbent spicules. Aedeagus very nearly as wide as long, broadest in proximal 0.6; with submedian tergal arms joined at midline to form a narrow median tergal bridge; apical tergal arms fused and forming an apical tergal bridge with a small median tubercle; median sternal plate sclerotized, apex slightly flared and hoodlike. Proctiger (in lateral view) with broad basal sclerotization (tergum X) attached at right angle to paraproct; paraproct narrow with enlarged apex bearing 4-7 small apical teeth and 1,2 subapical cercal setae.

Egg, larva and pupa - Unknown.

Systematics - *Sabethes ignotus* resembles *Sa. identicus*, *Sa. whitmani* and *Sa. xenismus* in having hindtarsomere 5 entirely dark-scaled. Both sexes are distinguished from *Sa. xenismus* by the entirely dark mesopostnotum. The females of *Sa. ignotus*, *Sa. identicus* and *Sa. whitmani* are indistinguishable, but the males of these species are easily distinguished by features of the genitalia and the distribution and color of pale scaling on the ventral surface of the proboscis. The affinities of *Sa. ignotus* are unknown, and may remain so until the immature stages are discovered and described.

Etymology - The specific name is a Latin adjective, meaning unknown, obscure, strange.

Bionomics - No bionomical data are associated with the type specimens.

Distribution - Known only from the type locality.

Material examined - Holotype male (740627-67) with dissected genitalia on microscope slide, COLOMBIA, Meta, Villavicencio, 1944, M. Bates; paratypes, 1 male (740627-68) with dissected geni-

talia on microscope slide and 1 male and 2 females with same data as holotype. The last three specimens were severely damaged when sent by mail from the National Museum of Natural History (NMNH), Smithsonian Institution, to the Natural History Museum in 1993. Each of the type specimens bears a label inscribed with "CV 101A / Villavicencio, Col / Rozeboom 47-48". According to unpublished collection records of the Mosquitoes of Middle America project (Belkin & Heinemann 1973) housed in the NMNH, collection number CV 101A was made by M Bates in 1944. The type series is deposited in the NMNH, Washington, D.C.

ACKNOWLEDGMENTS

To Ronald A Ward, retired, formerly at the Walter Reed Army Institute of Research, Washington, D.C., and John F Reinert, Medical and Veterinary Entomology Research Laboratory, U.S. Department of Agriculture, Gainesville, Florida, provided critical comments on the manuscript. Theresa Howard, Natural History Museum, labelled the drawings.

REFERENCES

- Belkin JN, Heinemann SJ 1973. Collection records of the project "Mosquitoes of Middle America" 1. Introduction; Dominican Republic (RDO). *Mosq Syst* 5: 201-220.
- Harbach RE 1991a. A new subgenus of the genus *Sabethes* (Diptera: Culicidae). *Mosq Syst* 23: 1-9.
- Harbach RE 1991b. Ontogeny of the larval stage of *Sabethes chloropterus*, with special reference to setal development and phylogenetic implications for the family Culicidae (Diptera). *Mosq Syst* 23: 10-24.
- Harbach RE 1992. Neotype designation, generic realignment and description of *Dendromyia schnusei* Martini (Diptera: Culicidae). *Mosq Syst* 23: 175-181.
- Harbach RE 1994. The subgenus *Sabethinus* of *Sabethes* (Diptera: Culicidae). *Syst Entomol* 19: 207-234.
- Harbach RE 1995. A new *Sabethes* of the subgenus *Peytonulus* (Diptera: Culicidae) with an unusual fourth-instar larva. *Entomol Scand* 26: 87-96.
- Harbach RE, Knight KL 1980. *Taxonomists' glossary of mosquito anatomy*. Plexus Publishing, Inc., Marlton, New Jersey, xi + 415 pp.
- Harbach RE, Knight KL 1982. Corrections and additions to *Taxonomists' glossary of mosquito anatomy*. *Mosq Syst* 13: 201-217.
- Harbach RE, Petersen JL 1992. Two species previously confused under the concept of *Sabethes tarsopus* in Central America (Diptera: Culicidae). *Mosq Syst* 24: 102-124.
- Harbach RE, Peyton EL 1990. A new subgenus in *Wyeomyia* (Diptera: Culicidae), with the reclassification and redescription of the type species, *Sabethes fernandezyepezi*. *Mosq Syst* 22: 15-23.
- Harbach RE, Peyton EL 1991. Transfer of the subgenus *Davismyia* from *Wyeomyia* to *Sabethes* and description of the type species, *Miamyia petrocchiaie* (Diptera: Culicidae). *Mosq Syst* 22: 149-159.
- Harbach RE, Peyton EL 1992. A new subgenus of *Wyeomyia* (Diptera: Culicidae), with the reclassification and redescription of *Wyeomyia (Davismyia) arborea*, *Wyeomyia (Dendromyia) tarsata* and *Sabethes (Sabethes) carrilloi*. *Mosq Syst* 23: 92-109.