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Two new species of the subgenus *Sabethinus* of *Sabethes* (Diptera: Culicidae) from Costa Rica, first confirmation of members of the subgenus in Central America

RALPH E. HARBACH
Department of Life Sciences, Natural History Museum, Cromwell Road, London SW7 5BD, UK. E-mail: r.harbach@nhm.ac.uk

Abstract

Two new species of *Sabethes* subgenus *Sabethinus* (Diptera: Culicidae) from Costa Rica are formally named *Sa. andreae* and *Sa. theresae*. Descriptions consisting of differential and diagnostic morphological characters are provided for adults, male genitalia and fourth-instar larvae. The male genitalia and the fourth-instar larva and pupa of both species are illustrated. The species are compared with the four previously described species known to occur only in South America, i.e. *Sa. idiogenes*, *Sa. intermedius*, *Sa. melanonymphe* and *Sa. xhyphydes*. A new country record for Colombia is reported for *Sa. xhyphydes* and keys are provided to distinguish the adults and larvae of the six species.

Key words: *andreae* **sp. n.**, keys, mosquito, taxonomy, *theresae* **sp. n.**

Introduction

Species of the genus *Sabethes* Robineau-Desvoidy are the culicid equivalent of the *Morpho* butterflies in the Neotropical Region. Species of *Sabethes*, however, are not nearly as well-known as species of *Morpho* Fabricius, probably because the adults are less conspicuous and collected less frequently, and the larvae, which are restricted to phytotelm habitats, are difficult to find, collect and rear to adulthood for taxonomic study.

Sabethes, as currently understood, includes 39 described species classified in five subgenera: *Davismyia* Lane & Cerqueira (1 species), *Peytonulus* Harbach (12 species), *Sabethes* (18 species), *Sabethinus* Lutz (4 species) and *Sabethoides* Theobald (4 species). Up-to-date information for the genus and the subgenera, with a list of species included in each, is available in the online Mosquito Taxonomic Inventory (http://mosquito-taxonomic-inventory.info/). The species of subgenus *Sabethinus* include *Sa. idiogenes* Harbach, *Sa. intermedius* (Lutz), *Sa. melanonymphe* Dyar and *Sa. xhyphydes* Harbach. One or more of these species are recorded from each of only six countries in South America (Argentina, Bolivia, Brazil, Colombia, French Guiana and Peru). With the elimination of a questionable record of *Sa. intermedius* in Panama, Harbach (1994) stated that there was "no evidence that species of *Sabethinus* occur in Central America." From the present study, it is obvious that statement was wrong—the two new species of *Sabethinus* described here were discovered in Costa Rica.

Material and methods

This study is based on specimens collected in the vicinity of Golfito, a port town located in Puntarenas Province on the southern Pacific Coast of Costa Rica near the border with Panama. Collections included adults and larvae. Larvae were reared individually to obtain adults with associated larval and pupal exuviae. Some fourth-instar larvae were also studied. Species concepts are based on a correlation of anatomical features in associated life stages. Diagnostic and differential characters were confirmed in all of the specimens listed in the material examined sections. Observations of the adults were made under simulated natural light. Larval and pupal chaetotaxy were studied using differential interference contrast microscopy. Measurements and counts are based on

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at least 5–8 specimens. Numbers in parentheses represent means (for measurements and ratios) and modes (for counts) of the reported ranges. The morphological terminology used herein is defined in the Anatomical Glossary of the Mosquito Taxonomic Inventory (URL above). The symbols ♀, ♂, Le, Pe and L are used in the sections on material examined to represent female(s), male(s), larval exuviae, pupal exuviae and fourth-instar larvae, respectively. Male and female genitalia are denoted by the letter G (genitalia) used in combination with the male and female symbols. Recognition of the new species is based on detailed morphological comparisons with the four previously described species of the subgenus (Harbach, 1994). All specimens are deposited in the Museo Nacional de Costa Rica (MNCR), formerly the Instituto Nacional de Biodiversidad (INBio), Cuesta de Moras, San José, Costa Rica.

Detailed larval and pupal chaetotaxy tables (ranges and modes of setal branches) are not provided for the two new species described below. Several years ago, Tom Zavortink, Anice Sallum and I discussed the value of recording the number of branches for all larval and pupal setae of mosquitoes and agreed that most of the information was not useful for distinguishing species and was of little use in phylogenetic analyses. It was also evident that such data are usually obtained from relatively few specimens (usually 5–10 of each life stage) from one or a few localities, which probably does not reflect the actual range of variation of setal branching. Differences in the relative position and specific form of homologous setae provide more robust taxonomic information than setal branching. For these reasons, the descriptions of the new species described here are based on explicit diagnostic and differential morphological characters.

Subgenus *Sabethinus* Lutz

Harbach (1991) provided a tabulated comparison of diagnostic and differential characters for the five subgenera of *Sabethes*. The tabulation serves, like a dichotomous key, to distinguish the subgenera and to determine to which subgenus, based on adult, larval and pupal characters, a species of *Sabethes* belongs. Only three of those characters are unique, i.e. diagnostic, for the subgenus *Sabethinus*—the presence of a comb plate and seta 4b-X in larvae, and the dorsal position of seta 8-VII in pupae. The occurrence of these features in the species formally named below immediately identifies them as species of subgenus *Sabethinus*.

Sabethes (*Sabethinus*) *andreae*, sp. n.

(Figs 1–3)

Adult, male and female. As described for the subgenus (Harbach, 1994). Similar in size and general appearance to other species of the subgenus; bearing the following distinctive and diagnostic features. *Head*: Vertex with iridescent violet scales; occiput with indistinct dull golden scales; proboscis with distal 0.2–0.3 flattened and gradually expanded laterally, more so in male than female, proboscis of female entirely dark-scaled, labella pale (yellow), proboscis of male with ventral patch of pale scaling 0.7–0.9 from base, scales yellow proximally grading into pure white distally. *Thorax*: Antepronotum with scales appearing bright iridescent azure blue in dorsal view, these noticeably different than iridescent violet scales of vertex; postgena with slightly golden to silvery-white scales. *Legs*: Predominantly dark-scaled, ventral surfaces of midtarsomeres 2 and 3, and usually part or all of tarsomere 4, with yellowish-white scaling; ventral surface of hindtarsomere 5, and sometimes distal part of hindtarsomere 4, white-scaled. *Male genitalia* (Fig. 1A–D): Ninth tergal lobes not produced, each side of tergum with 2–4(3) elongate, distally compressed and apically bent setae. Head of gonostylus without tergal process; lobe M without stem, broad and distally quadrate in lateral view, with a somewhat cylindrical lobe (?B) projecting more or less parallel to gonostylar stem from proximal area of mesal surface; lobe C a sharply recurved arm projecting toward gonostylar stem from near base of lobe M, free end with minute spicules on recurved side and acuminate apex.

Egg. Unknown.

Larva, fourth-instar (Fig. 2). As described for the subgenus (Harbach, 1994); character and placement of setae as figured; resembles *Sa. idiogenes* in having the stellate setae generally more highly branched than in other species of the subgenus; differing in the following primary differential and diagnostic features. *Head*: Seta 15-C

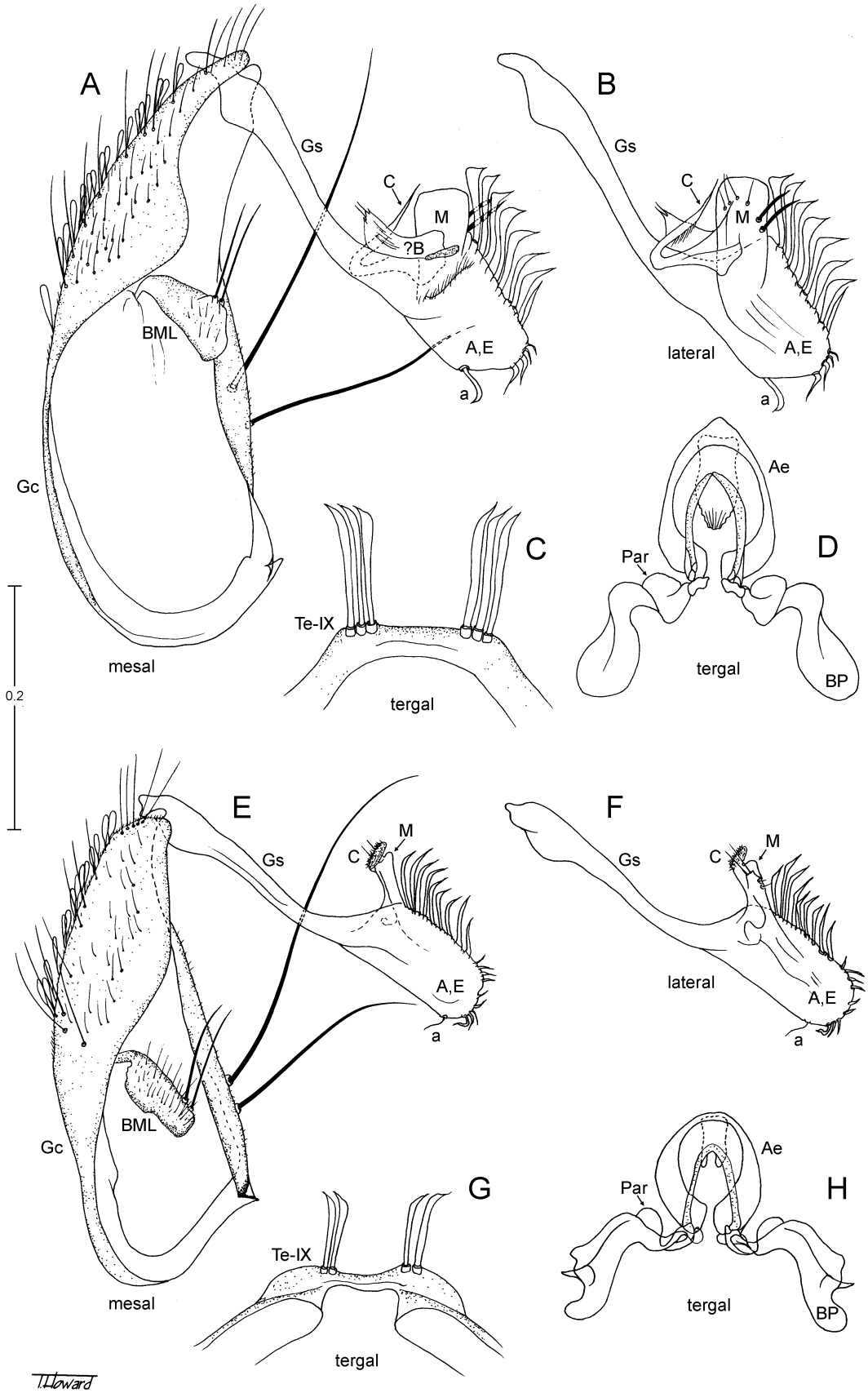

FIGURE 1. Male genitalia of (A–D) *Sabethes* (*Sabethinus*) *andreae* **sp. n.** and (E–H) *Sa.* (*Sab.*) *theresae* **sp. n.** A, E, Gonocoxopodite; B, F, gonostylus; C, G, tergum IX; D, H, aedeagus with parameres and basal pieces attached. Aspects as indicated: A, E, C, M and ?B, gonostylar lobes; a, seta a of gonostylar head; Ae, aedeagus; BML, basal mesal lobe; BP, basal piece; Gc, gonocoxite; Gs, gonostylus; Par, paramere; Te-IX, tergum IX. Scale in mm.

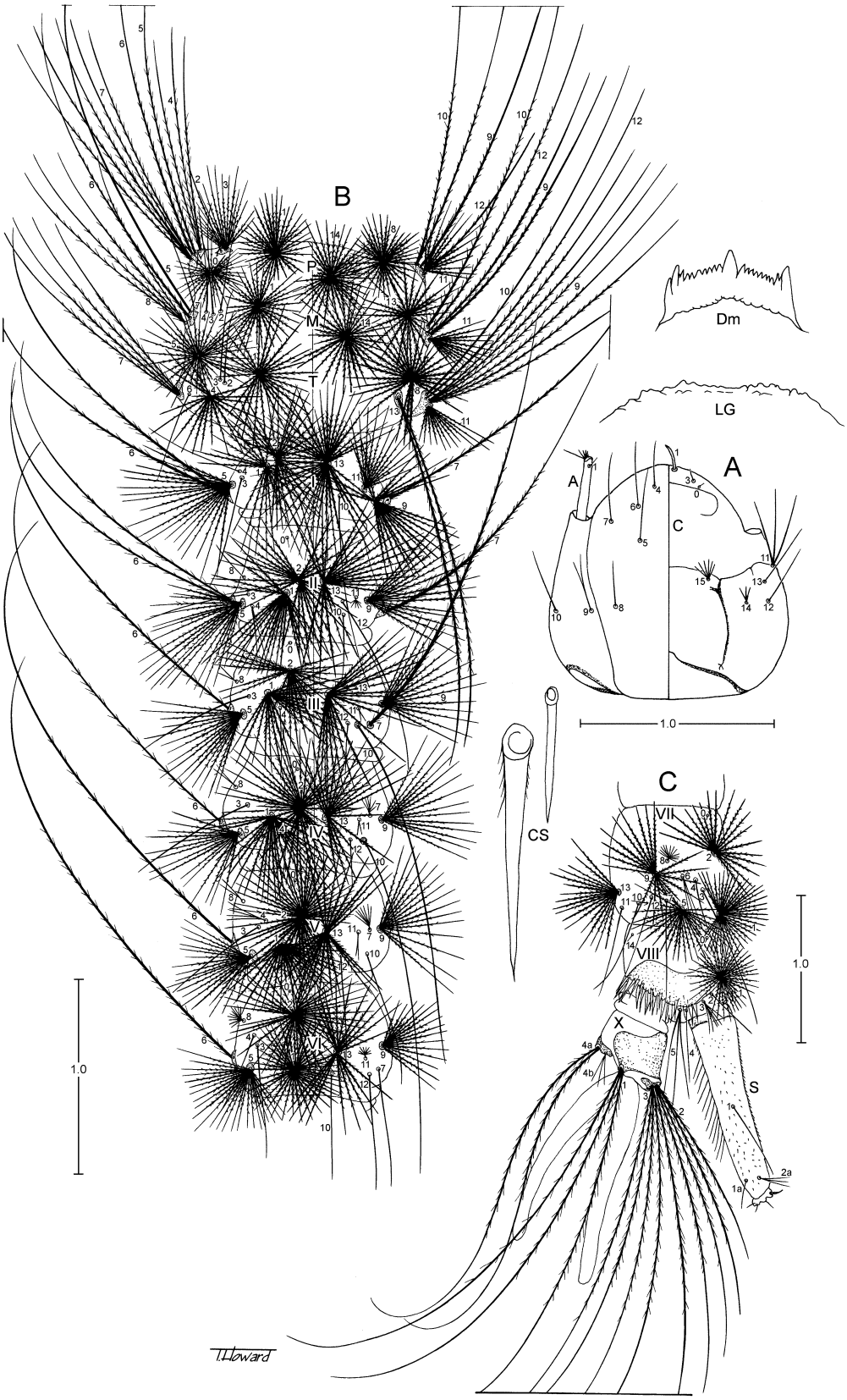

FIGURE 2. Fourth-instar larva of *Sabethes* (*Sabethinus*) *andreae* **sp. n.** A, Head, dorsal (left) and ventral (right) aspects of left side. B, Thorax and abdominal segments I–VI, dorsal (left) and ventral (right) aspects of left side. C, Abdominal segments VII–X, left side. A, antenna; C, cranium; CS, comb scale; Dm, dorsomentum; LG, labiogula; P, prothorax; M, mesothorax; S, siphon; T, metathorax; I–VIII,X = abdominal segments I–VIII and X; 1–15 = setal numbers for specified areas, e.g. seta 5-C. Scales in mm.

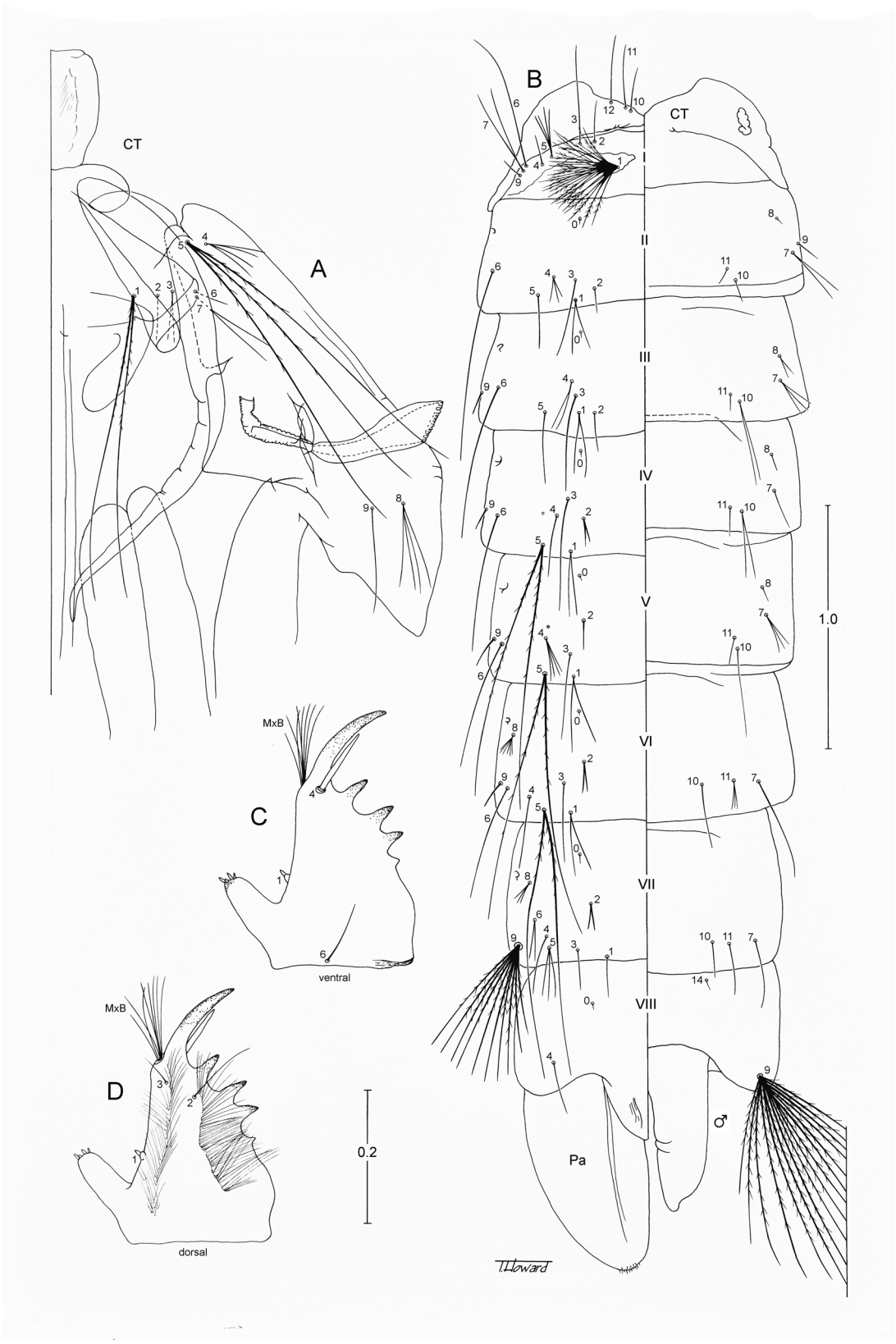

FIGURE 3. Pupa and maxilla of fourth-instar larva of *Sabethes* (*Sabethinus*) *andreae* **sp. n.** A, B, Pupa: A, left side of cephalothorax, dorsal to right; B, dorsal (left) and ventral (right) aspects of metathorax and abdomen. C, D, Maxilla (Mx) (aspects as indicated). CT, cephalothorax; MxB, maxillary brush; Pa, paddle; I-VIII = abdominal segments I–VIII; 1–14 = setal numbers for specified areas, e.g. seta 3-I and 6-Mx. Scales in mm.

more weakly developed than in *Sa. intermedius* (particularly), *Sa. idiogenes* and *Sa. xhyphydes*, similar to 15-C of *Sa. melanonymphe* but with fewer branches (5 or 6). Maxilla (Fig. 3) with 3 prominent and 1 or 2 smaller teeth in lateral row; apical tooth distinctly longer than seta 4-Mx; seta 1-Mx peg-like, borne on tubercle as in the South American species but arising farther laterad on dorsal surface than usual, visible at side of maxilla in ventral view; seta 4-Mx relatively short and distinctly stout. *Thorax*: Seta 13-T double, very long, length 1.85–2.40 mm (mean = 2.13 mm). *Abdomen*: Seta 2-I strongly developed, stellate (distinction from *Sa. xhyphydes*); seta 9-I strongly developed, stellate (distinction from *Sa. intermedius*, *Sa. melanonymphe*, *Sa. theresae* **sp. n.** and *Sa. xhyphydes*); seta 4-III,IV inserted ventromesad of seta 1 (unique, inserted anterior, anterolateral or lateral to seta 1 in *Sa. idiogenes*, *Sa. intermedius*, *Sa. melanonymphe* and *Sa. xhyphydes*; mesad of seta 1 in *Sa. theresae* **sp. n.**). *Segment VIII*: Comb similar to that of *Sa. idiogenes* in having numerous spine-like scales (25–47, mean = 35). *Siphon*: Relatively short, length 1.20–1.40 mm (mean = 1.25 mm), width at mid-length 0.22–0.27 mm (mean = 0.25 mm), index 4.44–6.36 (mean = 5.09); basal sclerotisation pale, indistinct (unique); lateral surfaces without column of distinctly larger spicules extending from seta 1-S to apex (unique). *Segment X*: Seta 2-X with 4 or 5 branches, usually 5 (distinction from *Sa. idiogenes*, *Sa. intermedius*, *Sa. melanonymphe* and *Sa. xhyphydes*); seta 3-X with 4 or 5 branches, usually 4 (unique); seta 4b-X with 2–5(4) branches.

Pupa (Fig. 3). As described for the subgenus (Harbach, 1994); character and positions of setae as figured; very similar to the other species of the subgenus. *Abdomen*: Seta 8-VII weakly developed, with 3–5(3) branches (distinction from *Sa. idiogenes*, *Sa. intermedius*, *Sa. melanonymphe* and *Sa. xhyphydes*). *Paddle*: Length 0.82–0.90 mm (mean = 0.86 mm), width at widest point 0.50–0.52 mm (mean = 0.51 mm), index 1.58–1.73 (mean = 1.68); apex rounded as in *Sa. melanonymphe* and *Sa. theresae* **sp. n.** (apex more triangulate in *Sa. idiogenes*, *Sa. intermedius* and *Sa. xhyphydes*).

Systematics. This is the most distinctive species of subgenus *Sabethinus* described to date. Based on features of the male genitalia and the highly branched stellate setae of the larva, including the strongly developed seta 9-I, this species seems to be more closely related to *Sa. idiogenes* than to the other species. However, it differs strikingly in other characters, including in particular the presence of pale scaling on the mid- and hindtarsi of adults, the position of seta 4-III,IV and development of the siphon of the larva, and the development of seta 8-VII of the pupa. Oddly, the pale scaling on the ventral surface of the midtarsus of adults is shared with species of the subgenus *Sabethoides*, which until now has been considered to be a diagnostic character for that subgenus (Harbach, 1991).

Etymology. This species is dedicated to my beautiful daughter Andrea Lynn, who passed away unexpectedly at the youthful age of 34. As a young girl, Andrea was very much interested in "bugs" and was especially fond of "daddy legs", i.e. daddy longlegs (order Opiliones: Arachnida).

Bionomics. Larvae of *Sa. andreae* were found exclusively in the internodes of *Merostachys latifolia* R.W. Pohl. *Merostachys* is a Neotropical genus of bamboo in the grass family Poaceae. *Merostachys latifolia* have narrow stems (8 mm) and grow to heights of only 1.5–4.0 m. The collector mixed specimens from the same habitat according to locality, so it is not known whether *Sa. andreae* was found in association with *Sa. theresae* **sp. n.**, which was found in the same type of bamboo. The small diameter of the bamboo is likely to severely limit the number of larvae that can inhabit a single internode. Larvae of *Onirion regale* Peyton & Harbach and a species of *Shannoniana* Lane & Cerqueira were also found in internodes of *M. latifolia* (G. Chaverri, personal communication, 9 May 2003). Nothing is known about the bionomics of the adults of *Sa. andreae*.

Distribution. *Sabethes andreae* is only known only from the type locality near Golfito of Puntarenas Province in southern Costa Rica. As the type locality is near the border with Panama, the species is likely to occur in that country as well.

Type series. Seventy-five specimens (7 ♀, 11 ♂, 2 ♀G, 5 ♂G, 19 Le, 18 Pe and 13 L, including 14 individual larval rearings. *Holotype* ♂ (BHB-553.08), with Le + Pe and dissected genitalia on separate microscope slides: COSTA RICA: Prov. Puntarenas, Golfito, Jiménez, ACOSA, del Cerro Mueller, 0.2 km N. hacia Cerro Rincón, 680 m, 29 Jul 01, B. Hernández, [larva collected] En internudos de *Merostachys latifolia* (Poaceae), LS 273200 521500. *Paratypes*, with same data as holotype except as otherwise indicated: 6 ♀LePe (BHB-553.3–6, 9, 12; 3 and 12 with dissected genitalia on separate microscope slides); 6 ♂LePe (BHB-553.1, 2, 10, 11, 16, 17; 16 and 17 with dissected genitalia mounted on microscope slide with LePe), 8 L (BHB-553a, 553b, 553c,d,e, 553f,g,h; a and b with dissected maxillae), 2 Le + 2 Pe on same microscope slide (BHB-553.4b); P.N. Corcovado, 0.4 km N. del Cerro Rincón, 28 Jul 01, 1 ♀LePe + 1 Le (BHB-547.2), 2 ♂LePe (BHB-547.1, 3; 3 with dissected genitalia on

separate microscope slide), 3 L (BHB-547a,b,c); P.N. Corcovado, 2.8 km N. del Cerro Mueller, 28 Jul 01, 2 ♂ (BHB-548.4, 4b; 4 with dissected genitalia on microscope slide), 2 L (BHB-548c, 548d; c with dissected maxillae). Additional specimens: 16 ♀, 13 ♂ (BHB-553); 3 ♀, 2 ♂ (BHB-548). The type series and additional specimens are deposited in the Museo Nacional de Costa Rica (MNCR), Cuesta de Moras, San José, Costa Rica.

***Sabethes* (*Sabethinus*) *theresae*, sp. n.**
(Figs 1, 4, 5)

Adult, male and female. As described for the subgenus (Harbach, 1994). Similar but somewhat darker than *Sa. andreae* **sp. n.** *Head*: Vertex with iridescent violet scales as in *Sa. andreae* **sp. n.**; postgena with golden to silvery scales at side of head; proboscis of male with ventral patch of white scales 0.60–0.85 from base. *Thorax*: Antepronotum with scales appearing iridescent golden in dorsal view, these noticeably different than iridescent violet scales of vertex. *Legs*: More extensively dark-scaled than legs of *Sa. andreae* **sp. n.**, ventral surfaces of tarsomere 5 of fore- and hindlegs white-scaled, midtarsomeres 2 and 3 with indistinct ventral pale scaling. *Male genitalia* (Fig. 1A–D): Ninth tergal lobes slightly produced, separated by very narrow bridge, each with 2 relatively short curved setae that are slightly if at all flattened distally. Head of gonostylus with smaller lobes than in *Sa. andreae* **sp. n.**; tergal process also absent; lobe M slender and stem-like, lobe ?B absent; lobe C uniquely developed among known species of the subgenus, not recurved, developed as a narrow club-like process arising from the basal sternolateral margin of lobe M and projecting more or less parallel to that lobe, free end slightly enlarged and minutely spiculate.

Egg. Unknown.

Larva, fourth-instar (Fig. 4). As described for the subgenus (Harbach, 1994); character and placement of setae as figured; differing from other species of the subgenus in the following primary differential and diagnostic features. *Head*: Seta 15-C developed as in *Sa. andreae* **sp. n.** weakly developed compared to 15-C of *Sa. intermedius*, *Sa. idiogenes* and *Sa. xhyphydes*, similar to 15-C of *Sa. melanonymphe* but with generally fewer branches (3–7). Maxilla (Fig. 5) similar to the maxilla of *Sa. idiogenes* in having the first lateral tooth displaced dorsally and not in line with the other lateral teeth, but differs in not being widely separated from the second lateral tooth; apical tooth slightly if at all longer than seta 4-Mx; seta 1-Mx slender, not peg-like and not borne on a tubercle (unique); seta 4-Mx relatively short and stout, about as long as apical tooth. *Thorax*: Seta 13-T single, stout and tapered, length 0.90–1.05 mm (mean = 0.98 mm). *Abdomen*: Seta 2-I strongly developed, stellate (distinction from *Sa. xhyphydes*); seta 9-I weakly developed compared to 9-II–VII, with 2 or 3 branches, usually 3 (distinction from *Sa. andreae* **sp. n.** and *Sa. idiogenes*); seta 4-III,IV inserted mesad of seta 1 (unique, inserted anterior, anterolateral or lateral to seta 1 in *Sa. idiogenes*, *Sa. intermedius*, *Sa. melanonymphe* and *Sa. xhyphydes*; ventromesad in *Sa. theresae* **sp. n.**). *Segment VIII*: Comb with 14–22 spine-like scales (mean = 18). *Siphon*: Relatively long, length 1.25–1.50 mm (mean = 1.39 mm), width at mid-length 0.15–0.20 mm (mean = 0.17 mm), index 6.50–9.38 (mean = 8.16); basal sclerotisation darkly pigmented, distinct; lateral surfaces with column of distinctly larger spicules extending from seta 1-S to apex (distinction from *Sa. andreae* **sp. n.**). *Segment X*: Seta 2-X with 3 or 4 branches; seta 3-X with 2 branches (distinction from *Sa. andreae* **sp. n.** and *Sa. xhyphydes*); seta 4b-X with 3–7(4) branches.

Pupa (Fig. 5). As described for the subgenus (Harbach, 1994); character and positions of setae as figured; very similar to the other species of the subgenus. *Abdomen*: Seta 8-VII weakly developed (distinction from *Sa. idiogenes*, *Sa. intermedius*, *Sa. melanonymphe* and *Sa. xhyphydes*), single or double, more often single (distinction from *Sa. andreae* **sp. n.**). *Paddle*: Length 0.69–0.80 mm (mean = 0.74 mm), width at widest point 0.33–0.40 mm (mean = 0.38 mm), index 1.82–2.42 (mean = 1.95); apex rounded as in *Sa. melanonymphe* and *Sa. andreae* **sp. n.** (apex more triangulate in *Sa. idiogenes*, *Sa. intermedius* and *Sa. xhyphydes*).

Systematics. Based on the presence of pale scaling on the legs of adults, the absence of a tergal process on the gonostylus of males and the weakly developed seta 8-VII of pupae, *Sa. theresae* **sp. n.** appears to be more closely related to *Sa. andreae* **sp. n.** than to the four South American species. The true affinities of the species may not be known until other species of the subgenus have been discovered and described (see Discussion below) and subjected to phylogenetic analyses that include a combination of morphological and molecular data.

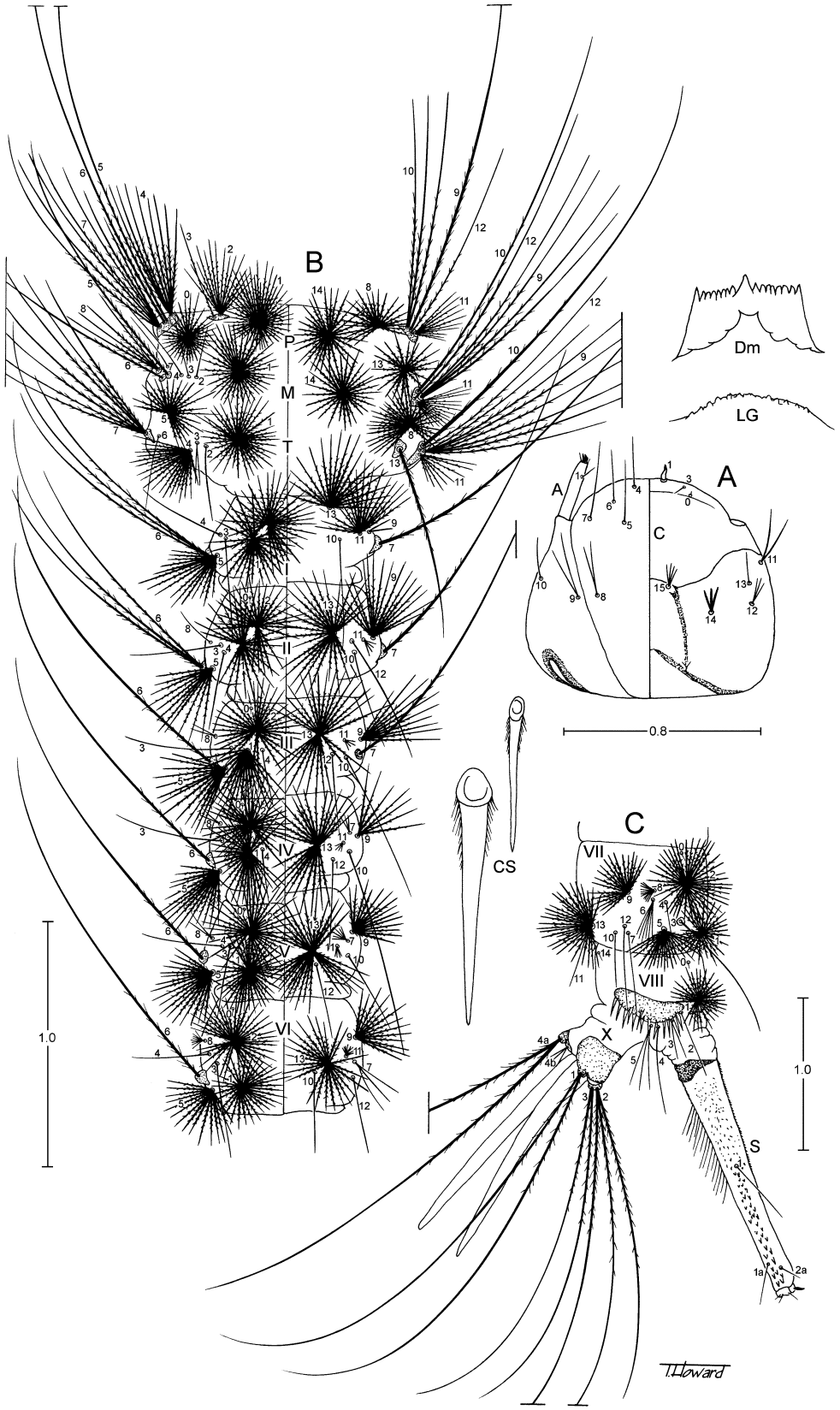

FIGURE 4. Fourth-instar larvae of *Sabethes* (*Sabethinus*) *theresae* **sp. n.** A, Head, dorsal (left) and ventral (right) aspects of left side. B, Thorax and abdominal segments I–VI, dorsal (left) and ventral (right) aspects of left side. C, Abdominal segments VII–X, left side. A, antenna; C, cranium; CS, comb scale; Dm, dorsomentum; LG, labiogula; P, prothorax; M, mesothorax; S, siphon; T, metathorax; I–VIII,X = abdominal segments I–VIII and X; 1–15 = setal numbers for specified areas, e.g. seta 5-C. Scales in mm.

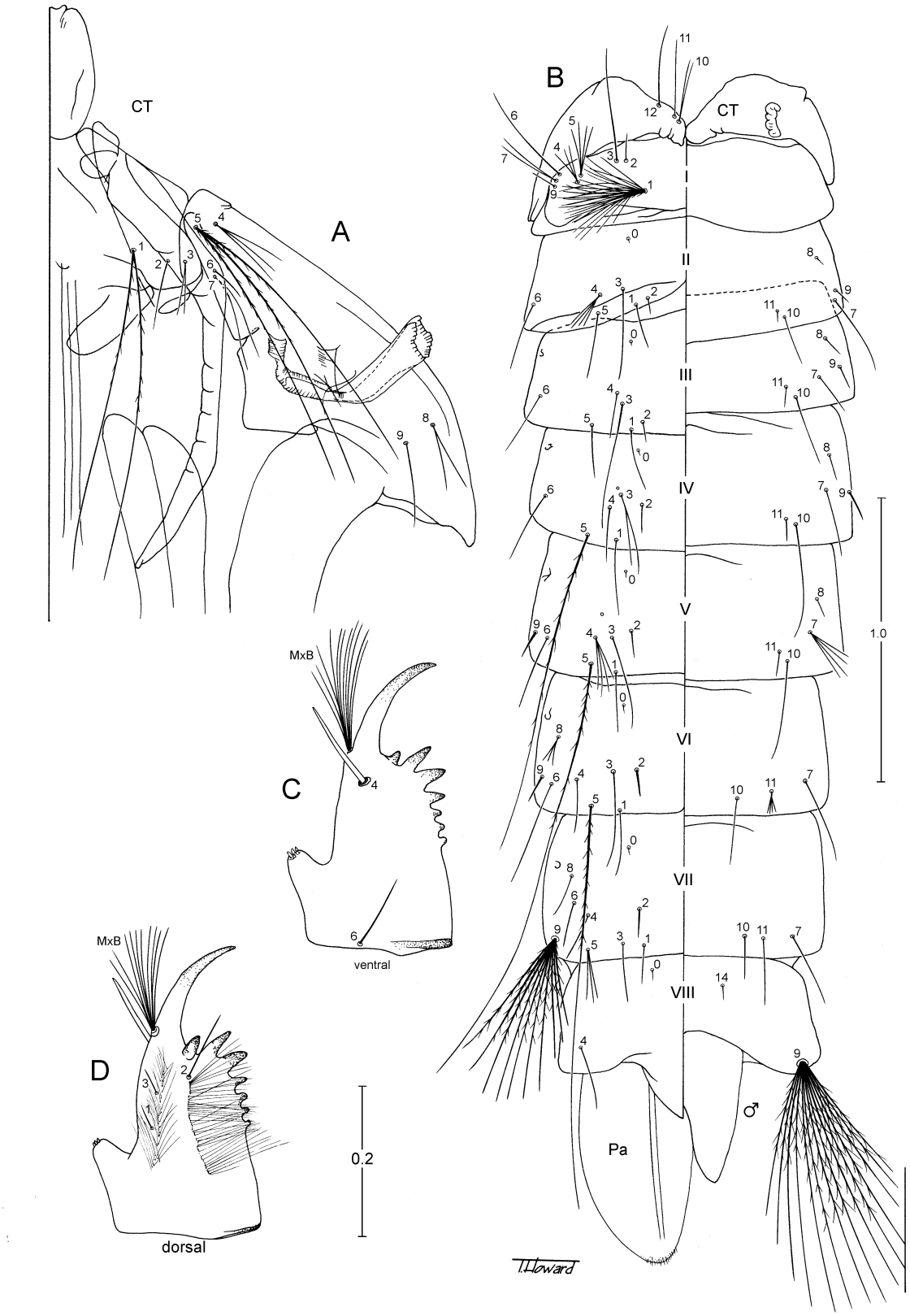

FIGURE 5. Pupa and maxilla of fourth-instar larva of *Sabethes* (*Sabethinus*) *theresae* **sp. n.** A, B, Pupa: A, left side of cephalothorax, dorsal to right; B, dorsal (left) and ventral (right) aspects of metathorax and abdomen. C, D, Maxilla (Mx) (aspects as indicated). CT, cephalothorax; MxB, maxillary brush; Pa, paddle; I-VIII = abdominal segments I–VIII; 1–14 = setal numbers for specified areas, e.g. seta 3-I and 6-Mx. Scales in mm.

Etymology. This species is dedicated to my retired friend and colleague Theresa M. Howard, who skilfully produced many mosquito illustrations, including those in the present paper, and co-authored a number of taxonomic papers with me while we worked together in the Natural History Museum.

Bionomics. Larvae of *Sa. theresae* **sp. n.** were found exclusively in the internodes of *Merostachys latifolia* R.W. Pohl. As indicated for *Sa. andreae* **sp. n.**, *M. latifolia* have narrow stems (8 mm) and grow to heights of only 1.5–4.0 m. The collector mixed specimens from the same habitat according to locality, so it is not known whether *Sa. theresae* **sp. n.** and *Sa. andreae* **sp. n.** were found together in a single internode (doubtful), in different internodes of the same plant or in the internodes of different plants. Larvae of *Onirion regale* and a species of *Shannoniana* were also found in internodes of *M. latifolia* (G. Chaverri, personal communication, 9 May 2003). Nothing is known about the bionomics of the adults of *Sa. theresae* **sp. n.**

Distribution. *Sabethes theresae* is only known only from the type locality near Golfito of Puntarenas Province in southern Costa Rica. As the type locality is near the border with Panama, the species is likely to occur in that country as well.

Material examined. Thirty-seven specimens (2 ♀, 5 ♂, 2 ♀G, 4 ♂G, 7 Le, 10 Pe and 7 L, including seven individual larval rearings. *Holotype* ♂ (BHB-548.13), with Le + Pe and dissected genitalia on separate microscope slides: COSTA RICA: Prov. Puntarenas, Golfito, Jiménez, ACOSA, P.N. Corcovado, 2.8 km N. del Cerro Mueller, 680 m, 28 Jul 01, B. Hernández, [larva collected] En internudos de *Merostachys latifolia* (Poaceae), LS 273200 521500. *Paratypes*, with same data as holotype: 2 ♀LePe (BHB-548.3, 12; both with dissected genitalia on separate microscope slides); 5 ♂LePe (BHB-548.7, 9, 10, 11, 13; 7 with dissect genitalia on microscope slide with LePe; 9, 10 and 11 with dissected genitalia on separate microscope slides), 7 L (BHB-548a, 548b, 548c,d, 548e,f,g, 548h,i,j; a with dissected maxillae). Additional specimens: 3 ♀, 5 ♂ (BHB-548). The type series and additional specimens are deposited in the Museo Nacional de Costa Rica (MNCR), Cuesta de Moras, San José, Costa Rica.

Discussion

Keys are provided below to distinguish the adults and larvae of the six species now formally recognized as species of the subgenus *Sabethinus*. These species fall into two groups based on the following characteristics:

Group A (Intermedius Group)—Adults: Tarsi entirely dark-scaled, head of gonostylus of male genitalia with wattle-like tergal process. Larvae: Seta 4-III,IV inserted anterior to lateral of seta 1. Pupae: Seta 8-VII strongly developed.

Group B (Andreae Group)—Adults: Some tarsomeres with ventral pale scaling; head of gonostylus of male genitalia without wattle-like tergal process. Larvae: Seta 4-III,IV inserted mesal to ventromesal of seta 1. Pupae: Seta 8-VII weakly developed.

At least three additional new species of the subgenus are known to occur in Costa Rica, and it is quite likely that other new species of the group await discovery in both Central and South America. At the time of this study, a slide-mounted fourth-instar larva of *Sa. xhyphydes* collected in Colombia was discovered among specimens on loan from the Smithsonian Institution. Until now, this species was only known from its type locality in São Paulo State of Brazil. The larva (433) was collected at Guamal, Colombia on 13-VI-47. Guamal is a town in Magdalena Department, which is located in the north of Colombia by the Caribbean Sea. This clearly indicates that species of the subgenus are probably more widely distributed in the Neotropical Region than current records suggest. At present, country records for each of the six species of the subgenus *Sabethinus* are as follow: *Sa. andreae* (Costa Rica); *Sa. idiogenes* (Peru); *Sa. intermedius* (Bolivia, Brazil, Argentina, Colombia, French Guiana); *Sa. melanonymphe* (Argentina, Brazil); *Sa. theresae* (Costa Rica); *Sa. xhyphydes* (Brazil, Colombia). Specific localities where specimens have been collected in these countries are listed in Harbach (1994) and references cited therein.

Keys to species

The following keys are modified from Harbach (1994) to include the two new species described herein. As noted previously, differences in coloration used to distinguish the adults of the dark-legged South American species may not be reliable and their identification should be confirmed by examination of associated larval exuviae and dissected male genitalia when possible.

Adults

1. Tarsi entirely dark-scaled . . . 2
- Some tarsi with pale-scaling . . . 5
2(1). Scales of vertex and dorsal part of antepronotum with same metallic coloration. . . . 3
- Scales of these areas differing in metallic coloration . . . 4
3(2). Vertex and antepronotum with bright violet and gold reflections when viewed dorsally, antepronotum entirely golden-scaled in lateral view . . . *Sa. intermedius*
- These areas with bright blue and violet reflections and few if any golden scales, only lower part of antepronotum golden-scaled in lateral view . . . *Sa. melanonymphe*
4(2). Dorsal part of antepronotum with bright azure blue scales, scales of vertex predominantly violet; proboscis of male entirely dark-scaled . . . *Sa. xhyphydes*
- Same but extreme dorsal area of antepronotum with indication of violet reflections (this character probably is not reliable); proboscis of male largely white-scaled ventrally . . . *Sa. idiogenes*
5(1). Antepronotum with metallic golden scales in dorsal view; foretarsomere 5 pale-scaled ventrally . . . *Sa. theresae* **sp. n.**
- Antepronotum with iridescent blue scales in dorsal view; foretarsomere 5 entirely dark-scaled. . . . *Sa. andreae* **sp. n.**

Male genitalia

1. Head of gonostylus with wattle-like tergal process; lobe A,E short, distally rounded in lateral view . . . 2
- Head of gonostylus without wattle-like tergal process; lobe A,E elongate, somewhat rectangular in lateral view . . . 5
2(1). Ninth tergum deeply emarginate on distal margin, with prominent lobes, each with 3 relatively short broad sabre-like setae (Harbach, 1994: fig 4E) . . . *Sa. melanonymphe*
- Ninth tergum shallowly if at all emarginate, lobes poorly differentiated, each with 3–5 relatively long apically curved setae . 3
3(2). Wattle-like tergal process of lobe A,E reniform in lateral view, stem barely developed, free portion very broad and close to lobe A,D; setae on sternomesal margin of lobe A,E broadened and angled subapically (Harbach, 1994: fig. 10A, B) . *Sa. idiogenes*
- Wattle-like tergal process of lobe A,E spatulate in lateral view, stem evident, broad end removed from lobe A,E; setae on sternomesal margin of lobe A,E slender, curved, unmodified . . . 4
4(3). Broad end of tergal process distinctly smaller than lobe A,E in lateral view; lobe M without stem, closely attached to lobe A,E (Harbach, 1994: fig. 1A, B). . . . *Sa. intermedius*
- Broad end of tergal process as large as lobe A,E in lateral view; lobe M with stem, removed from lobe A,E (Harbach, 1994: fig. 7A, B) . . . *Sa. xhyphydes*
5(1). Lobe C of gonostylus a slender recurved arm with minute spicules on recurved side and acuminate apex; lobe M without stem, broad, distal margin quadrate in lateral view, with a somewhat cylindrical lobe (?B) projecting from proximal area of mesal surface (Fig. 1 A, B) . . . *Sa. andreae* **sp. n.**
- Lobe C a narrow erect club-like process with slightly enlarged and minutely spiculate head; lobe M slender and stem-like, without mesal lobe ?B (Fig. 1E, F) . . . *Sa. theresae* **sp. n.**

Larvae

1. Siphon very long, index 20 or more; seta 2-I weakly developed, with 1 or 2 branches; setae 2,3-X single (Harbach, 1994: fig. 8) . . . *Sa. xhyphydes*
- Siphon shorter, index less that 12; seta 2-I strongly developed, stellate, multi-branched; setae 2,3-X with 2 or more branches . . . 2
2(1). Seta 13-T exceptionally long, length about 2.0 mm (about combined length of abdominal segments I–III); siphon without lateral column of large spicules extending from seta 1-S to apex, basal sclerotisation pale; seta 4-III,IV inserted ventromesad of seta 1; seta 3-X with 4,5(4) branches (Fig. 2) . . . *Sa. andreae* **sp. n.**
- Seta 13-T shorter, length about 1.0 mm (about combined length of abdominal segments I and II); siphon with lateral column of distinctly larger spicules extending from seta 1-S to apex, basal sclerotisation dark; seta 4-III,IV inserted anterior to lateral of seta 1 (except in *Sa. theresae* **sp. n.**); seta 3-X with 2,3(2) branches . . . 3
3(2). Seta 4-P single to triple, longer than half length of setae 5,6-P; seta 13-T with 1–3 (usually 2) relatively slender branches; seta 4-III,IV inserted anterior, anterolateral or lateral of seta 1 . . . 4
- Seta 4-P with multiple branches, shorter than half length of setae 5,6-P; seta 13-T single, strong and thick; seta 4-III,IV inserted mesad of seta 1 (Fig. 4) . . . *Sa. theresae* **sp. n.**
4(3). Seta 15-C strongly developed, with 22–30 branches, much longer that seta 14-C; setae 5,9-VII of one side with total of 10–33 branches, pecten with 2–6 filaments (Harbach, 1994: fig. 2) . . . *Sa. intermedius*
- Seta 15-C weaker, with 7–19 branches, only slightly longer than seta 14-C; setae 5,9-VII more highly branched, with total of 27–69 branches on one side; pecten with more than 10 filaments . . . 5
5(4). Seta 9-I weakly developed compared to seta 9-II–VII, with 1–6(1) branches; comb with 9–18 scales; seta 4b-X usually with 3 or 4 branches (2–4); stellate setae moderately branched, seta 2-I with 6–9(7) branches (Harbach, 1994: fig. 5) . . . *Sa. melanonymphe*
- Seta 9-I strongly developed, stellate, with 7–18(15) branches; comb wit 27–42 scales; seta 4b-X usually single (1,2); stellate setae usually highly branched, seta 2-I with 9–10 (16) branches (Harbach, 1994: fig. 11) . . . *Sa. idiogenes*

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