

A review of the leafhopper genus *Scaphytopius* (Cicadellidae: Deltocephalinae) from Costa Rica with descriptions of sixteen new species

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Abstract

The genus *Scaphytopius* is a group of leafhoppers widely distributed in the Americas with phytoplasma vector species. A possible vector of phytoplasmas has been found in Costa Rica, but the taxonomy of the group has been little studied in Central America. Therefore, the aim of this study was to review the taxonomy of the genus in Costa Rica, based on the main entomological collections of the country. We found sixteen new species, and nine species that are new records for the country. We also provide a key for the identification of the twenty-nine species present in Costa Rica.

Key words: Auchenorrhyncha, Hemiptera, leafhoppers, phytoplasma, Scaphytopiini, vector insects.

Introduction

The genus *Scaphytopius*, which was described by Ball (1931), is a group of leafhoppers widely distributed in the Americas (Linnavuori, 1959). Traditionally, the genus has been divided into three subgenera: *Convelinus* Ball 1931, *Scaphytopius* s. str., and *Cloanthanus* Ball 1931 (Linnavuori, 1959). However, the genus is currently being revised, and preliminary molecular phylogenetic work indicates that these subgenera are not monophyletic (C. Dietrich, personal communication, February 26, 2024). Therefore, we do not attempt to place species to subgenera in this study, pending further phylogenetic analyses.

The genus contains species that are vectors of phytopathogens that affect crops such as citrus (Nielson, 1968; Lopes-da-Silva *et al.*, 2020) and potatoes (Pantoja *et al.*, 2009). In 13 neotropical countries species that transmit phytoplasmas have been reported, such as *Scaphytopius marginelineatus* Stal 1959 in Colombia (Álvarez & Betancourth, 2016) and Brazil (Marques *et al.*, 2012), and preliminary results have found a possible phytoplasma vector species in Costa Rica (Montero-Astúa *et al.*, unpublished data).

The genus has been reported as one of the most common groups of leafhoppers in Costa Rican coffee plantations (Webb & Godoy, 1993), yet according to Linnavuori (1959) and Cwikla & Freytag (1982) there are only four species reported from the country. Despite the economic importance of this group, the taxonomy of the genus has been little studied in Central American countries, which is reflected by the absence of keys to the regional species. Therefore, the aims of this study were to review the taxonomy of the genus in Costa Rica, to describe the species present in the country, including a potential vector species of phytoplasmas, and to provide a key to the Costa Rican species.

Materials and methods

During 2023–2024, the main entomological collections of Costa Rica were studied: Museum of Zoology at the University of Costa Rica (MZUCR) the National Museum of Costa Rica (MNCR) and Insect Museum at the University of Costa Rica (MIUCR). In addition, individuals were collected from *Trichilia havanensis* (Meliaceae) Jacq. in the College of Agronomists of Costa Rica (9°57'31.96"N & 84° 3'41.68"W at 1175 masl) and the University of Costa Rica campus (9°56'24.67"N & 84°2'38.30"W at 1227 masl).

For the preparation of the leafhopper male genitalia, the abdomen was placed separately in 10% potassium hydroxide for 24 hours at room temperature. The next day the genitalia were washed for one minute in water. Subsequently, they were placed in plastic genitalia vials with glycerin (Oman, 1949). The key to neotropical Deltocephalinae by Linnavuori (1959) was used to identify the species.

Specimens are deposited in the following collections.

BMNH	The Natural History Museum, London, UK.
LACM	Natural History Museum of Los Angeles County, California, U.S.A.
MIUCR	Museo de Insectos, Universidad de Costa Rica, San Pedro, Costa Rica
MNCR	Museo Nacional de Costa Rica, Santo Domingo, Costa Rica
MZUCR	Museo de Zoología, Universidad de Costa Rica, San Pedro, Costa Rica
USNM	United States National Museum, Washington, D.C., U.S.A.

Taxonomy

Genus *Scaphytopius* Ball

Type species. *Platymetopius elegans* Van Duzee, 1890, by original designation (Ball, 1931).

Diagnosis. Head usually angulately produced, acute apically in dorsal and lateral views. Anteclypeus elongate, broadening apically; frontoclypeus long and narrow, only slightly broadening upwards; lora large; ocellocular area narrow. Gena not incised laterally and visible behind eyes in dorsal view, Crown flat or slightly concave, usually longer than pronotum. Ocelli near eyes. Pronotum short and broad; lateral margins very short. Elytra with 3 closed subapical cells; costal area with numerous reflexed veinlets; appendix distinct. Macrosetae of fore tibia 1 + 4; of hind femur 2 + 2 + 1.

Male genitalia: Pygofer sclerotized, not incised dorsally; side lobes with macrosetae; usually without appendages. Anal tube short and broad, sclerotized. Valve very large, elliptical. Genital plates triangular, macrosetae if present uniseriate. Connective usually W or U-shaped, stem short or absent. Stylus elongate; apophysis usually short, claw-like; basal part relatively narrow; preapical angle distinct. Penis symmetrical, often with appendages, pseudostyli or paraphyses; gonopore apical.

New records

Scaphytopius anadamus (DeLong, 1943)

(Figs. 11A, 12A, 13A, 14A, B)

Cloanthanus anadamus DeLong, 1943: 170

Scaphytopius (Convelinus) anadamus (DeLong, 1943) Linnavuori 1959:71

Scaphytopius (Cloanthanus) anadamus (DeLong, 1943) Metcalf, 1967: 2276.

Diagnosis. Length of male 4 mm. General appearance brownish. Crown 1.5 x longer than basal width between eyes, pale white with numerous longitudinal brown spots forming nearly continuous band between eyes and another toward apex. Forewings brown with multiple dark spots widely distributed, with 10–11 veinlets and numerous

round white spots outlined with brown. Face yellowish white. Aedeagus in lateral view with long shaft with pair of short apical spines directed basally (DeLong, 1943; Linnavuori, 1959).

Distribution. Panamá (DeLong, 1943), Costa Rica.

Biology. Unknown.

Material examined. 1 ♂. Costa Rica, Puntarenas, Lepanto, Reserva Privada Karen Mogensen, Sendero Quebrada Negra. 315 m. 2.VII.2003. col: W. Porras, INB0003742082 (MNCR). 1 ♂. Costa Rica, Puntarenas, Refugio Nacional Isla San Lucas. 0–100 m. 20.XI.2005. col: J. Azofeifa, B. Hernández & M. Moraga, INB0003985843 (MNCR). 1 ♂. Costa Rica, Guanacaste, 15 km SW Cañas, Estación Experimental E. Jimenez Nuñez. 14.VI.1993. col: R.G. Allen, INBIO CRI002 086209 (MNCR).

Scaphytopius barroensis Linnavuori & DeLong, 1978

(Figs. 11D, 12D, 13D, 14C, D)

Scaphytopius (Cloanthanus) barroensis Linnavuori & DeLong, 1978: 196.

Diagnosis. Length of male 4 mm, female 4.5 mm. General appearance brownish. Crown 1.4 x longer than basal width between eyes, whitish, anterior margin bordered with fine brown line, dusky ring behind white spot on apex, two irregularly shaped orange spots on disk (Linnavuori & DeLong, 1978). Forewings whitish, cells adjacent to claval suture transparent-whitish, upper part of corium tinged with orange, with 8 veinlets. Face orange. Paraphyses long and slender, in lateral aspect upcurved apically, in dorsal aspect undulate and recurved apically. Shaft of aedeagus broad and very short, flattened, tooth present in middle of dorsal surface.

Distribution. Panamá (Linnavuori & DeLong, 1978), Costa Rica.

Biology. Unknown.

Material examined. 2 ♂. Costa Rica, Heredia, Estación Biológica La Selva. 50–150 m. 10°26'N 84°01'W. V.1993. col: INBio-OET, INBIO CRI001 272330// INBIO CRI001 272323 (MNCR).

Scaphytopius latens (DeLong, 1943)

(Figs. 11M, 12M, 13M, 14F1–2)

Cloanthanus latens DeLong, 1943: 163.

Scaphytopius (Cloanthanus) latens (DeLong, 1943) Linnavuori, 1959: 77.

Diagnosis. Length of male 4.5 mm. General appearance dark brown. Crown 1.5 x longer than basal width between eyes, with apical margin and pair of spots on either side between apex and eyes white; these almost form a transverse band before eyes. Forewings dark brown, with three small round spots on posterior margin of clavus, with 8 veinlets and few round white spots outlined in brown preapically. Face bright yellow (DeLong, 1943). Paraphyses slender, longer than plates, strongly notched on ventral side just before slightly enlarged tips. Aedeagus in lateral view gradually curved dorsally, with shaft and dorsal apodeme creating C shaped space; preatrium length similar to shaft; dorsal apodeme shorter than shaft.

Distribution. Mexico, Nicaragua, Panama (DeLong, 1943), Costa Rica.

Biology. Unknown.

Material examined. 1 ♂. Costa Rica, Puntarenas, Reserva Biológica Carara. 200 m. II.1990. col: R. Zuñiga, INBIO CRI000 068454 (MNCR). 1 ♂. Costa Rica, Guanacaste 15 km SW Cañas, Estacion Experimental E. Jimenez Nuñez. 13.VIII.93. col: R.G. Allen, INBIO CRI002 085890 (MNCR).

***Scaphytopius latidens* (DeLong, 1944)**

(Figs. 11N, 12N, 13N, 14G)

Tumeus latidens DeLong, 1944: 172

Scaphytopius (*Scaphytopius*) *latidens* (DeLong, 1944) Linnavuori, 1959:72.

Scaphytopius latidens (DeLong, 1944) Metcalf, 1967:2255.

Diagnosis. Length of male 4–4.5 mm. General appearance pale with darker coloration (DeLong, 1944). Crown 1.7 x longer than basal width between eyes, light brown with two pale longitudinal bands in center, separated by a dark line, extending for 2/3 of crown; third pale longitudinal band, discontinuous with previous bands, extends from last third of crown to apex. Forewings white, heavily marked with dark brown, 8 veinlets and few indistinct round pale spots outlined in brown. Face dark brown (DeLong, 1944). Paraphysis undivided through most of length, braces divergent beyond aedeagus, terminating in pair of falcate spines, dorsal spine larger than ventral one; preatrium absent, short and robust, with shaft and dorsal apodeme forming V shaped space (Dmitriev *et al.*, 2022).

Distribution. Belize, Guatemala, Mexico, Nicaragua (DeLong, 1944), Costa Rica.

Biology. Collected from coffee plantations.

Material examined. 16 ♂. Costa Rica, Heredia, Santa Bárbara. 1100 m. 10.XII.98. col: Godoy & Hanson. In: *Coffea*. (MZUCR). 7 ♂. Costa Rica, Heredia, Santa Bárbara. 1100 m. 10.XII.98. col: Godoy & Hanson. In: *Coffea*, MUCR 0001094-MUCR 0001100 (MIUCR). 2 ♂. Costa Rica, Alajuela, Carrizal, Pavas de Carrizal. 1372 m. 10°04'27.2"N 84°10'12.4"W. 30.VII.2024. In *Coffea arabica*, col: L. Garita, S. Carvajal & K. Valverde, MIUCR 0001092/ MIUCR 0001093 (MIUCR).

***Scaphytopius limbatus* (Osborn, 1926)**

(Figs. 11O, 12O, 13O, 14H, I)

Platymetopius limbatus Osborn, 1926: 343

Tumeus limbatus (Osborn, 1926) DeLong, 1944: 173.

Scaphytopius (*Cloanthanus*) *limbatus* (Osborn, 1926) Linnavuori, 1959: 81.

Scaphytopius limbatus (Osborn, 1926) Metcalf, 1967: 2255.

Diagnosis. Length of male 4–4.5mm. General appearance brownish. Crown 1.6 x longer than basal width between eyes, with broad curved brownish band just back of apex and broad broken brown band between anterior margins of eyes (DeLong, 1944). Forewings white subhyaline, cells adjacent to claval suture brown; clavus marked with brown, anterior half unmarked on basal two thirds, with 7 veinlets (Osborn, 1926). Face dark brown. Paraphyses long and slender which are enlarged and truncate at apex, in lateral aspect curved downward apically, in dorsal aspect undulate and recurved apically. Shaft of aedeagus very short and curved dorsal pointed apically (Linnavuori, 1959).

Distribution. Belize, Cuba, Guatemala, Mexico (Osborn, 1926; DeLong, 1944), Costa Rica.

Biology. Unknown.

Material examined. 1 ♂. Costa Rica, Puntarenas, Reserva Biológica Carara. 200 m. III.1990. col: R. Zuñiga, INBIO CRI000 170848 (MNCR). 1 ♂ Costa Rica, Guanacaste, Nandayure. 619 m. 9°55'45.00"N 85°18'8.99"W. 24.II.2023. col: A. Arias-Paco, L. Garita, S. Carvajal & K. Valverde, MUCR 0001085 (MIUCR). 1 ♂ Costa Rica, Alajuela, Tambor. 935 m. 10°2'37.345"N 84°14'14.744."W. 31.X.2023. col: A. Arias-Paco, L. Garita, S. Carvajal & K. Valverde, MUCR 0001086 (MIUCR)

***Scaphytopius nigrinotus* Caldwell, 1952**

(Figs. 11Q, 12Q, 13Q, 14K)

Scaphytopius nigrinotus Caldwell, 1952: 46.

Scaphytopius (*Cloanthanus*) *nigrinotus* (Caldwell, 1952) Linnavuori, 1959:82.

Diagnosis. Length of male 4.5 mm. General appearance black (specimens from Costa Rica are light brown). Crown

1.7 x longer than basal width between eyes, light brown with two pale longitudinal bands in center, separated by dark line; third pale longitudinal band, discontinuous with previous bands, extends from last third of crown to apex. Forewings brownish with indistinct hyaline markings; base of costal cell white, with 9 veinlets. Face dark (specimens from Costa Rica with face orange). Paraphyses fused basally, elongate (Linnavuori, 1959), in ventral view in shape of an arch, with apex in form of triangular spine. Shaft of aedeagus thin and very short (Caldwell, 1952), in lateral view L-shaped, with dorsal apodeme longer than shaft.

Distribution. Cuba (Hidalgo-Gato & Rodríguez-León, 2003), Puerto Rico (Caldwell, 1952); Costa Rica.

Biology. In the original description, specimens were collected from *Rhizophora mangle* (Caldwell, 1952).

Material examined. 2 ♂. Costa Rica, Guanacaste, 19 km SW Cañas. 20.VIII.1992. col: M.W. Nielson & H. Lezama, MUCR 0001087//MUCR 0001088 (MIUCR).

***Scaphytopius nitridus* (DeLong, 1943)**

(Figs. 11R, 12R, 13R, 14L)

Cloanthanus nitridus DeLong, 1943: 166.

Scaphytopius (*Convelinus*) *nitridus* (DeLong, 1943) Linnavuori, 1959: 70.

Scaphytopius (*Cloanthanus*) *nitridus* (DeLong, 1943) Metcalf, 1967: 2313.

Diagnosis. Length of male 4–4.5 mm. General appearance black. Crown 1.6 x longer than basal width between eyes, with three conspicuous white markings, elongate spot at apex and broader elongate spot arising on each side of margin half-way from apex to eye and parallel to apical spot (DeLong, 1943). Fore wings dark brown with oblique white dashes, with 9 costal veins. Face yellow with numerous irregular brown markings. Without paraphyses. Shaft of aedeagus of similar length to dorsal apodeme; shaft and dorsal apodeme in lateral view U-shaped; in ventral view with pair of short triangular spines at apex (DeLong, 1943).

Distribution. Guatemala, Mexico (DeLong, 1943, Linnavuori, 1959); Costa Rica.

Biology. Unknown.

Material examined. 1 ♂. Costa Rica, Puntarenas, Coto Brus, Estación Biológica las Alturas. 1500 m. III.1992. col: P. Hanson & C. Godoy, INB0004176927 (MNCR). 1 ♂. Costa Rica, Cartago, Paraíso Cachí. 1110 m. 14.III.2014. col: C. Viquez, INB0004406264 (MNCR). 1 ♂. Costa Rica, Alajuela, Carrizal, Pavas de Carrizal. 1372 m. 10°04'27.2"N 84°10'12.4"W. 5.III.2024. In *Coffea arabica*, col: L. Garita, S. Carvajal & K. Valverde, MUCR 0001090 (MIUCR).

***Scaphytopius osborni* (Van Duzee, 1910)**

(Figs. 11S, 12S, 13S, 14M)

Platymetopius osborni Van Duzee, 1910: 229

Convelinus osborni (Van Duzee, 1910) Ball, 1932: 255.

Cloanthanus osborni (Van Duzee, 1910) DeLong, 1943: 193.

Scaphytopius (*Cloanthanus*) *osborni* (Van Duzee, 1910) Hepner, 1947: 483.

Diagnosis. Length of male 4.5 mm. General appearance light brown with irregular dark brown markings (Linnavuori, 1959). Crown 1.2 x longer than basal width between eyes, reddish brown with white dot at apex and white spot on either side almost forming white band behind apex; base of crown white (Van Duzee, 1910). Forewings light brown with irregular dark brown markings, with 12 veinlets. Face pale yellow with numerous irregular dark brown markings. Paraphyses in ventral view thin and elongated, with wide lateral projection in shape of a triangle. Aedeagus with shaft short; shaft and dorsal apodeme in lateral view C-shaped; shaft tubular, with pair of short preapical teeth.

Distribution. Guatemala, Mexico, United States (Van Duzee, 1910); Costa Rica.

Biology. Unknown.

Material examined. 1 ♂. Costa Rica, San Jose, San Antonio. I.III.1993. col: Nielson & Mora, INBIO CRI002 082983 (MNCR). 1 ♂. Costa Rica, Puntarenas, Rey Curre, Vuelta Campana, R. Terraba. 100–500 m. VIII.1992. col: S. Rojas, INBIO CRI000 762355 (MNCR).

***Scaphytopius sulphureus* (Osborn, 1923)**

(Figs. 11X, 12X, 13X)

Platymetopius sulphureus Osborn, 1923: 35.

Scaphytopius sulphureus (Osborn, 1923) Oman, 1938: 368.

Scaphytopius (*Cloanthanus*) *sulphureus* (Osborn, 1923) Linnavuori, 1959: 80

Diagnosis. Length of male 4 mm. General appearance black and sulphur-yellow. Crown 1.6 x longer than basal width between eyes. Crown yellow from base to 2/3 of its length. Scutellum, mesonotum, and pronotum sulphur-yellow. Forewings dark brown with most of clavus yellow with whitish border (Osborn, 1923), with 7–8 costal veins. Face brown, becoming blacker toward margin; base of frontoclypeus with alternating brown and yellow lines (Linnavuori, 1959). Paraphyses in ventral view fused at base, diverging slightly at about midlength. Aedeagus in lateral view with shaft and dorsal apodeme C-shaped; dorsal apodeme of similar length to shaft; apex of shaft with two small spines that in lateral aspect are curved downward apically.

Distribution. Bolivia (Osborn, 1923), Perú (Lozada & Arellano, 2008); Costa Rica.

Biology. Unknown.

Material examined. 1 ♂. Costa Rica (MIUCR 0001083)

New species

***Scaphytopius ancorus* Arias-Paco & Godoy, sp. nov.**

(Figs. 1A–F, 9A, 10A, 11B, 12B, 13B)

Description. Length of male 3.80–3.83 mm. General appearance brown. Crown 1.4 x longer than basal width between eyes, pale white with numerous longitudinal brown spots forming nearly continuous band between eyes and another toward apex (Fig. 1A). Face is pale white with multiple light brown spots on frontoclypeus, lorum, and anteclypeus; darker spots near lateral margins of gena (Fig. 1C). Forewings brown with multiple dark spots widely distributed and numerous round white spots present (around 18–20), with approximately 11 veinlets (Fig. 1B); veins light brown, with third and fourth apical cell with white outer edge. Legs light brown with black spots on tibiae and femora.

Male genitalia. Pygofer in lateral view triangular, with acuminate apex and multiple macrosetae at apex (Fig. 9A). Subgenital plate triangular, wider at base than apex, much longer than wide, with a row of 4–5 macrosetae along outer margin (Fig. 10A), and 4 thin elongated setae at apex. Connective in ventral view W-shaped. Style in ventral view with apophysis thin, truncated at apex; space between preapical lobe and apophysis C-shaped (Fig. 1D). Paraphyses in ventral view short preceding aedeagus, of similar length to shaft, divided by narrow longitudinal space at base, connected by a membrane; apex with two small needlelike distal processes extended very little, without reaching base of shaft (Fig. 1D). Aedeagus in lateral view V-shaped, with dorsal apodeme of similar length to shaft (Fig. 1E); shaft in ventral view thin and tubular, with two lateral anchor-like spines at apex, distinguishable only in ventral view (Fig. 1F) (not visible in lateral view); preatrium absent. Gonopore apical.

Diagnosis. Paraphyses in ventral view of similar length to shaft, divided by small membranous space longitudinally (Fig. 1D). Aedeagus in lateral view V-shaped (Fig. 1E), with two lateral spines at apex, in ventral view resemble an anchor (Fig. 1F). This species is distinguished from *S. piperatus*, by the following features: Shaft in ventral view with two lateral, anchor-like spines at apex, long and curved upward (Figs. 1D, F); shaft narrows toward apex (Fig. 1D); apex of paraphyses in ventral view with two small needlelike distal processes extended very little, without reaching base of shaft (Fig. 1D).

Distribution. Costa Rica.

Biology. Unknown.

Etymology. From Latin *ancora* (anchor), referring to the similarity of the aedeagus apex in ventral view to an anchor.

Material examined. Holotype. ♂. Costa Rica, Guanacaste, 15 km SW Cañas, Estación Experimental E. Jiménez Nuñez. 10.VII.1993, col: R. G. Allen, INBIO CRI002 070614 (MNCR). **Paratype.** 1 ♂. Costa Rica, Puntarenas, Isla San Lucas, Cerro Control. 100 m. 11.III.05, col: B. Gamboa, D. Briceño & M. Moraga, INB0004093401 (MNCR).

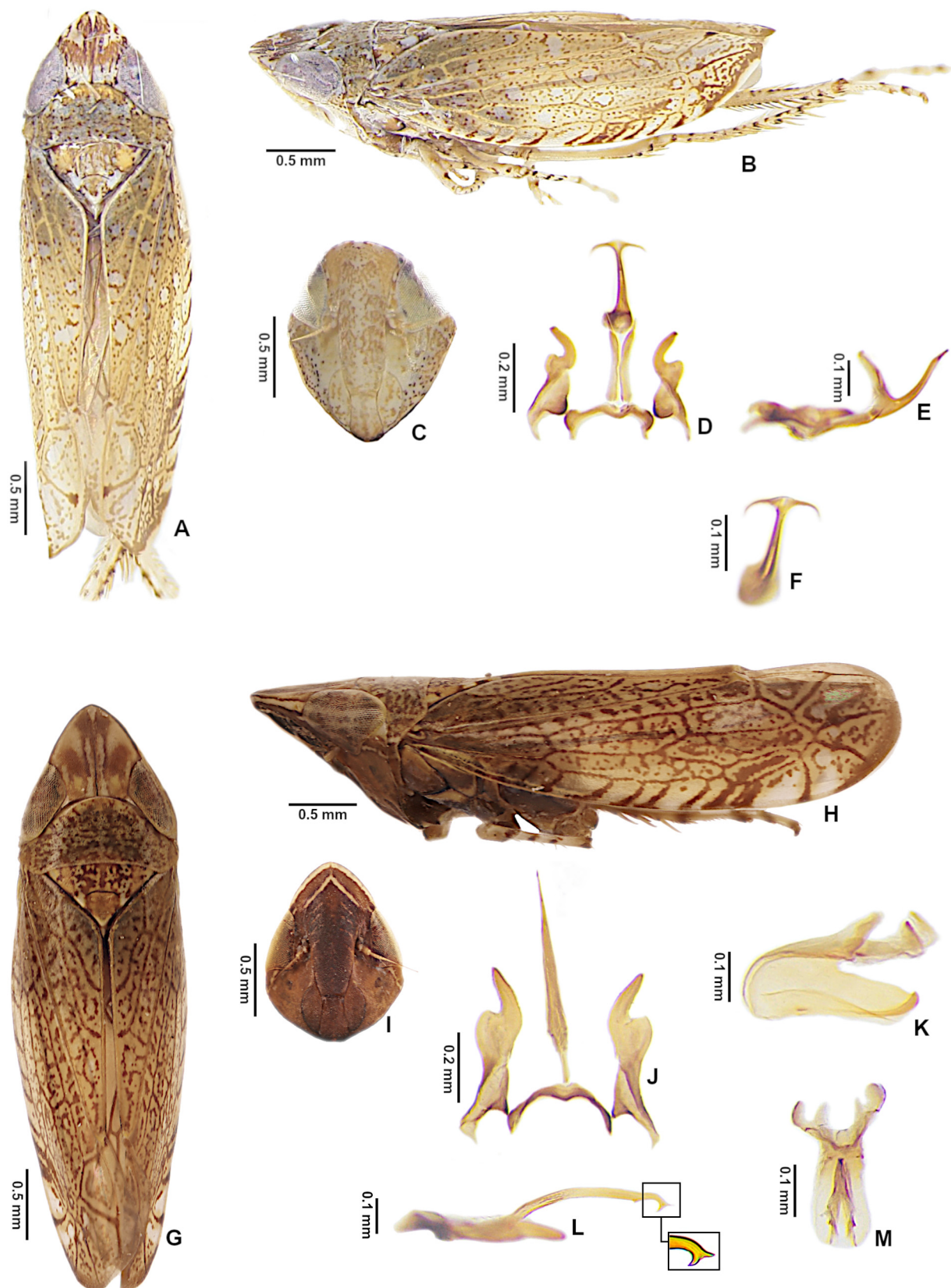


FIGURE 1. A–F *Scaphytopius ancorus* sp. nov. male. A. Dorsal habitus. B. Lateral habitus. C. Ventral view of face. D. Ventral view of connective, styles and aedeagus. E. Lateral view of aedeagus. F. Ventral view of the shaft apex. G–M *Scaphytopius balaena* sp. nov. male. G. Dorsal habitus. H. Lateral habitus. I. Ventral view of face. J. Ventral view of connective, styles and paraphyses. K. Lateral view of aedeagus. L. Lateral view of paraphyses. M. Apical view of the shaft apex.

***Scaphytopius balaena* Arias-Paco & Godoy, sp. nov.**

(Figs. 1G–M, 9B, 10B, 11C, 12C, 13C)

Description. Length of male 3.99–4.02 mm. General appearance brown. Crown 1.5 x longer than basal width between eyes, light brown with two pale longitudinal bands in center, laterally pale with pair of oblique orangish brown maculae, remainder of dorsum with irregular orange-brown maculae and smaller orange brown spots near of apex; light brown with two pale longitudinal bands in center, separated by dark line, extending for 2/3 of crown; pale triangular spot at apex (Fig. 1G). Face brown; gena and apex of frontoclypeus orange-brown, anteclypeus, lorum, and basal and medial parts of frontoclypeus dark brown (Fig. 1I); apex of frontoclypeus has two pale-white transverse bands forming inverted V shape; with 4–5 short pale transverse lines along sides of frontoclypeus (Fig. 1I). Forewings light brown with multiple irregular dark brown spots widely distributed, in apical area with very few white spots (5–6 round white spots) (Fig. 1H), with 10–11 veinlets; veins dark brown. Legs light brown with black spots on tibiae.

Male genitalia. Pygofer in lateral view triangular, with rounded apex and multiple macrosetae (Fig. 9B). Subgenital plate slightly triangular, somewhat wider at base than at apex, longer than wide, without macrosetae, with small punctures along outer margin (Fig. 10B). Connective W-shaped. Style in ventral view with apophysis short, thin, rounded at apex; space between preapical lobe and apophysis C-shaped (Fig. 1J). Paraphyses long, thin, and undivided, with two small dorsoventral spines at apex bifurcated (Fig. 1L). Aedeagus in lateral view short and robust, with shaft and dorsal apodeme creating a V-shaped space in lateral view (Fig. 1K); preatrium absent; dorsal apodeme straight and shorter than shaft; shaft straight and strongly compressed laterally, with pointed apex that is slightly curved dorsally (Fig. 1K); in ventral view, shaft compressed laterally, with broad, drop-shaped gonopore and two small spines on either side (Fig. 1M). Gonopore positioned ventral-apically.

Diagnosis. Paraphyses long, thin, and undivided, with two spines at apex that bifurcate dorsoventrally (Fig. 1L). Aedeagus short and robust, with V-shaped space between shaft and dorsal apodeme in lateral view (Fig. 1K).

Distribution. Costa Rica.

Biology. Unknown.

Etymology. From Latin *balaena* (whale), referring to the appearance of the paraphyses' spines in lateral view, resembling a whale's tail.

Material examined. Holotype. ♂. Costa Rica, Heredia, Estación Biológica La Selva, 3 km al sur de Puerto Viejo. 100 m. 10°26'N 84° 01'W. 25.VI.1990. col: H.A. Hespenheide, MUCR 0001078(MIUCR). **Paratype.** 1 ♂. Costa Rica, Heredia, Chilamate. 75 m. 3.IV.1990. col: Hanson & Godoy, (USNM).

***Scaphytopius caprensis* Arias-Paco & Godoy, sp. nov.**

(Figs. 2A–H, 9C, 10C, 11F, 12F, 13F)

Description. Length of male 4.09–4.63 mm, female 4.15–4.23 mm. General appearance dark brown with white spots. Crown 2.4 x longer than basal width between eyes, brown with dark brown longitudinal band in center, widening toward apex; small white band at apex (Fig. 2A). Face dark brown, almost black; apex of frontoclypeus with two transverse white bands forming inverted V; 4–5 short pale transverse lines on sides of frontoclypeus (Fig. 2C). Forewings brown with multiple irregular dark brown spots; with numerous white spots widely distributed (usually between 18–20), with 11 veinlets; veins red (Fig. 2B). Legs dark brown with black spots on tibiae.

Male genitalia. Pygofer in lateral view with long, thin, spine-like projection at apex, of similar length to rest of pygofer (Figs. 2D, 9C); with some macrosetae on dorsal part. Subgenital plate triangular, wider at base than apex, much longer than wide; with row of approximately 6–8 macrosetae on outer margin and multiple punctures widely distributed (Fig. 10C). Connective V-shaped. Style in ventral view with apophysis short, thin, and rounded at apex; space between preapical lobe and apophysis L-shaped (Fig. 2F). Paraphyses absent. Aedeagus in ventral view with tubular preatrium that widens before shaft (Fig. 2G), of similar length to shaft; in lateral view, dorsal apodeme straight, shorter than shaft; shaft tubular and curved dorsally toward apex; with two spines at apex that curve ventrally around their own axis (Fig. 2E). Gonopore apical (Fig. 2H).

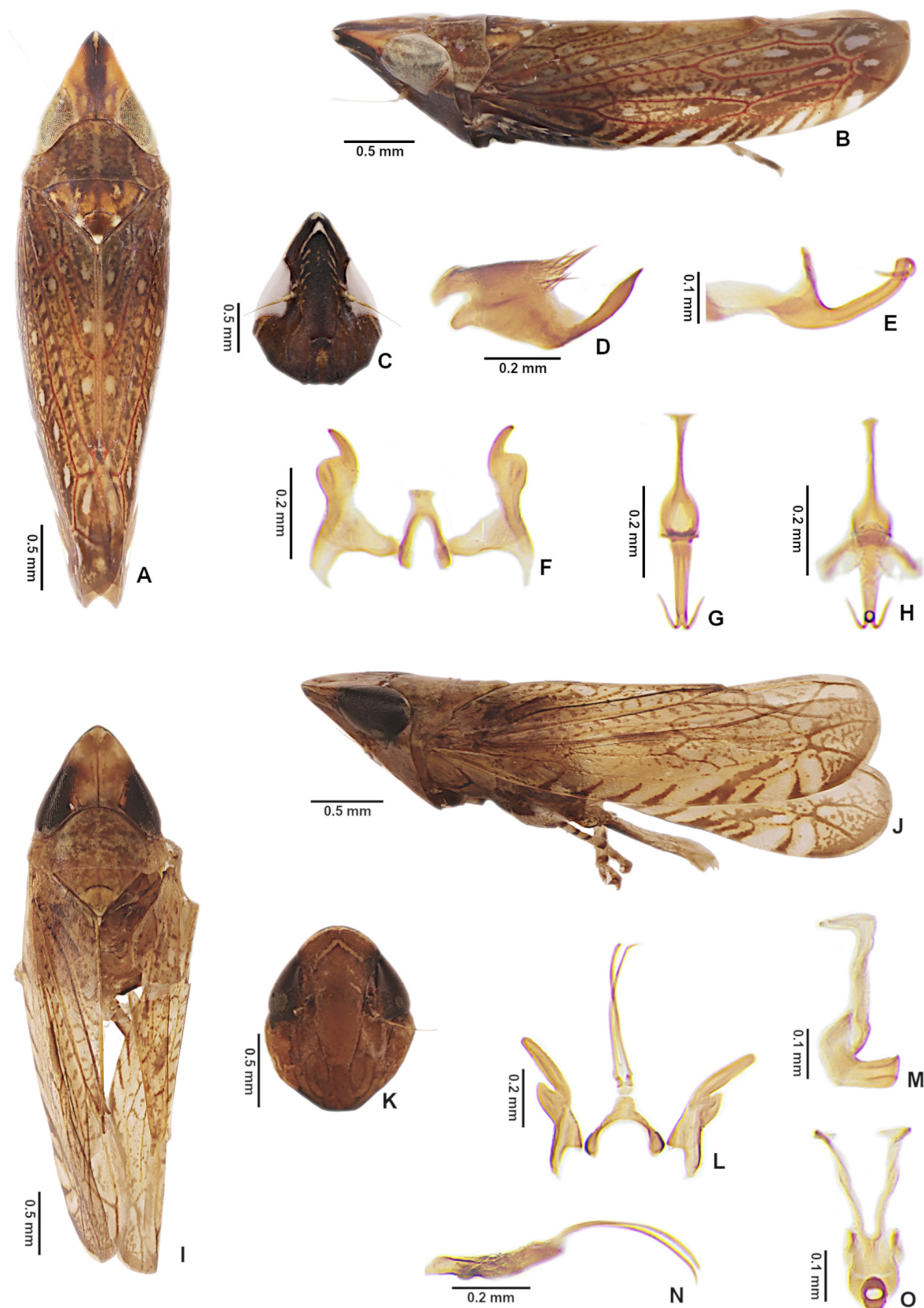


FIGURE 2. A–H *Scaphytopius caprensis* sp. nov. male. A. Dorsal habitus. B. Lateral habitus. C. Ventral view of face. D. Lateral view of pygofer. E. Lateral view of aedeagus. F. Ventral view of connective and styles. G. Ventral view of aedeagus. H. Dorsal view of the shaft apex. I–O *Scaphytopius cientosetenta* sp. nov. male. I. Dorsal habitus. J. Lateral habitus. K. Ventral view of face. L. Ventral view of connective, styles and paraphyses. M. Lateral view of aedeagus. N. Lateral view of paraphyses. O. Apical view of the shaft apex.

Female. External appearance similar to male. Sternite VII slightly longer than wide, longer than sternite VI; posterior margin becoming narrower toward apex; with a slight notch in middle (Fig. 14O). Pygofer with multiple macrosetae at apex. In lateral view first valvulae curved, with pointed apex; second valvulae dorsally curved in lateral view, with small denticles extending almost from midlength and reaching to apex. Before beginning of denticles the valvulae is misaligned, with shape of a slight step (Fig. 14P); valvulae united at midlength, in lateral view with more sclerotized area that is perceived as slight spot in center, much wider than long.

Diagnosis. Wings with red veins (Fig. 2B). Pygofer in lateral view with long, thin, spine-like projection at apex, of similar length to rest of pygofer (Fig. 2D). Aedeagus apex with spines that curve ventrally around their own axis (Fig. 2E).

Distribution. Costa Rica.

Biology. Unknown.

Etymology. In reference to the genus *Capra* (goat), due to the shape of the spines of the aedeagus, which resemble goat horns.

Material examined. Holotype. ♂. Costa Rica, Heredia, Estación Biológica La Selva, sector arboleda. 100 m. 10°26'N 84° 01'W. 18.V.1993. col: C. Godoy, MUCR 0001052 (MIUCR). **Paratype.** 6 ♂. same data that holotype except MUCR 0001051/MUCR 0001053/MUCR 0001054/MUCR 0001055/MUCR 0001056/MUCR 0001059 (MIUCR). 4♂. same data except 19.IV.93, INBIO CRI 001 275383 (MNCR), 13.V.93, INBIO CRI 001 269404 (MNCR), 13.X.93, INBIO CRI 001 252723 (MNCR), 17.X.93, INBIO CRI 001 270727 (MNCR). 1 ♂ same data that holotype (MZUCR). 1 ♂ same data that holotype (USNM). 1 ♂. Costa Rica, Limón, Sur de Iroquois. 300 m, 23.V.1987. col: P. Hanson (BMNH) 2 ♀. same data that holotype except MUCR 0001057/ MUCR 0001058 (MIUCR). 3 ♀. same data except 20.III.93, INBIO CRI 001 274576 (MNCR), 13.V.93, INBIO CRI 001 252488 (MNCR), 17.X.93, INBIO CRI 001 270658 (MNCR). 1 ♀. Costa Rica, Heredia, Sarapiquí, Estación Biológica La Tirimbina. 167 m. VIII-IX.11. col: I. Chacón, INB0004298927 (MNCR). 1 ♀. same data except IV-V.11, INB0004288146 (MNCR).

Scaphytopius cientosetenta Arias-Paco & Godoy, sp. nov.

(Figs. 2I–O, 9D, 10D, 11G, 12G, 13G)

Description. Length of male 3.95–4.05 mm. General appearance light brown. Crown 1.8 x longer than basal width between eyes, pale brown with thin longitudinal black line in center, extending from base to 2/3 of crown length; two longitudinal orange-brown spots at apex of crown and two spots of same color between eyes (Fig. 2I). Face entirely orange-brown; apex of frontoclypeus with two pale transverse bands forming inverted V; with 2 short pale transverse lines toward sides of frontoclypeus (Fig. 2K). Forewings light brown with short longitudinal dark brown spots widely distributed; discal cell with dark brown longitudinal spot; in apical area with few faint round white spots (fewer than 6) (Fig. 2J), with 8 veinlets; veins dark brown. Legs pale with black bands on tibiae and tarsi.

Male genitalia. Pygofer in lateral view triangular with rounded apex; multiple macrosetae at apex (Fig. 9D). Subgenital plate triangular, wider at base than apex, without macrosetae (Fig. 10D). Connective U-shaped. Style in ventral view with apophysis long, robust, and rounded at apex; with very narrow space between preapical lobe and apophysis (Fig. 2L). Paraphyses fused at base, diverging early, long and thin with pointed apex (Fig. 2L), in lateral view strongly curved downward (Fig. 2N). Aedeagus in lateral view very short, L-shaped; preatrium absent; dorsal apodeme shorter than shaft, straight and wide (Fig. 2M); shaft straight and tubular, with very small notch before reaching apex, and slightly pointed apex (Fig. 2M). In apical view, shaft strongly tubular, with broad and evident gonopore (Fig. 2O), that opens in cone-like shape at apex (Fig. 2M). Gonopore apical.

Diagnosis. This species is easily distinguished from *S. dilatus*, by the following features: Space between style preapical lobe and apophysis relatively narrow (Fig. 2L); dorsal apodeme of aedeagus shorter than shaft (Fig. 2M); shaft without small dorsal preapical tooth (Fig. 2M).

Distribution. Costa Rica.

Biology. Collected from *Vitex cooperi* (Lamiaceae), *Tapirira guianensis* (Anacardiaceae), *Virola koschnyi* (Myristicaceae), *Goethalsia meiantha* (Malvaceae), *Carapa guianensis* (Meliaceae).

Etymology. The species is dedicated to laboratory 170 (*ciento setenta* in Spanish), the entomology lab of the School of Biology, University of Costa Rica, which has trained generations of Costa Rican biologists and entomologists.

Material examined. Holotype. ♂. Costa Rica, Heredia, Estación Biológica La Selva, sector arboleda. 100 m. 10°26'N 84° 01'W. 17.V.1993. col: C. Godoy, MUCR 0001081 (MIUCR). **Paratype.** 1 ♂ same data that holotype (USNM). 7 ♂. same data that holotype except 17.X.93, INBIO CRI002 802427// INBIO CRI001 270663// INBIO CRI001 270666 (MNCR), 5.V.93, INBIO CRI001 272371 (MNCR), 5.I.94, INBIO CRI001 251561// INBIO CRI001 251563// INBIO CRI001 251566 (MNCR). 1 ♂. Costa Rica, Limón, Est. Aguas Frías. 10–20 m. IX.97. col: E. Rojas, INBIO CRI002 571072 (MNCR). 1 ♂. Costa Rica, Limón, Sector Cedrales de la Rita, 3 km N del Puente Río Suerte, Ruta Puerto Lindo. 10 m. I.97. col: E. Rojas, INBIO CRI002 488919 (MNCR).

***Scaphytopius cyma* Arias-Paco & Godoy, sp. nov.**

(Figs. 3A–F, 9E, 10E, 11H, 12H, 13H)

Description. Length of male 4.10 mm. General appearance light brown. Crown 1.4 x longer than basal width between eyes, light brown, with two pale white longitudinal bands in center, separated by black line extending to two-thirds of crown length, posteriorly, bands merge into single band at apex (Fig. 3A). Face black with two transverse white bands in form of inverted «V» at apex of frontoclypeus, and small white band on outer margin of gena extending to eye (Fig. 3C). Forewings light brown, with 2 circular white spots on clavus, and more than 5 veinlets (Fig. 3B); veins dark brown. Femora black, anterior and middle tibiae light brown, posterior tibiae black, and tarsi light brown.

Male genitalia. Pygofer in lateral view rectangular, apex slightly rounded with multiple macrosetae at apex (Fig. 9E). Subgenital plate slightly triangular at apex, similar width at base and at apex, longer than wide, with faint punctures at apex (Fig. 10E). Connective in ventral view forming wide “U”. Style in ventral view with apophysis short, robust, square-shaped, with spine on inner margin (Fig. 3D); space between preapical lobe and apophysis C-shaped (Fig. 3D). Paraphyses fused at base in ventral view, diverging slightly before midlength, remaining nearly parallel to end (Fig. 3D). Aedeagus very short, L-shaped in lateral view (Fig. 3E); preatrium absent; dorsal apodeme shorter than shaft, extending straight to apex; shaft robust, straight, tubular, in apical view in gonopore area with two small lateral spines and third dorsal spine of similar size (Fig. 3F). Gonopore subapical, at base of dorsal spine (Fig. 3F).

Diagnosis. Face entirely black except narrow transverse white line dorsally (Fig. 3C). Style apophysis strongly widened distally in dorsal view with spine on inner margin, connective in dorsal view forming “U” (Fig. 3D). Paraphyses divided slightly before midlength in dorsal view but branches not divergent (Fig. 3D). Aedeagus very short, in apical view with dorsal spine of similar length to lateral spines (Fig. 3F).

Distribution. Costa Rica.

Biology. Unknown.

Etymology. From the Latin *cyma*, meaning summit, referring to its collection in the highlands of Braulio Carrillo National Park, Costa Rica.

Material examined. Holotype. ♂. Costa Rica, Heredia, Parque Nacional Braulio Carrillo, Estación Barva. 2500 m. VI. 1990. INBIO CRI000 282692 (MNCR).

***Scaphytopius freytagi* Arias-Paco & Godoy, sp. nov.**

(Figs. 3G–M, 9F, 10F, 11I, 12I, 13I)

Description. Length of male 4.77–5.16 mm; female 5.10–5.20 mm. General appearance light brown with white spots. Crown 1.6 x longer than basal width between eyes, light brown with white spot at apex of crown; two opaque brown bands in center, separated by black line extending to two-thirds of crown length (Fig. 3G); bands do not merge at apex but reach the margins of apex separately. Face light brown, frontoclypeus dark brown toward apex; apex of frontoclypeus with pale white spot in center, and longitudinal white band in shape of inverted V; 6–8 short pale transverse lines on sides of frontoclypeus (Fig. 3I). Forewings light brown, with anteapical and discal cells containing irregular dark brown longitudinal spots; with numerous (usually 11–14) disperse circular white spots, 9 veinlets (Fig. 3H); veins dark brown at clavus suture, light brown in rest of wing. Legs light brown.

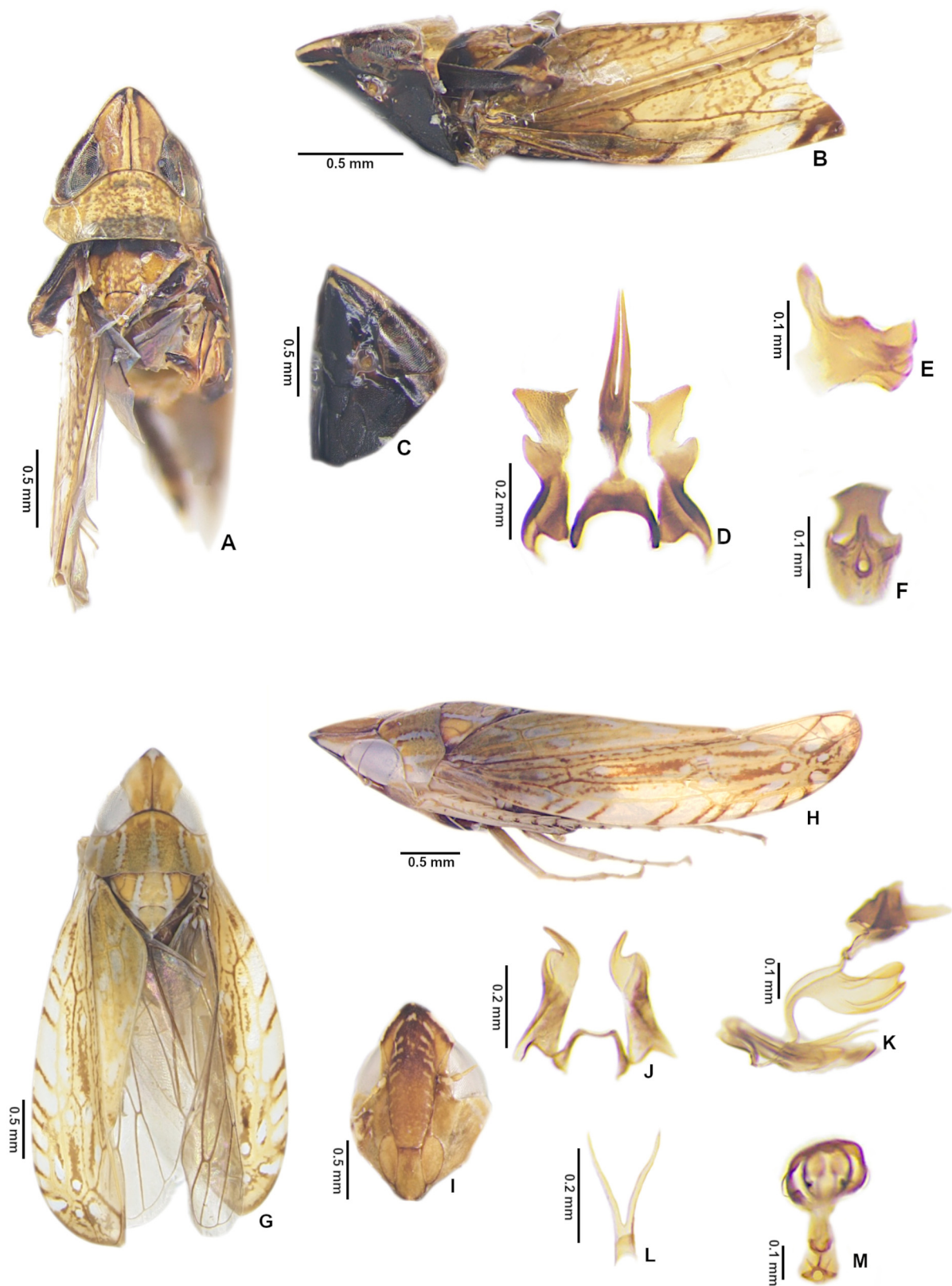


FIGURE 3. A–F *Scaphytopius cyma* sp. nov. male. A. Dorsal habitus. B. Lateral habitus. C. Ventral view of face. D. Ventral view of connective, styles and paraphyses. E. Lateral view of aedeagus. F. Apical view of the shaft apex. G–M *Scaphytopius freytagi* sp. nov. male. G. Dorsal habitus. H. Lateral habitus. I. Ventral view of face. J. Ventral view of connective and styles. K. Lateral view of aedeagus. L. Ventral view of paraphyses. M. Apical view of the shaft apex.

Male genitalia. Pygofer in lateral view triangular, apex small, with multiple macrosetae at apex (Fig. 9F). Subgenital plate triangular, slightly wider at base than apex, longer than wide, with row of approximately 6–7 macrosetae on outer margin, and multiple punctures from middle to apex (Fig. 10F). Connective in ventral view flat, U-shaped (Fig. 3J). Styles in ventral view elongated, rectangular, with short, thin style apophysis; space between preapical lobe and apophysis C-shaped (Fig. 3J). Paraphyses in ventral view fused at base, diverging widely before midlength, forming inverted V, with thin and pointed apex (Fig. 3L). Aedeagus in lateral view wide, with narrow, dorsally projected preatrium; shaft dorsoventrally widened and slightly curved toward apex (Fig. 3K); in apical view, laterally compressed, with two small projections in form of spines located above gonopore (Fig. 3M). Gonopore subapical.

Diagnosis. Crown light brown with white spot at apex (Fig. 3G). Styles rectangular, connective flat and U-shaped (Fig. 3J). Aedeagus laterally compressed and dorsoventrally widened (Fig. 3K), in apical view with two small lateral spine-like projections above the gonopore (Fig. 3M).

Distribution. Costa Rica.

Biology. Unknown.

Etymology. Named in honor of Paul Freytag, mentor and friend of the second author, for his contributions to the study of Cicadellidae.

Material examined. Holotype. ♂. Costa Rica, Cartago, Madre Selva Finca Los Lagos, 2000–2600 m. VIII.1993. INBIO CRI002 519600 (MNCR). **Paratype.** 3 ♂. same data that holotype except INBIO CRI002 605630//INBIO CRI002 605633//INBIO CRI002 605680 (MNCR).

Scaphytopius hansonii Arias-Paco & Godoy, sp. nov.

(Figs. 4A–F, 9G, 10G, 11K, 12K, 13K)

Description. Length of male 4.41 mm. General appearance brown. Crown 1.4 x longer than basal width between eyes, light brown, with two pale white longitudinal bands in center, separated by black line extending to two-thirds of crown length; after this, bands merge into a single band at apex (Fig. 4A). Face entirely black, with two transverse white bands in shape of inverted V at apex of frontoclypeus (Fig. 4C), and faint white band on outer margin of gena extending to eye. Forewings light brown; anteapical cells with dark spots and macula in discal cell, with 2 circular white spots in clavus, and 6–7 veinlets (Fig. 4B); veins dark brown. Legs with femora black, anterior and middle tibiae light brown, posterior tibiae black. Tarsi light brown.

Male genitalia. Pygofer in lateral view triangular, apex rounded; multiple macrosetae at apex (Fig. 9G). Subgenital plate triangular, much wider at base than apex, almost as wide as long, with row of thin, elongated setae at apex (Fig. 10G). Connective in ventral view straight in middle and slightly elevated toward junction with styles (Fig. 4D). Style in ventral view with apophysis short, robust, with no spines, square-shaped on inner margin; space between preapical lobe and apophysis C-shaped. Paraphyses in ventral view fused at base, diverging widely and abruptly beyond midlength (Fig. 4D). Aedeagus very short, L-shaped in lateral view (Fig. 4E); preatrium absent; dorsal apodeme longer than shaft, with slight curvature toward apex (Fig. 4E); shaft in lateral view straight and tubular, in apical view in gonopore area with two small lateral spines and third, larger dorsal spine (Fig. 4F). Gonopore subapical, at base of dorsal spine.

Diagnosis. Connective straight in middle and slightly elevated toward junction points with styles (Fig. 4D); straighter and less curved than in *S. cyma*. In dorsal view style apophysis without spine on inner margin; apophysis in ventral view square-shaped; paraphyses in dorsal view fused at base, diverging widely and abruptly beyond midpoint of their length, giving appearance of inverted U (Fig. 4D).

Distribution. Costa Rica.

Biology. Unknown.

Etymology. Dedicated to Paul Hanson, entomologist who has worked on the description of numerous species of microhymenopteran in Costa Rica.

Material examined. Holotype. ♂. Costa Rica, San José, Cerro de la Muerte. 30.I.1993. INBIO CRI002 082768 (MNCR).

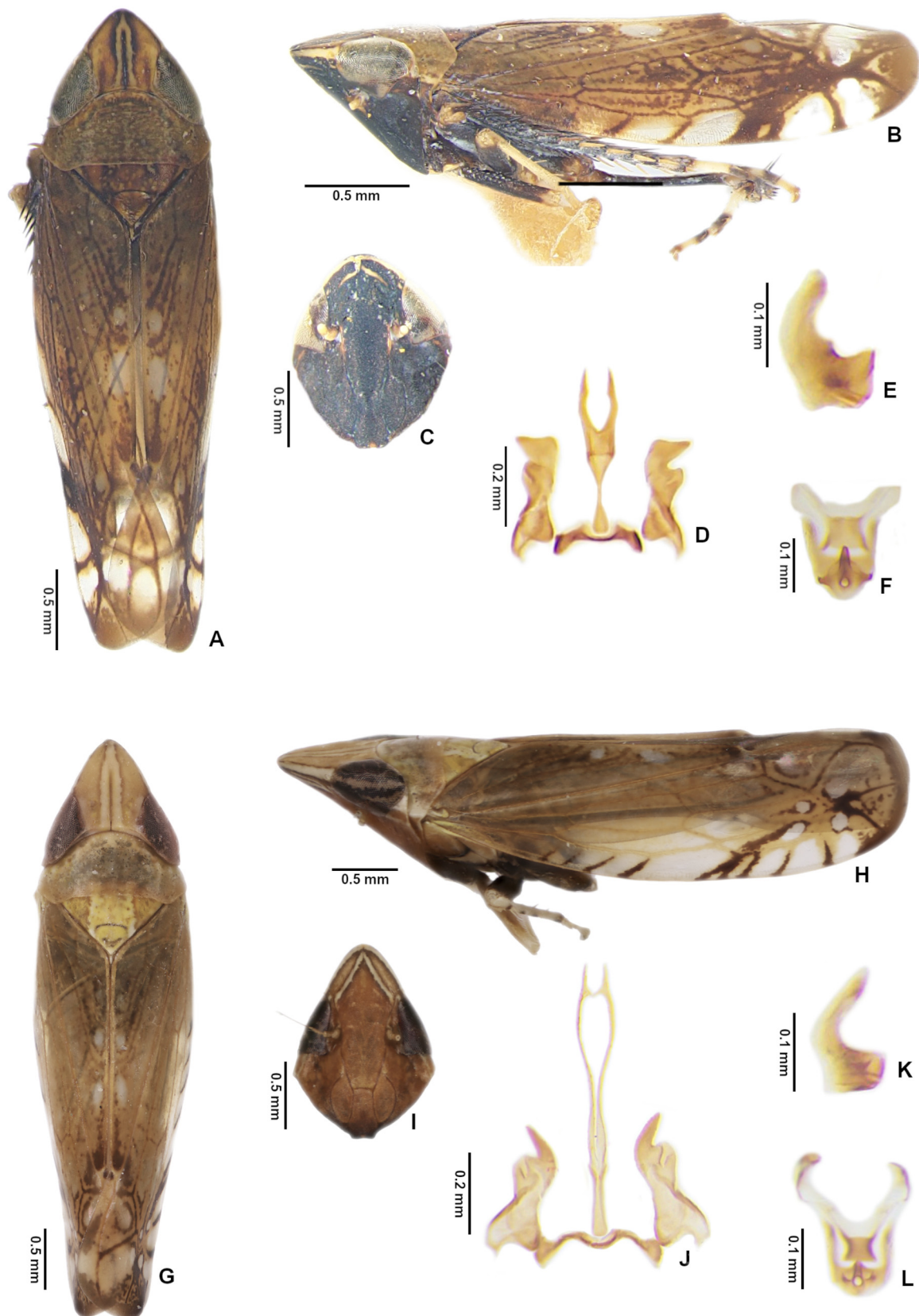


FIGURE 4. A–F *Scaphytopius hansonii* sp. nov. male. A. Dorsal habitus. B. Lateral habitus. C. Ventral view of face. D. Ventral view of connective, styles and paraphyses. E. Lateral view of aedeagus. F. Apical view of the shaft apex. G–L *Scaphytopius lafovensis* sp. nov. male. G. Dorsal habitus. H. Lateral habitus. I. Ventral view of face. J. Ventral view of connective, styles and paraphyses. K. Lateral view of aedeagus. L. Apical view of the shaft apex.

***Scaphytopius lafovensis* Arias-Paco & Godoy, sp. nov.**

(Figs. 4G–L, 9H, 10H, 11L, 12L, 13L)

Description. Length of male 3.75–4.43 mm, female 3.84–4.49 mm. General appearance light brown, in dorsal view with only four small white spots. Crown 1.8 x longer than basal width between eyes, light brown, with two pale white longitudinal bands in center, separated by dark brown line extending two-thirds of crown length; two white bands then merge into single band at apex (Fig. 4G). Face orange-brown; apex of frontoclypeus with two pale white transverse bands in shape of inverted V (Fig. 4I). Forewings light brown, without dark spots or irregular patches; discal cell without spot; clavus with 2 white spots, with around 5–6 round white spots at apex (Fig. 4H), 9 veinlets; veins light brown. Legs light brown.

Male genitalia. Pygofer in lateral view triangular, apex rounded; multiple macrosetae at apex (Fig. 9H). Subgenital plate triangular, wider at base than apex, much longer than wide, with thin setae along outer margin (Fig. 10H). Connective W-shaped. Style in ventral view with apophysis short, thin, and pointed at apex; space between preapical lobe and apophysis C-shaped and narrow. Paraphyses long and slender in ventral view; fused at base for about 1/4 of their length, then slightly separated, remaining parallel up to half their length, where they begin to diverge, ultimately converging again at apex (Fig. 4J); apex with internal spine in shape of triangular claw. Aedeagus in lateral view very short, L-shaped; preatrium absent; dorsal apodeme longer than shaft, with curvature toward apex (Fig. 4K); shaft in apical view straight and tubular, gonopore area with two small lateral spines and third, larger dorsal spine (Fig. 4L). Gonopore subapical, at base of dorsal spine.

Female. External appearance similar to male. Sternite VII wider than long, longer than sternite VI. Posterior margin narrowing toward apex; with three slight notches in middle (Fig. 14Q). Pygofer with multiple macrosetae at apex; first valvulae in lateral view curved, with pointed apex; second valvulae in lateral view dorsally curved, with denticles extending approximately from last quarter of its length to apex. Before beginning of denticles the valvulae is misaligned, slightly V-shaped (Fig. 14R); valvulae united at midlength, in lateral view with more sclerotized area that is perceived as slight spot in center, slightly wider than long.

Diagnosis. Wings light brown, discal cell without irregular patches, dark spots, or circular white spots (Fig. 4H). Paraphyses long and slender, fused at base for about 1/4 of their length, then slightly separated, remaining parallel up to half their length, where they begin to diverge and ultimately converge again at apex (Fig. 4J). Aedeagus in lateral view short, L-shaped; dorsal apodeme longer than shaft, with pronounced curvature toward apex (Fig. 4K).

Distribution. Costa Rica.

Biology. The full biology of this species, including life cycle, courtship, oviposition patterns, and feeding, is being studied at the Laboratory of Obligate Phytopathogens and their Vectors at the University of Costa Rica.

Etymology. Dedicated to Laboratorio de Fitopatógenos Obligados y sus Vectores at the University of Costa Rica (*LaFOV*), as the biology and phytoplasma vector capacity of this species are being studied in depth.

Material examined. Holotype. ♂. Costa Rica, San José, San Pedro, Campus UCR Finca 2, 1 227 m. 9°56'24.23"N 84° 2'38.17"W. V. 2022. col: A. Arias-Paco, L. Garita & S. Carvajal, MUCR 0001064 (MIUCR). **Paratype.** 8 ♂. same data except MUCR 0001065/MUCR 0001067/MUCR 0001068/MUCR 0001070/MUCR 0001071/MUCR 0001072/ MUCR 0001073/MUCR 0001101 (MIUCR). 10 ♀. same data except MUCR 0001102 to MUCR 0001111 (MIUCR). 2 ♂. same data that holotype (USNM). 2 ♂. same data that holotype (BMNH). 2 ♂. same data that holotype (LACM). 2 ♂. same data that holotype (MZUCR). 1 ♂. Costa Rica, Heredia, Estación Biológica La Selva, 17.VIII.1992. col: Nielson & Godoy, INBIO CRI001 148488 (MNCR). 1 ♂. Costa Rica, Guanacaste, Río Naranjo, 20.VIII.1992, col : Nielson & Lezama, INBIO CRI001 148517 (MNCR). 1 ♂. Costa Rica, San José UCR Campus, 26.VIII.1992, col : M.W. Nielson, INBIO CRI001 148370 (MNCR). 1 ♂. Costa Rica, Heredia, Estación Biológica La Selva. 50–150 m. 10°26'N 84° 01'W. VII.1993. col : INBio-OET, INBIO CRI001 252886 (MNCR). 4 ♀. Costa Rica, Heredia, Estación Biológica La Selva. 50–150 m. 10°26'N 84° 01'W. VII.1993. col : C. Godoy, INBIO CRI001 272325/ INBIO CRI001 252885/INB0004294780/INB0004294781 (MNCR).

***Scaphytopius phillipsae* Arias-Paco & Godoy, sp. nov.**

(Figs. 5A–F, 9I, 10I, 11T, 12T, 13T)

Description. Length of male 4.18 mm. General appearance brown with multiple dark longitudinal spots and round white spots. Crown 1.8 x longer than basal width between eyes, pale brown, with thin black longitudinal line in center extending from base to 2/3 of crown length; faint pale V-shaped spot toward apex (Fig. 5A). Face mostly dark brown; gena margins orange-brown; apex of frontoclypeus black; apex of frontoclypeus with pale white transverse band in inverted V-shape, with small triangular spot below it (Fig. 5C). Forewings light brown, with dark spots in anteapical cells and dark brown elongated spot in discal cell; about 12 widely distributed, round white spots (Figs. 5A, B), 10 veinlets; veins dark brown. Legs with black femora, light brown tibiae and tarsi; posterior tibiae with black spots.

Male genitalia. In lateral view, the pygofer is triangular with rounded apex, with multiple macrosetae at apex (Fig. 9I). Subgenital plate triangular, wider at base than apex, much longer than wide, with row of 3–5 long macrosetae on external margin; with multiple punctures extending toward apex (Fig. 10I). Connective in ventral view U-shaped. Style in ventral view with apophysis very short, robust, and pointed at apex; space between preapical lobe and apophysis C-shaped (Fig. 5E). Paraphyses absent. Aedeagus in lateral view strongly curved, giving the appearance of wide U-shape (Fig. 5D); preatrium length similar to shaft; dorsal apodeme shorter than shaft; straight toward apex; shaft tubular, curved dorsally; in ventral view, shaft is compact up to half its length, where it divides into three projections (Fig. 5E): central projection where the gonoduct and gonopore are located, and two lateral projections in form of spines that project beyond central projection; in apical view two lateral projections are directed opposite to gonopore (Fig. 5F). Gonopore in subapical position, located between two lateral spines (Fig. 5F).

Diagnosis. Aedeagus with shaft that, at half its length, divides into three projections, with central projection containing gonoduct and gonopore, and lateral projections positioned to either side of it (Fig. 5E.). Lateral projections are longer than central projection and acquire opposite directions toward apex (Fig. 5F).

Distribution. Costa Rica.

Biology. Unknown.

Etymology. Dedicated to Eugenie Phillips-Rodriguez, colleague and friend of the second author, for her contribution to the study of microlepidopterans of Costa Rica.

Material examined. Holotype. ♂. Costa Rica, Heredia, Estación Biológica La Selva, sector arboleda. 100 m. 10°26'N 84° 01'W. 18.V.1993. col: C. Godoy, MUCR 0001080 (MIUCR).

***Scaphytopius scarlatum* Arias-Paco & Godoy, sp. nov.**

(Figs. 5G–M, 9J, 11V, 12V, 13V)

Description. Length of male 4.02 mm. General appearance opaque brown with scarlet-red scutellum, pronotum, and crown. Crown 1.5 x longer than basal width between eyes, scarlet-red, with two lateral pale brown bands. Pronotum and scutellum scarlet-red (Fig. 5G). Face dark brown, with one white transverse band at apex of frontoclypeus in inverted V-shape, with 3–4 short pale transverse lines on sides of frontoclypeus (Fig. 5I). Forewings dark brown; with few (less than 4) dispersed round white spots, with 8 veinlets (Fig. 5H); veins dark brown. Legs with scarlet-red femora; light brown tibiae and tarsi.

Male genitalia. In lateral view, the pygofer is triangular with rounded apex, with multiple macrosetae at apex (Fig. 9J). Connective in ventral view V-shaped. Style in ventral view with apophysis very long, slender, and rounded at apex; preapical lobe in shape of claw (Fig. 5J); internal margin of style with tubercle protruding just after midlength (Fig. 5J). Paraphyses slender and elongated; in ventral view, fused at base and rapidly diverging, converging beyond midlength, then diverging and converge again toward apex (Fig. 5K). Aedeagus in lateral view very short and wide at apex (Fig. 5L); preatrium absent; dorsal apodeme very short and straight; shaft very short, tubular with dorsolateral folds curving toward apex; in apical view, with triangular fold above gonopore (Fig. 5M). Gonopore in subapical position.

Diagnosis. Pronotum and crown scarlet-red (Fig. 5G). Style of apophysis very long and slender, in ventral view with tubercle just beyond midlength (Fig. 5J); preapical lobe in shape of claw. Shaft in apical view with dorsolateral folds curving toward apex, with triangular fold above gonopore (Fig. 5M).

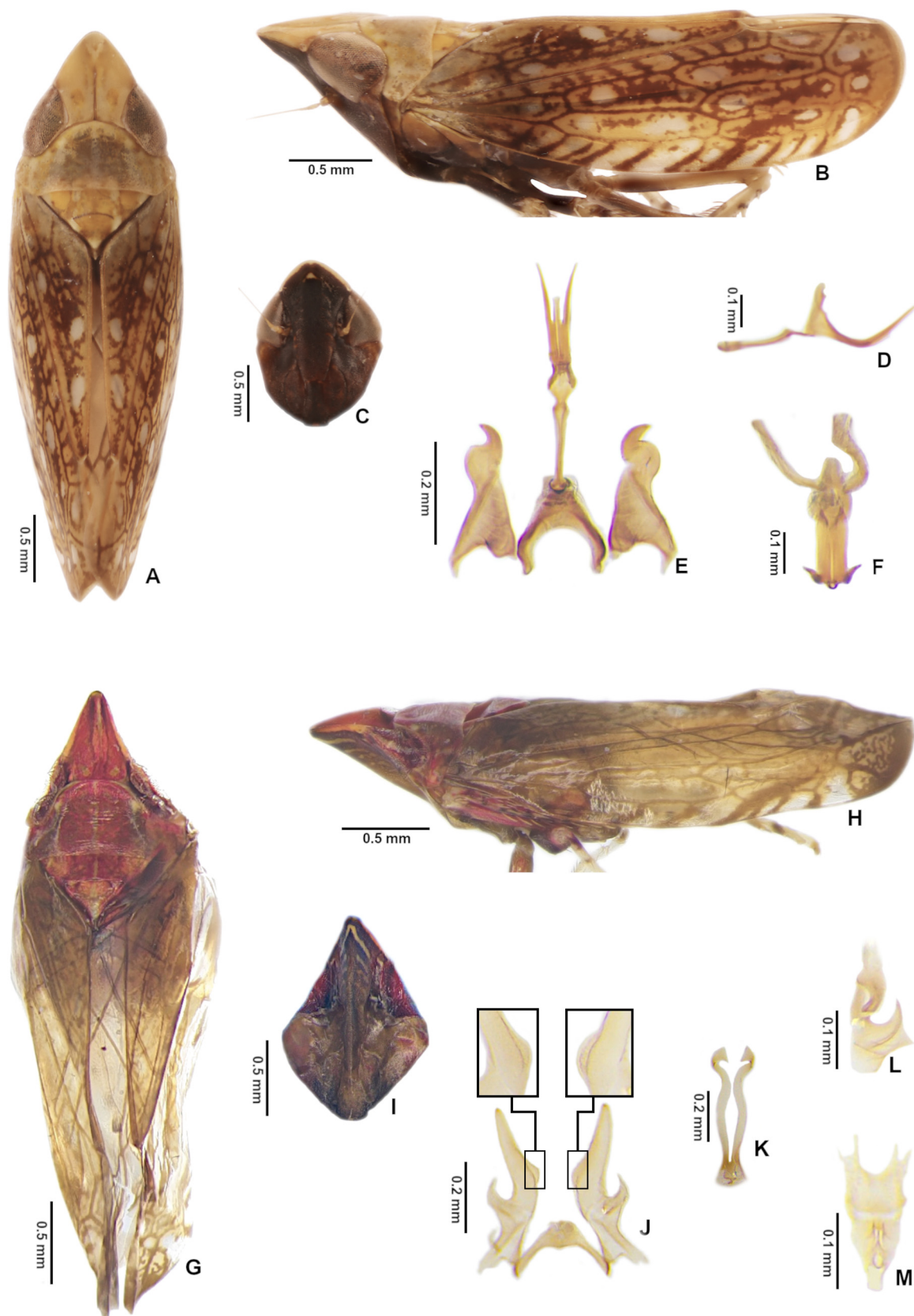


FIGURE 5. A–F *Scaphytopius phillipsae* sp. nov. male. A. Dorsal habitus. B. Lateral habitus. C. Ventral view of face. D. Lateral view of aedeagus. E. Ventral view of connective, styles and aedeagus. F. Apical view of the shaft apex. G–M *Scaphytopius scarlatum* sp. nov. male. G. Dorsal habitus. H. Lateral habitus. I. Ventral view of face. J. Ventral view of connective and styles. K. Ventral view of paraphyses. L. Lateral view of aedeagus. M. Apical view of the shaft apex.

Distribution. Costa Rica.

Biology. Unknown.

Etymology. From medieval Latin *scarlatum* referring to the distinctive scarlet color of its crown and pronotum.

Material examined. Holotype. ♂. Costa Rica, Puntarenas, En Punta de Manglar en boca del Río Aranjuez. XII.2006. INB0004047543 (MNCR).

***Scaphytopius springerae* Arias-Paco & Godoy, sp. nov.**

(Figs. 6A–F, 9K, 10J, 11W, 12W, 13W)

Description. Length of male 3.50 mm. General appearance light brown with numerous dark spots widely distributed. Crown 1.4 x longer than basal width between eyes, white with several longitudinal brown spots forming almost continuous band between eyes, and another extending longitudinally to apex (Fig. 6A). Face white, with numerous irregular brown spots scattered widely across gena and frontoclypeus, but fewer spots on lorum and anteclypeus (Fig. 6C). Forewings brown with multiple dark spots widely distributed; around 12 widely distributed irregular white spots (Fig. 6B), with 7–8 veinlets; veins brown, and third apical cell with pale outer edge. Legs light brown with black spots on tibiae and femora.

Male genitalia. Pygofer in lateral view rectangular with rounded apex; brown with irregular pale spots, without macrosetae (Fig. 9K). Subgenital plate triangular, wider at base than apex, much longer than wide, with row of approximately 5 macrosetae on external margin (Fig. 10J). Connective in ventral view W-shaped. Styles thin and elongated, rectangular-shaped; apophysis short, thin, and rounded at apex; space between preapical lobe and apophysis in L-shape (Fig. 6D). Paraphyses in ventral view long and thin, fused at base, they remain parallel in basal quarter, then diverge, crossing at midlength, and converging again toward apex (Fig. 6D). Aedeagus in lateral view wedged between paraphyses just before they cross (Figs. 6D–E); very short, robust, apically rounded, hammer-shaped with curved handle (Fig. 6E); preatrium inconspicuous; dorsal apodeme longer than shaft and curved toward apex (Fig. 6E); shaft short and robust; in dorsal view tubular (Fig. 6F). Gonopore in apical position.

Diagnosis. Thin and elongated styles in rectangular shape with L-shaped space between apophysis and preapical lobe (Fig. 6D). Aedeagus positioned between paraphyses just before they cross (Figs. 6D–E); shaft very short, tubular and robust, rounded toward apex; dorsal apodeme curved toward apex, longer than shaft, giving hammer-like shape with curved handle (Fig. 6E). This species is distinguished from *S. brevis*, by the following features: In dorsal view the crown is longer; in lateral view shaft much shorter; dorsal apodeme is 2.4x longer than shaft; apex of shaft rounded (Fig. 6E); junction of dorsal apodeme with shaft rounded, giving triangular appearance (Fig. 6E); in ventral view paraphyses much shorter, crossing at same level as apex of styles.

Distribution. Costa Rica.

Biology. Unknown.

Etymology. Dedicated to Monika Springer, aquatic entomologist renowned for her studies on aquatic insects and freshwater ecosystems in Costa Rica.

Material examined. Holotype. ♂. Costa Rica, Guanacaste, Nicoya, San Antonio, Humedal, Corral de Piedra. 6.VII.2005. INB0004155439 (MNCR)

***Scaphytopius trisolis* Arias-Paco & Godoy, sp. nov.**

(Figs. 6G–L, 9L, 10K, 11Y, 12Y, 13Y)

Description. Length of male 3.86–3.99 mm, female 4.15–4.23 mm. General appearance brown, in dorsal view with 3 large pale-yellow circular spots on wings. Crown 1.2 x longer than basal width between eyes, light brown with two small black spots at apex; with thin longitudinal line in center of crown that disappears near apex (Fig. 6G). Face with orange-brown gena, dark brown lorum, and black frontoclypeus and anteclypeus (Fig. 6I); apex of frontoclypeus with three pale white spots; with 5–6 short pale transverse lines on sides of frontoclypeus. Forewings in dorsal view light brown, with 3 large pale-yellow spots forming 3 large semicircles on clavus, with both wings joined forming 3 large pale circles (Fig. 6G); with few small irregular dark spots and fewer than 6 round white spots

at apex, with 7 veinlets (Fig. 6H); veins dark brown. Legs with black femora, light brown tibiae and tarsi; posterior tibiae with black spots.

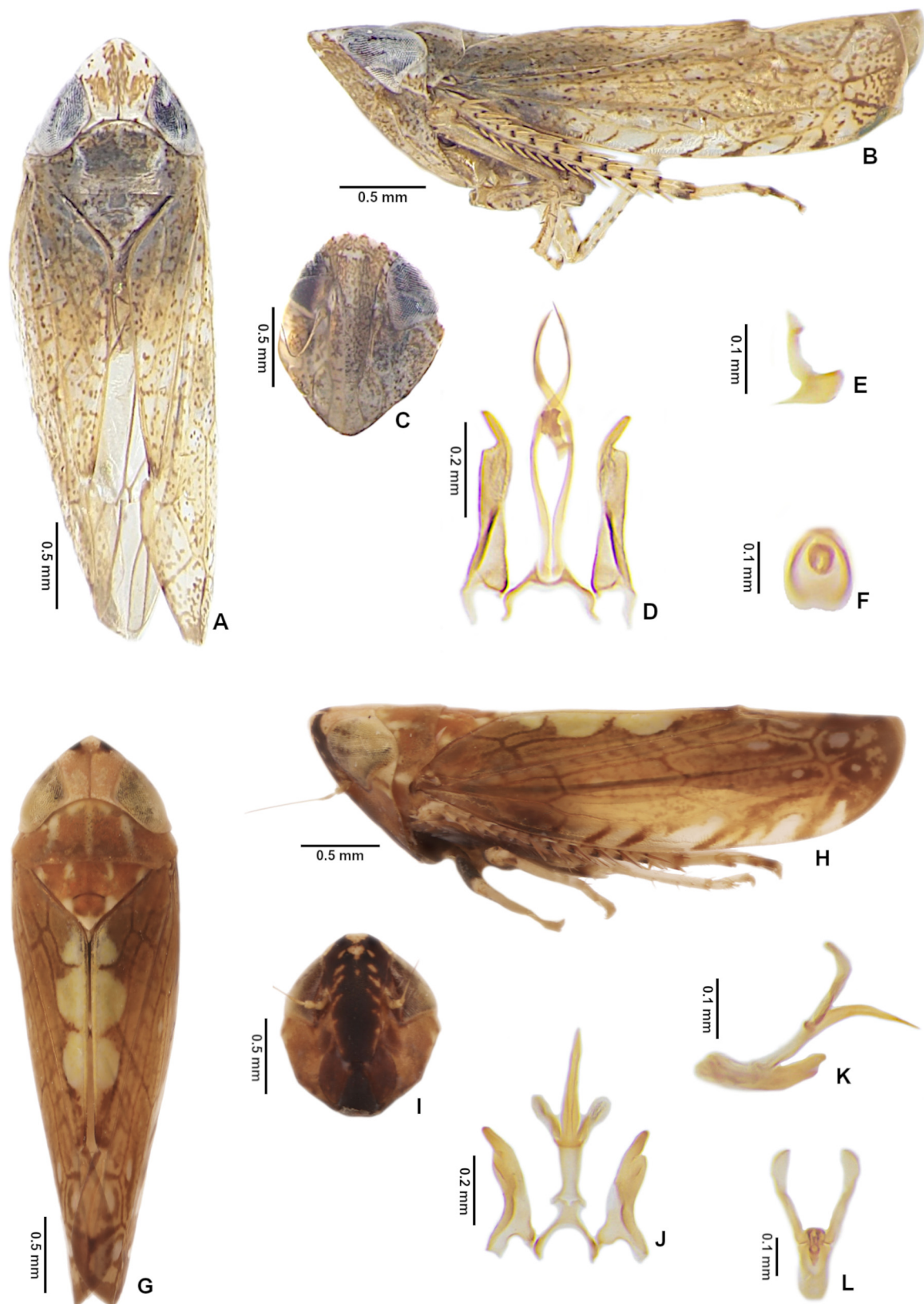


FIGURE 6. A–F *Scaphytopius springerae* sp. nov. male. A. Dorsal habitus. B. Lateral habitus. C. Ventral view of face. D. Ventral view of connective, styles, paraphyses and aedeagus. E. Lateral view of aedeagus. F. Apical view of the shaft apex. G–L *Scaphytopius trisolis* sp. nov. male. G. Dorsal habitus. H. Lateral habitus. I. Ventral view of face. J. Ventral view of connective, styles and aedeagus. K. Lateral view of aedeagus. L. Apical view of the shaft apex.

Male genitalia. Pygofer in lateral view triangular, with rounded apex and multiple macrosetae at apex (Fig. 9L). Subgenital plate triangular, wider at base than apex, much longer than wide, with small setae on apex, and multiple small punctures (Fig. 10K). Connective U-shaped. Style in ventral view with apophysis short, thin, and rounded at apex; preapical lobe and apophysis without obvious space between them (Fig. 6J). Paraphyses absent. Aedeagus in lateral view with preatrium, dorsal apodeme, and shaft forming a Y-shape (Fig. 6K); preatrium straight, shorter than shaft; dorsal apodeme shorter than shaft, straight with sharp 90-degree bend toward apex (Fig. 6K); shaft tubular, ventrally curved, becoming thinner toward apex; in apical view, dorsal apodeme and shaft project in opposite directions; apex of shaft pointed and triangular (Fig. 6L). Gonopore in apical position.

Female. External appearance similar to male. Sternite VII wider than long, longer than sternite VI; posterior margin becoming narrower toward apex; with marked division in middle (Fig. 14S). Pygofer with multiple macrosetae toward apex; first valvulae in lateral view curved, with pointed apex; second valvulae dorsally curved in lateral view, with denticles extending approximately from last third of its length to apex. Before beginning of denticles, valvulae is not misaligned, but then changes direction markedly (Fig. 14T); valvulae united at midlength, in lateral view with more sclerotized area that is perceived as slight spot in center, much wider than long.

Diagnosis. Brown appearance, with 3 large pale-yellow circular spots on wings in dorsal view (Fig. 6G). Aedeagus with preatrium, dorsal apodeme, and shaft forming Y-shape in lateral view (Fig. 6K); dorsal apodeme shorter than shaft, straight with sharp 90-degree bend toward apex; shaft with pointed triangular apex (Fig. 6L).

Distribution. Costa Rica.

Biology. Unknown.

Etymology. From the Latin *tri* (three) and *solis* (suns), referring to the three sun-like spots on the forewings in dorsal view.

Material examined. Holotype. ♂. Costa Rica, Heredia, Estación Biológica La Selva, bosque secundario. 100 m. 10°26'N 84° 01'W. 18.V.1993. col: C. Godoy, MUCR 0001077 (MIUCR). **Paratype.** 1 ♂. same data that holotype (USNM). 1 ♀. same data that holotype except MUCR 0001074 (MIUCR). 1 ♀. same data that holotype (USNM)

Scaphytopius viperans Arias-Paco & Godoy, sp. nov.

(Figs. 7A–F, 9M, 10L, 11Z, 12Z, 13Z)

Description. Length of male 4.15–4.28 mm. General appearance light brown with numerous widely distributed dark spots. Crown 1.6 x longer than basal width between eyes, pale white with several longitudinal brown spots forming almost continuous band between eyes and another toward apex (Fig. 7A). Face pale yellow with small light brown spots at apex of frontoclypeus and along lateral margins of gena (Fig. 7C). Forewings brown, with numerous widely distributed dark spots; with numerous (14–16 approximately) widely distributed round white spots (Fig. 7B), with 11 brown veins; third apical cell with pale outer edge. Legs light brown with black spots on tibiae and femora.

Male genitalia. Pygofer in lateral view triangular with rounded apex, multiple macrosetae at apex (Fig. 9M). Subgenital plate triangular, wider at base than at apex, much longer than wide, with row of approximately 5–6 macrosetae on external margin, with multiple extended punctures (Fig. 10L). Connective in ventral view U-shaped. Style apophysis in ventral view thin and rounded at apex; space between preapical lobe and apophysis L-shaped (Fig. 7D). Paraphyses in ventral view long and thin, fused at base and diverging rapidly, crossing at midlength, then converging again toward apex; apex of paraphyses with slight V-shaped bifurcation (Fig. 7D). Aedeagus in lateral view with dorsal apodeme and shaft forming V-shape (Fig. 7E1); preatrium absent; dorsal apodeme of similar length to shaft; shaft thin and tubular, with two small spines at apex projecting dorsolaterally; in apical view, tubular with two very small dorsolateral spines (Figs. 7F). Gonopore in apical position (Fig. 7F).

Diagnosis. Apex of paraphyses with slight bifurcation (Fig. 7D). Aedeagus in lateral view with dorsal apodeme and shaft forming a V-shape (Fig. 7E1), with two very small spines dorsolaterally (Fig. 7E2).

Distribution. Costa Rica.

Biology. Unknown.

Etymology. Referring to viper snakes, due to the appearance of the paraphyses apex resembling the mouth of viper.

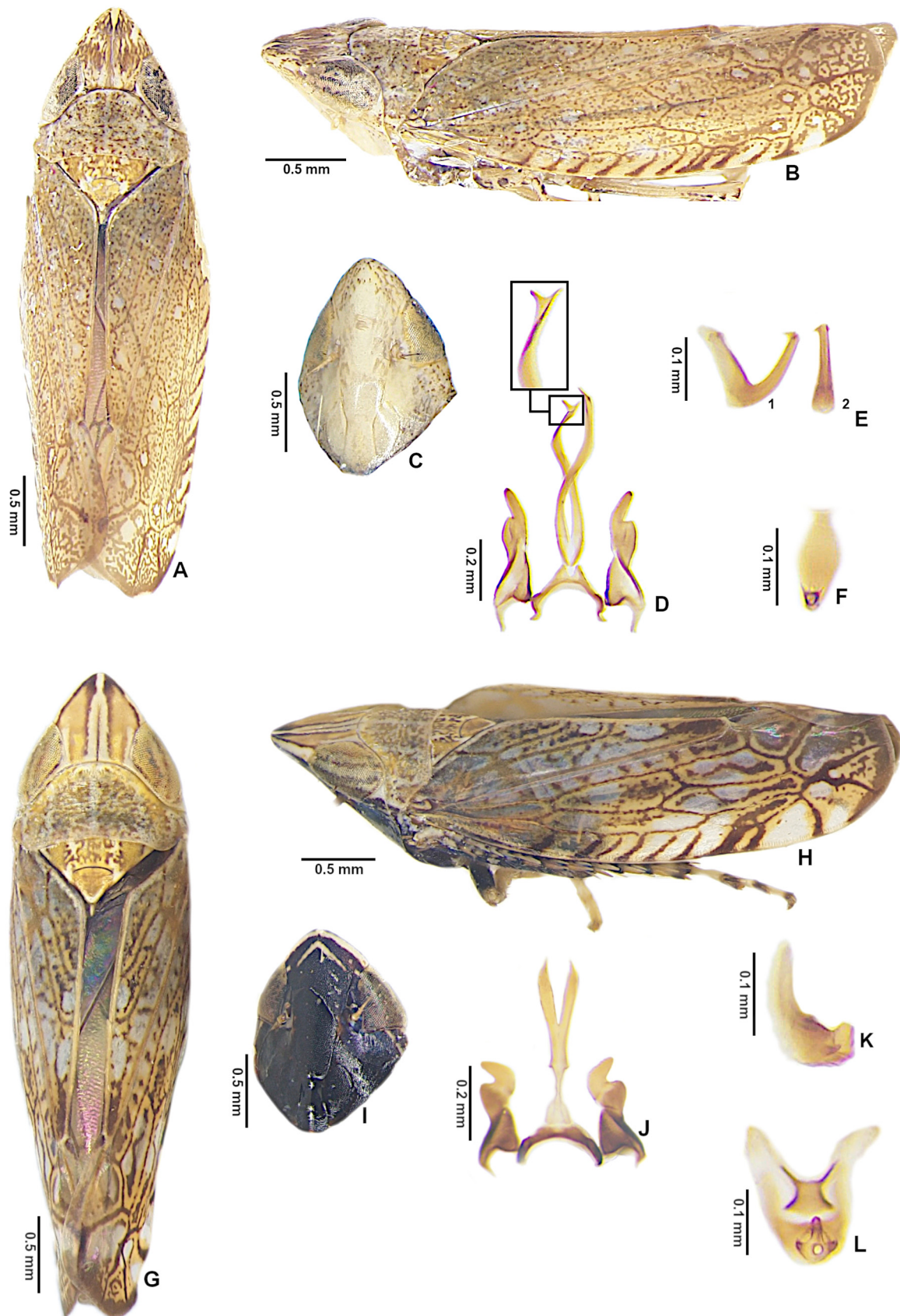


FIGURE 7. A–F *Scaphytopius viperans* sp. nov. male. A. Dorsal habitus. B. Lateral habitus. C. Ventral view of face. D. Ventral view of connective, styles and paraphyses. E.1 Lateral and 2.ventral view of aedeagus. F. Apical view of the shaft apex. G–L *Scaphytopius vulcanus* sp. nov. male. G. Dorsal habitus. H. Lateral habitus. I. Ventral view of face. J. Ventral view of connective, styles and paraphyses. K. Lateral view of aedeagus. L. Apical view of the shaft apex.

Material examined. Holotype. ♂. Costa Rica, Guanacaste, 3 km sureste Río Naranjo, Rancho Montezuma. 20.XI.1994. col : R.G. Allen, INBIO CRI001 951065 (MNCR). **Paratype.** 1 ♂. Costa Rica, Guanacaste, 15 km SW Cañas, Estacion Experimental E. Jimenez Nuñez. 13.VIII.93. col : R.G. Allen, INBIO CRI002 085615 (MNCR). 1 ♂. Costa Rica, Guanacaste, Cerro el Hacha 12 km SE La Cruz. 800 m. 1988. INBIO CRI000 050279 (MNCR)

***Scaphytopius vulcanus* Arias-Paco & Godoy, sp. nov.**

(Figs. 7G–L, 9N, 10M, 11AA, 12AA, 13AA)

Description. Length of male 4.51 mm. General appearance light brown with irregular transparent spots. Crown 1.4 x longer than basal width between eyes, light brown, with two longitudinal pale white bands in center, separated by black line that extends to two-thirds of crown's length; after this point, bands merge to form single band at apex (Fig. 7G). Face entirely black, with two white transverse bands in shape of inverted V at apex of frontoclypeus, and faint white band on external margin of gena that extends to eye (Fig. 7I). Forewings light brown; clavus cells with irregular white spots, discal and anteapical cells with irregular white spots, with 9 veinlets (Fig. 7H); veins dark and light brown. Legs with black femora; light brown anterior and middle tibiae, black posterior tibiae, and light brown tarsi.

Male genitalia. Pygofer in lateral view rectangular, with rounded apex, multiple macrosetae at apex (Fig. 9N). Subgenital plate triangular, much wider at base than apex, longer than wide, with row of long thin setae at apex (Fig. 10M). Connective in ventral view in shape of wide U. Style in ventral view with apophysis short and rounded, without spines and with rounded internal margin; space between preapical lobe and apophysis C-shaped (Fig. 7J). Paraphyses fused at base, diverging slightly and gradually beyond midlength in ventral view, giving appearance of inverted V (Fig. 7J). Aedeagus in lateral view very short, L-shaped (Fig. 7K); preatrium absent; dorsal apodeme longer than shaft, straight toward apex; shaft straight and tubular, in apical view with two small lateral spines and third, larger dorsal spine in gonopore area (Fig. 7L). Gonopore in subapical position, at base of dorsal spine.

Diagnosis. Style apophysis in dorsal view without spine on internal margin and rounded in shape (Fig. 7J). Connective in shape of open U. Paraphyses fused at base, diverging slightly beyond midlength in dorsal view, forming inverted V (Fig. 7J). Dorsal apodeme longer than shaft and straight toward apex (in contrast to *S. hansonii*, which is curved) (Fig. 7K).

Distribution. Costa Rica.

Biology. Unknown.

Etymology. From the Latin *vulcanus*, because it was collected on the Cacao Volcano in Costa Rica.

Material examined. Holotype. ♂. Costa Rica, Guanacaste, Volcán Cacao. 1000–1400 m. VIII.1989. INBIO CRI000 029734 (MNCR).

***Scaphytopius webbi* Arias-Paco & Godoy, sp. nov.**

(Figs. 8A–G, 9O, 10N, 11AB, 12AB, 13AB)

Description. Length of male 4.4 mm. General appearance black with irregular white spots. Crown 1.8 x longer than basal width between eyes, dark brown, with two longitudinal black bands in center extending to apex; four short irregular pale spots between eyes and one irregular pale spot after apex of eye (Fig. 8A). Face entirely black, with two triangular white spots at apex; four short pale transverse lines on sides of frontoclypeus (Fig. 8C). Forewings with multiple wide black spots covering almost entire wing, with approximately 15–16 widely distributed round white spots (Fig. 8B), with 12 veinlets; veins black. Legs with black femora, white tibiae and tarsi with black spots.

Male genitalia. Pygofer in lateral view with thin, short spine-like projection at apex, much shorter than rest of pygofer (Figs. 8D, 9O); with few macrosetae on dorsal part. Subgenital plate triangular, wider at base than apex, much longer than wide, with row of 4 macrosetae on external margin, with 4–5 fine thin setae at apex; multiple punctures distributed across plate (Fig. 10N). Connective in shape of V. Style apophysis in ventral view short, robust, and rounded at apex; space between preapical lobe and apophysis very narrow (Fig. 8F). Paraphyse absent. Aedeagus in lateral view shaped like claw (Fig. 8E); preatrium short, shorter than shaft; dorsal apodeme straight, shorter than shaft; shaft curved dorsally and tubular, with laminar concave projection near apex that is easily noticeable in lateral (Fig. 8E), dorsal, and ventral views; in dorsal view, two laminar projections near apex of shaft are oval-shaped (Fig. 8G).

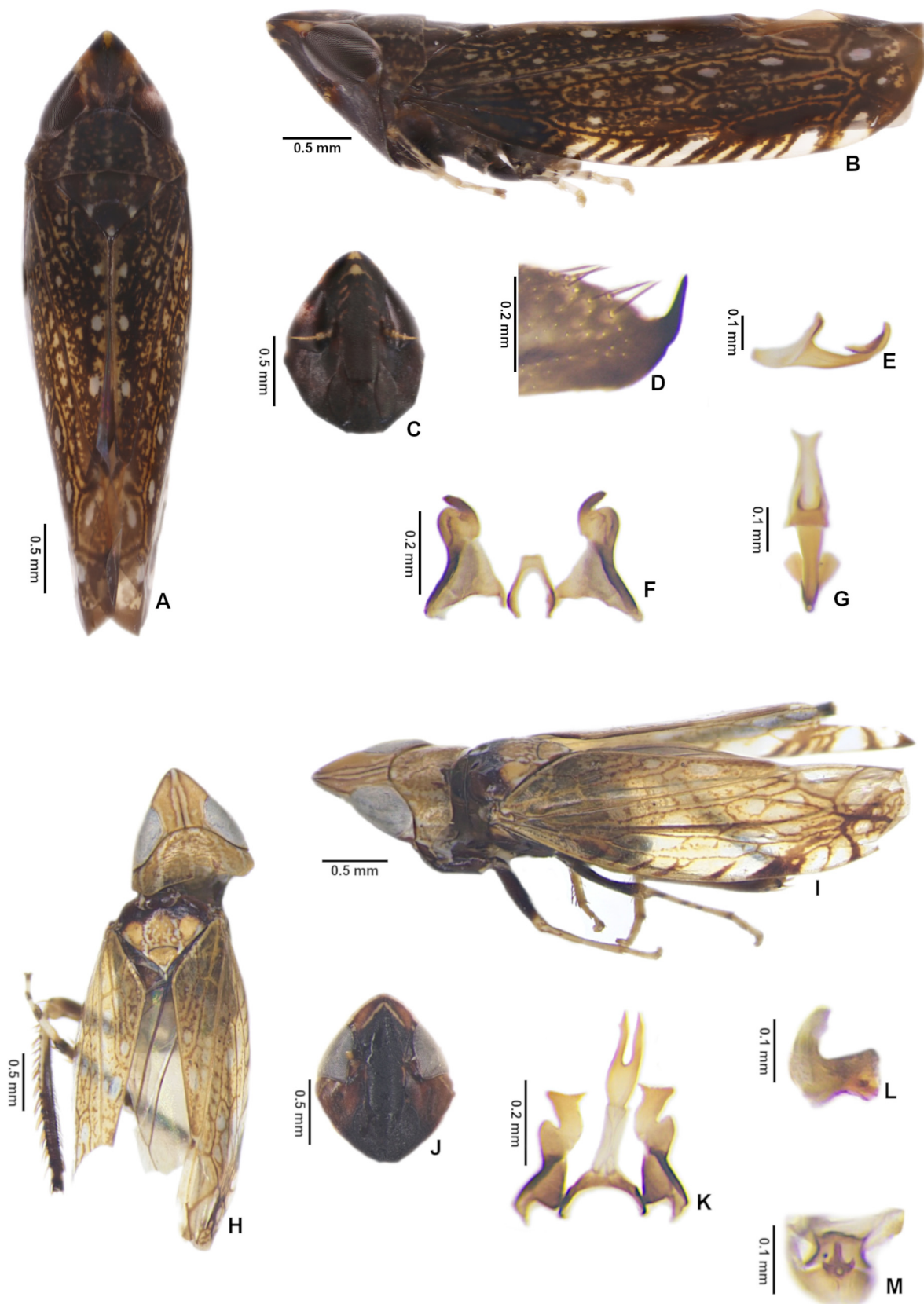


FIGURE 8. A–G *Scaphytopius webbi* sp. nov. male. A. Dorsal habitus. B. Lateral habitus. C. Ventral view of face. D. Lateral view of pygofer. E. Lateral view of aedeagus. F. Ventral view of connective and styles. G. Dorsal view of the shaft apex. H–M *Scaphytopius zurquiense* sp. nov. male. H. Dorsal habitus. I. Lateral habitus. J. Ventral view of face. K. Ventral view of connective, styles and paraphyses. L. Lateral view of aedeagus. M. Apical view of the shaft apex.

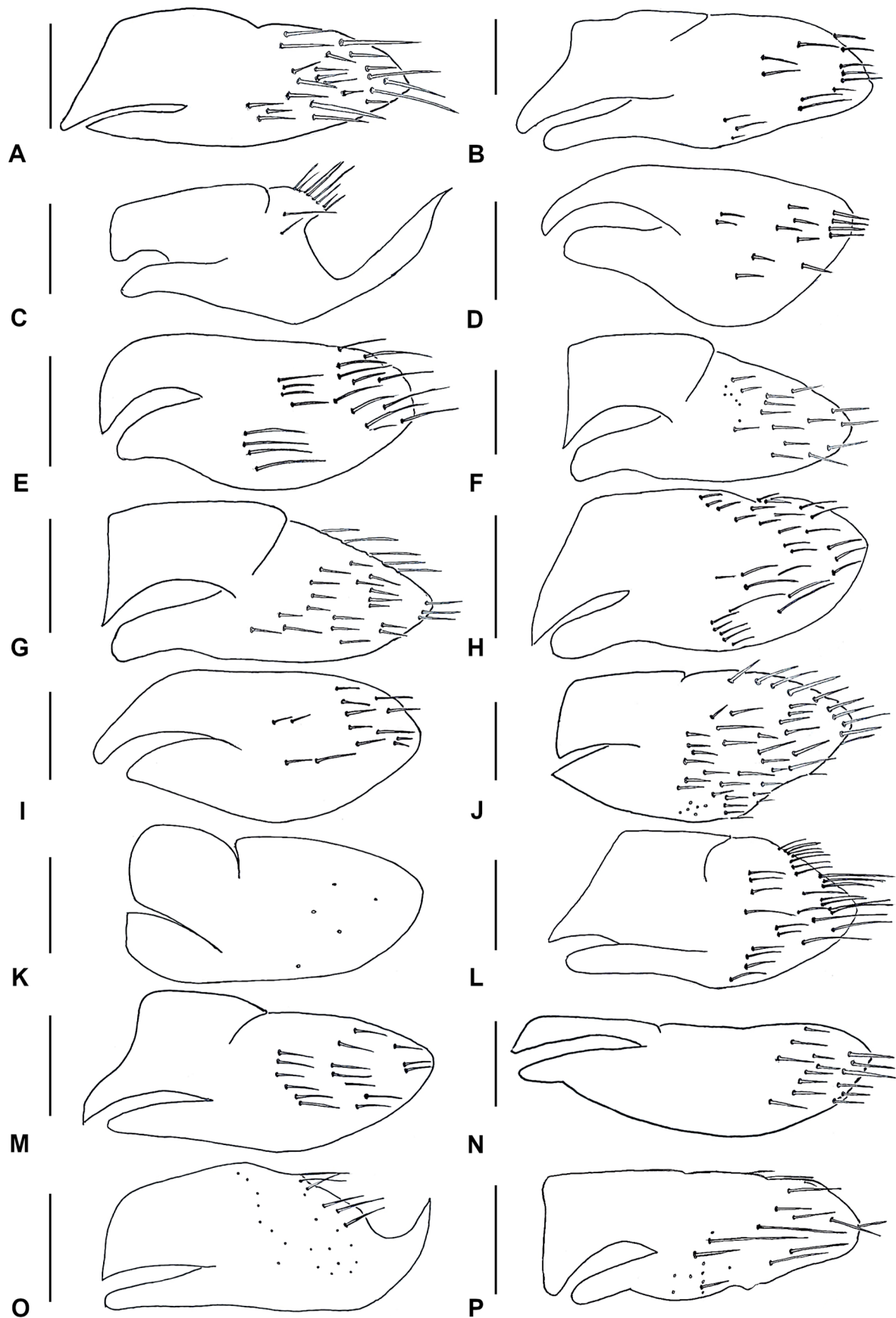


FIGURE 9. Lateral view of the pygofers of the new species of *Scaphytopius* from Costa Rica. A. *S. ancorus* B. *S. balaena* C. *S. caprensis* D. *S. cientosetenta* E. *S. cyma* F. *S. freytagi* G. *S. hansonii* H. *S. lafovensis* I. *S. phillipsae* J. *S. scarlatum* K. *S. springerae* L. *S. trisolis* M. *S. viperans* N. *S. vulcanus* O. *S. webbi* P. *S. zurquiense*. scale bars=0.2 mm.

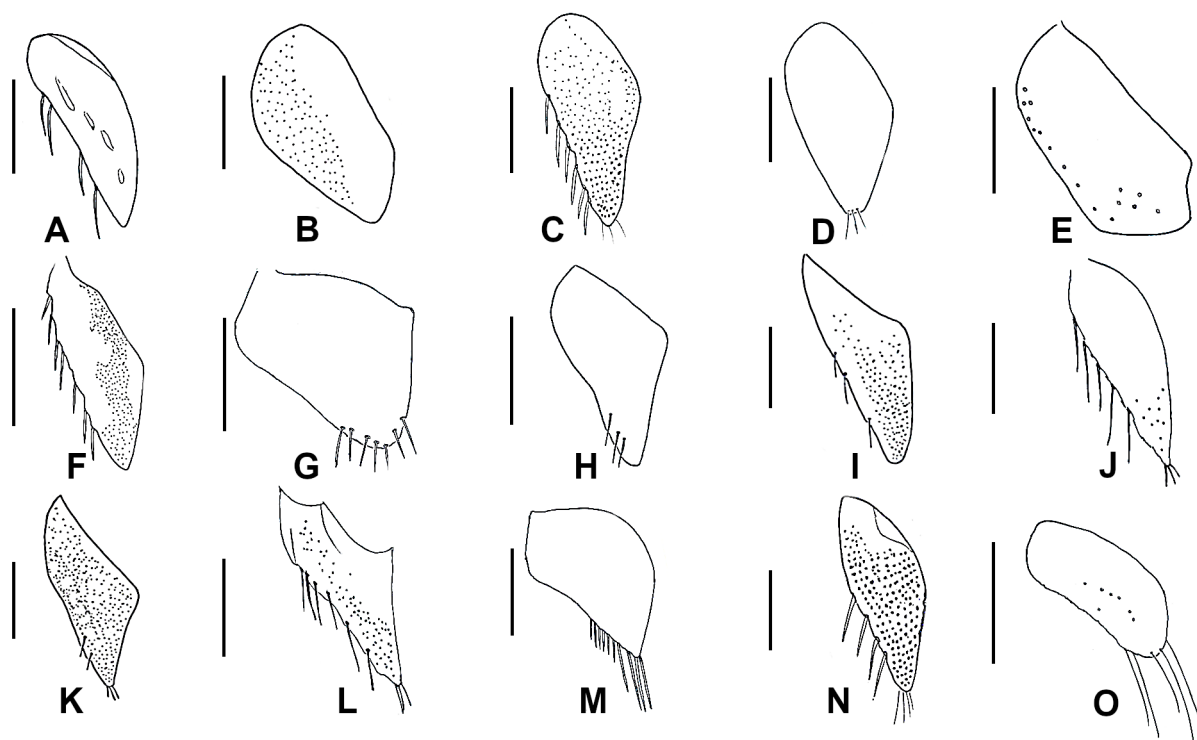


FIGURE 10. Ventral view of the subgenital plates of the new species of *Scaphytopius* from Costa Rica. A. *S. ancorus* B. *S. balaena* C. *S. caprensis* D. *S. cientosetenta* E. *S. cyma* F. *S. freytagi* G. *S. hansonii* H. *S. lafovensis* I. *S. phillipsae* J. *S. springerae* K. *S. trisolis* L. *S. viperans* M. *S. vulcanus* N. *S. webbi* O. *S. zurquiense*. scale bars=0.2 mm.

Diagnosis. Pygofer dark with spine-like projection at apex, much shorter than rest of pygofer (Fig. 8D). Aedeagus in dorsal view with two laminar projections near apex of shaft (Fig. 8G).

Distribution. Costa Rica.

Biology. Collected once in coffee plantation, during four years of sampling.

Etymology. Named in honor of Mick Webb, mentor of the second author, for his contributions to the study of Cicadellidae and Cercopidae.

Material examined. Holotype. ♂. Costa Rica, Alajuela, Carrizal, Pavas de Carrizal. 1372 m. 10°04'27.2"N 84°10'12.4"W. 30.VII.24. In *Coffea arabica*, col: L. Garita, S. Carvajal & K. Valverde, MUCR 0001082 (MIUCR).

Scaphytopius zurquiense Arias-Paco & Godoy, sp. nov.

(Figs. 8H–M, 9P, 10O, 11AC, 12AC, 13AC)

Description. Length of male 4.13 mm. General appearance light brown overall, with irregular whitish spots. Crown 1.4 x longer than basal width between eyes, light brown, with two longitudinal pale white bands in center, separated by black line extending to two-thirds of crown's length; after this point, bands merge to form single band at apex (Fig. 8H). Face entirely black on frontoclypeus, anteclypeus, and lorum, slightly orange-brown toward apex and margins of gena; with two white transverse bands in shape of inverted V at apex of frontoclypeus, and small white band on margin of gena that extends to eye (Fig. 8J). Forewings light brown; with about 3–6 dispersed round white spots, with 9 veinlets (Fig. 8I); veins dark brown. Legs with black femora, light brown anterior and middle tibiae, black posterior tibiae and light brown tarsi.

Male genitalia. Pygofer in lateral view rectangular, with slightly rounded apex; with multiple macrosetae (Fig. 9P). Subgenital plate triangular, wider at base than apex, longer than wide, with row of long thin setae on apex (Fig. 10O). Connective in ventral view in shape of wide U. Style in ventral view with apophysis short and robust, square-shaped, with spine on internal margin (Fig. 8K); space between preapical lobe and apophysis narrowly C-shaped.

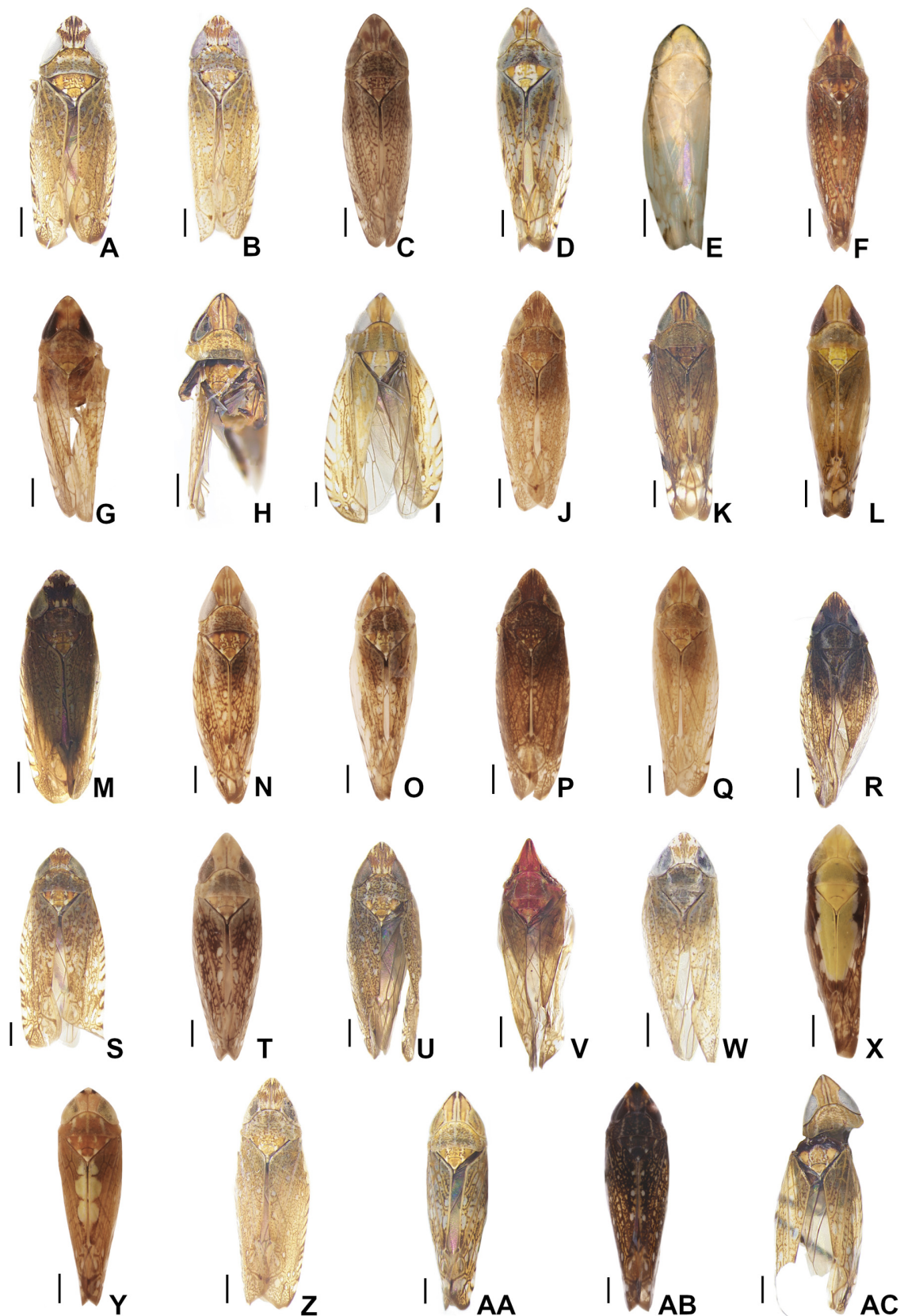


FIGURE 11. Dorsal habitus of *Scaphytopus* species from Costa Rica A. *S. anadamus* B. *S. ancorus* C. *S. balaena* D. *S. barroensis* E. *S. biflavus* F. *S. caprensis* G. *S. cientosetenta* H. *S. cyma* I. *S. freytagi* J. *S. fuliginosus* K. *S. hansonii* L. *S. lafovensis* M. *S. latens* N. *S. latidens* O. *S. limbatus* P. *S. loricatus* Q. *S. nigrinotus* R. *S. nitridus* S. *S. osborni* T. *S. phillipsae* U. *S. saginatus* V. *S. scarlatum* W. *S. springerae* X. *S. sulphureus* Y. *S. trisolis* Z. *S. viperans* AA. *S. vulcanus* AB. *S. webbi* AC. *S. zurquiense*. scale bars=0.5 mm.

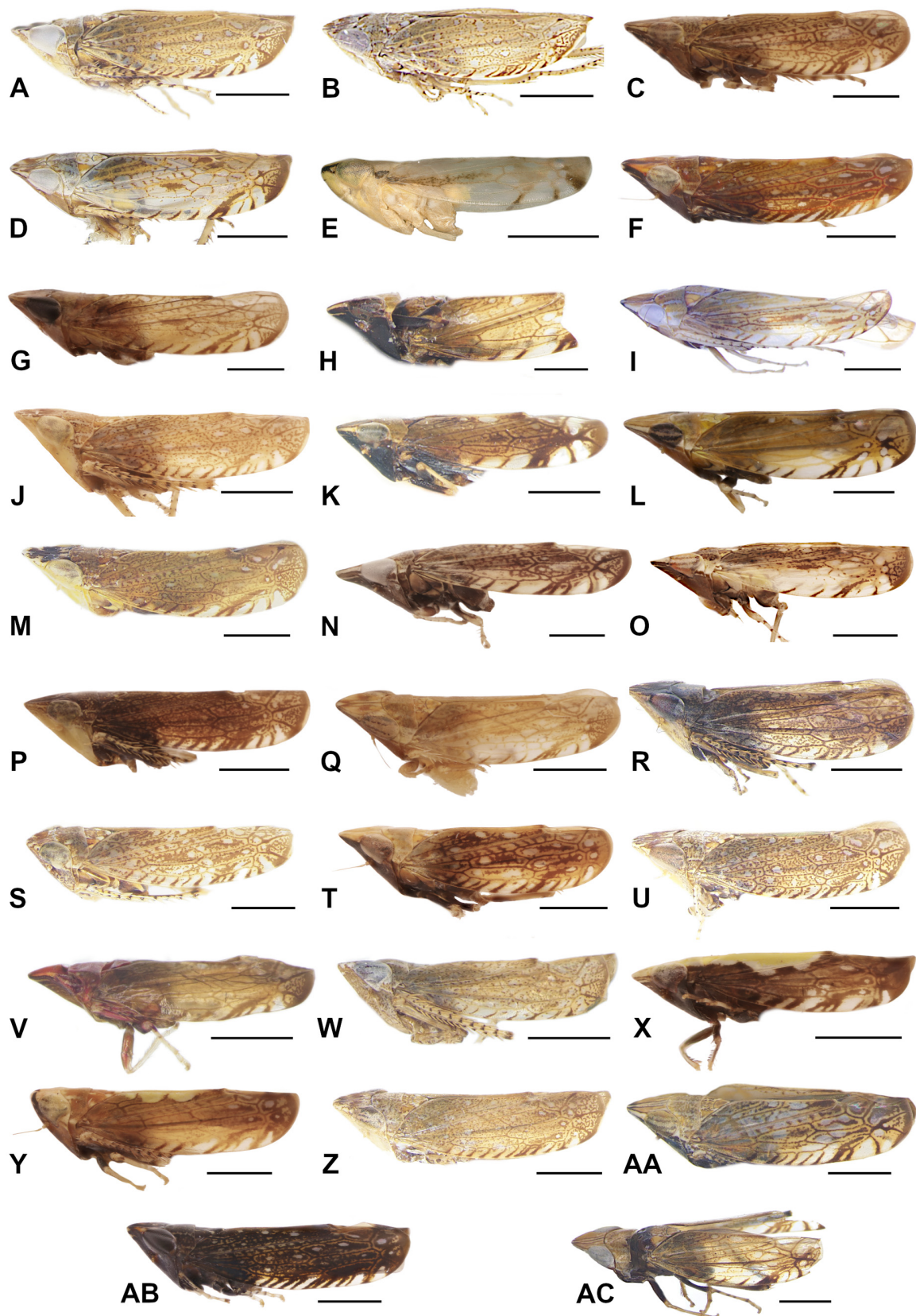


FIGURE 12. Lateral habitus of *Scaphytopius* species from Costa Rica A. *S. anadamus* B. *S. ancorus* C. *S. balaena* D. *S. barroensis* E. *S. biflavus* F. *S. caprensis* G. *S. cientosetenta* H. *S. cyma* I. *S. freytagi* J. *S. fuliginosus* K. *S. hansonii* L. *S. lafovensis* M. *S. latens* N. *S. latidens* O. *S. limbatus* P. *S. loricatus* Q. *S. nigrinotus* R. *S. nitridus* S. *S. osborni* T. *S. phillipsae* U. *S. saginatus* V. *S. scarlatum* W. *S. springerae* X. *S. sulphureus* Y. *S. trisolis* Z. *S. viperans* AA. *S. vulcanus* AB. *S. webbi* AC. *S. zurquiense*. scale bars=0.5 mm.

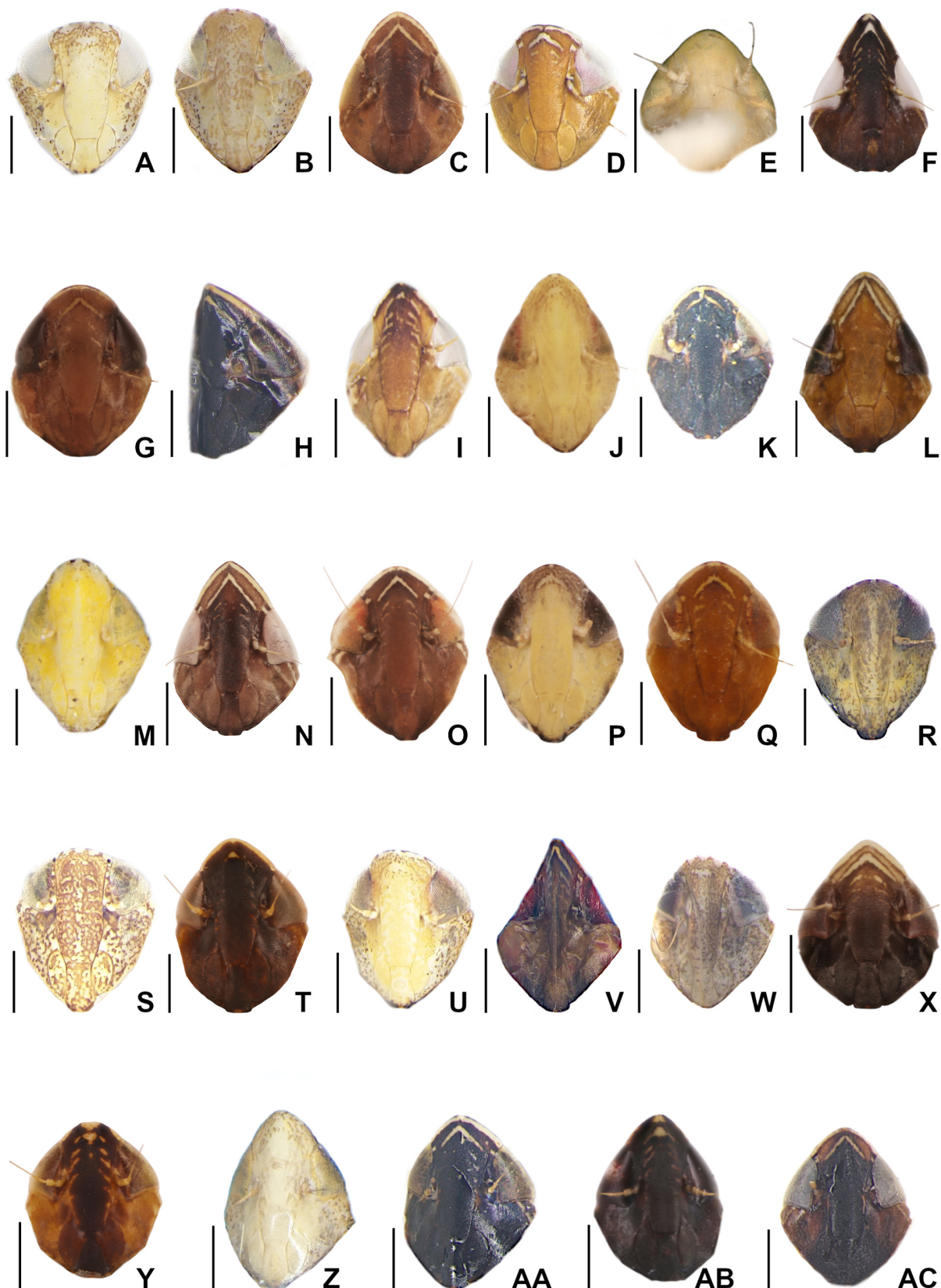


FIGURE 13. Ventral view of faces of *Scaphytopius* species from Costa Rica A. *S. anadamus* B. *S. ancorus* C. *S. balaena* D. *S. barroensis* E. *S. biflavus* F. *S. caprensis* G. *S. cientosetenta* H. *S. cyma* I. *S. freytagi* J. *S. fuliginosus* K. *S. hansonii* L. *S. lafovensis* M. *S. latens* N. *S. latidens* O. *S. limbatus* P. *S. loricatus* Q. *S. nigrinotus* R. *S. nitridus* S. *S. osborni* T. *S. phillipsae* U. *S. saginatus* V. *S. scarlatum* W. *S. springerae* X. *S. sulphureus* Y. *S. trisolis* Z. *S. viperans* AA. *S. vulcanus* AB. *S. webbi* AC. *S. zurquiense*. scale bars=0.5 mm.

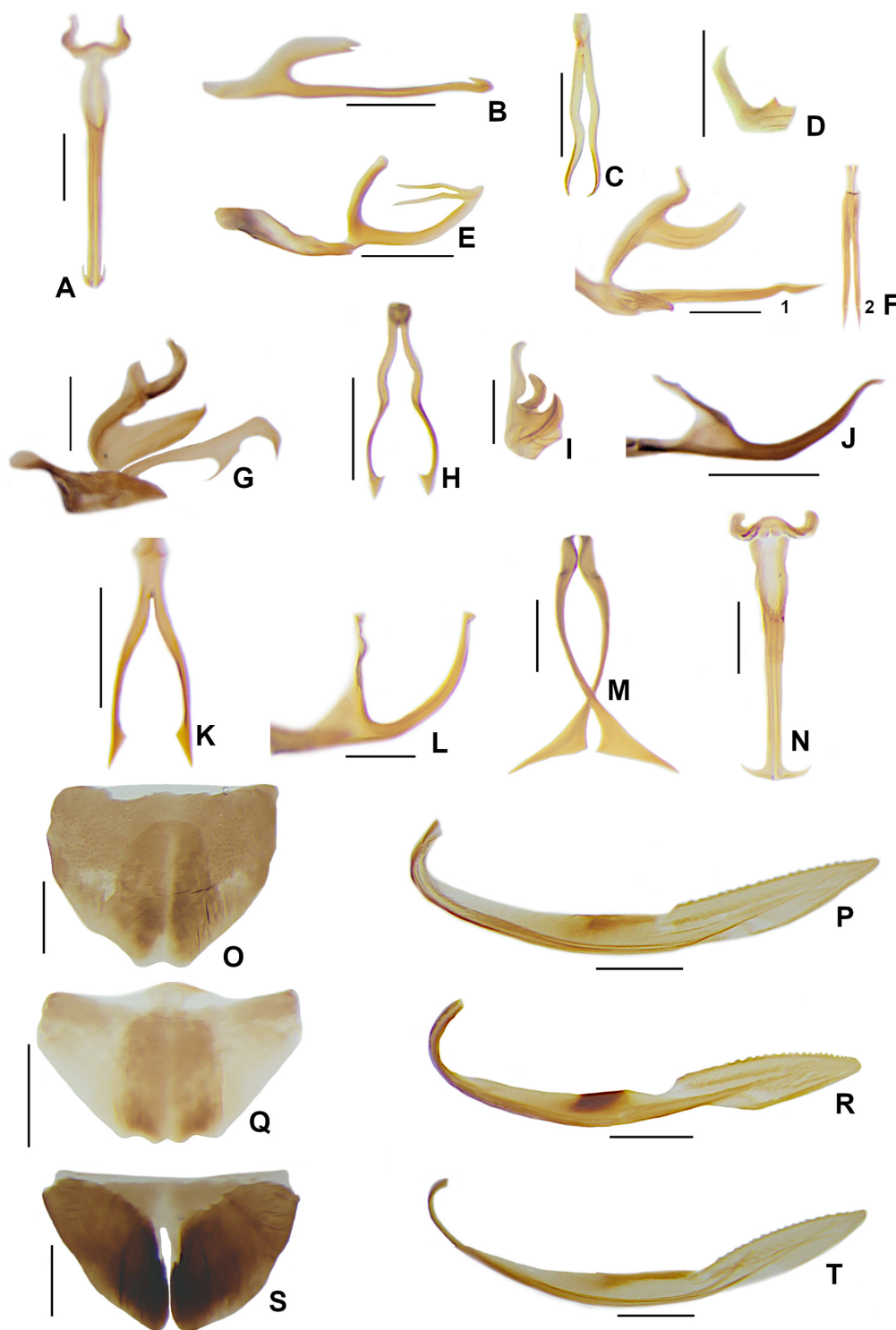


FIGURE 14. A–N Different views of useful characters in the genitalia of males to identify *Scaphytopius* species present in Costa Rica. A. Ventral view of shaft of *S. anadamus* B. Lateral view of shaft of *S. anadamus*. C. Ventral view of paraphyses of *S. barroensis* D. Lateral view of aedeagus of *S. barroensis* E. Lateral view of aedeagus of *S. fuliginosus* F. Lateral view of aedeagus (1) and ventral view of paraphyses (2) of *S. latens* G. Lateral view of aedeagus and paraphyses of *S. latidens* H. Ventral view of paraphyses of *S. limbatus* I. Lateral view of aedeagus of *S. limbatus* J. Lateral view of shaft of *S. loricatus* K. Ventral view of paraphyses of *S. nigrinotus* L. Lateral view of shaft of *S. nitridus* M. Ventral view of paraphyses of *S. osborni* N. Ventral view of shaft of *S. saginatus* O–T View of female genitalia of three new species of *Scaphytopius*. O. Ventral view of sternite VII of *S. caprensis* P. Lateral view of the second valvulae of *S. caprensis* Q. Ventral view of sternite VII of *S. lafovensis* R. Lateral view of the second valvulae of *S. lafovensis* S. Ventral view of sternite VII of *S. trisolis* T. Lateral view of the second valvulae of *S. trisolis*. scale bars=0.2 mm.

Paraphyses in ventral view fused at base, diverging slightly beyond midlength and remaining parallel until end (Fig. 8K); with very small lateral spine at apex. Aedeagus very short, L-shaped in lateral view (Fig. 8L); preatrium absent; dorsal apodeme of similar length to shaft; curving toward apex; shaft straight and tubular, in apical view with two small lateral spines and third, larger dorsal spine in gonopore area (Fig. 8M). Gonopore in subapical position, at base of dorsal spine.

Diagnosis. Style apophysis with spine on internal margin. Paraphyses in dorsal view fused at base, diverging slightly beyond midlength, remaining parallel to apex (Fig. 8K). Apex of paraphyses with very small lateral spine in dorsal view. Aedeagus in apical view with dorsal spine longer than lateral spines (Fig. 8M).

Distribution. Costa Rica.

Biology. Unknown.

Etymology. Named after the only site where it has been collected, the Zurquí of Moravia highlands in Costa Rica.

Material examined. Holotype. ♂. Costa Rica, San José, Zurquí. 1600 m. XI.1995. INBIO CRI002 606794 (MNCR).

Key to males of *Scaphytopius* of Costa Rica

1. Clavus, scutellum, mesonotum, pronotum, and basal 2/3 of crown sulfur yellow (Fig. 11X) *S. sulphureus*
 – Clavus, scutellum, mesonotum, pronotum, and basal 2/3 of crown with varied colors, but never sulfur yellow 2
2. Forewing transparent, pronotum yellowish white, anterior half of crown yellow, and posterior half yellowish white (Figs. 11E, 12E, 13E). Only known from Cocos Island *S. biflavus*
 – Forewing, pronotum, and crown with varied colors and patterns, but never as above 3
3. Pronotum and crown scarlet red (Figs. 11V, 12V) *S. scarlatum* **sp. nov.**
 – Pronotum and crown with varied colors, but never scarlet red 4
4. Forewing veins red (Figs. 11F, 12F). Pygofer in lateral view with a long, thin, spine-like projection at apex (Fig. 2D) *S. caprensis* **sp. nov.**
 – Forewing veins brown (Figs. 11J, U, 12J, U), black (Figs. 11P, AB, 12P, AB), or translucent (Figs. 11O, 12O), but never red. Pygofer in lateral view without a long spine-like projection at apex (Fig. 2D) 5
5. Clavus with 3 large semicircular pale yellow spots that, when the wings are united in dorsal view, form 3 large spots, one after the other (Figs. 11Y, 12Y) *S. trisolis* **sp. nov.**
 – Clavus without large semicircular spots or pale yellow spots that form the pattern described above 6
6. Face entirely black (Figs. 13H, K, AA, AB, AC), or at least with frontoclypeus, anteclypeus and lorum entirely black (Fig. 13AC). Apex of frontoclypeus with two transverse white bands forming an inverted V (Fig. 13AA) 7
 – Face not entirely black (Figs. 13N, T), but of varying shades of yellowish (Figs. 13A, B, J, Z) or brownish (Figs. 13C, D, I, O, T). Apex of frontoclypeus with or without spots or bands on apex 11
7. Pygofer in lateral view with a thin, short spine-like projection at apex (Fig. 8D); crown dark brown with two longitudinal black bands in center (Fig. 8A); in dorsal view with six or more white circular spots in clavus area (Fig. 8A) *S. webbi* **sp. nov.**
 – Pygofer with a rounded apex (Figs. 9E, G, P), without any spine-like projection; crown light brown, with two longitudinal white bands in center, merging into a single band at apex (Fig. 7G); in dorsal view with fewer than six white circular spots in clavus area (Fig. 4A) 8
8. Style apophysis in dorsal view with a spine on inner margin (Figs. 3D, 8K); in lateral view dorsal apodeme shorter than shaft (Figs. 3E, 8L) 9
 – Style apophysis in dorsal view without a spine on inner apex (Fig. 4D, 7J); in lateral view dorsal apodeme longer than shaft (Figs. 4E, 7K) 10
9. Paraphyses diverging slightly before half their length in dorsal view (Fig. 3D), apex of paraphyses without small lateral spine in dorsal view; gonopore area of aedeagus in apical view with a dorsal spine of similar length to lateral spines (Fig. 3F) *S. cyma* **sp. nov.**
 – Paraphyses diverging slightly beyond half their length in dorsal view (Fig. 8K), apex of paraphyses with a small lateral spine in dorsal view; gonopore area of aedeagus in apical view with a dorsal spine longer than lateral spines (Fig. 8M) *S. zurquiense* **sp. nov.**

10. Style apophysis in ventral view with a square shape on inner margin (Fig. 4D); paraphyses diverging widely and abruptly beyond half their length in dorsal view, giving the appearance of an inverted U (Fig. 4D); dorsal apodeme with a slight curvature toward apex (Fig. 4E) *S. hansonii* **sp. nov.**
- Style apophysis in ventral view with a rounded shape on inner margin (Fig. 7J); paraphyses diverging moderately and gradually beyond half their length in dorsal view, giving the appearance of an inverted V (Fig. 7J); dorsal apodeme straight toward apex (Fig. 7K) *S. vulcanus* **sp. nov.**
11. Face dark yellow, yellow (Figs. 13J, M, P, R, W) or pale colored (Figs. 13A, B, S, U, Z); with spots (Figs. 13B, R, S, W), with partial spots (Figs. 13A, P, U, Z) or without spots (Figs. 13J, M), and without V-shaped transverse bands on apex of frontoclypeus 12
- Face brownish to orange (Figs. 13C, D, G, I, L, N, O, Q, T); without spots and with V-shaped transverse bands on apex of frontoclypeus 21
12. With paraphyses 13
- Without paraphyses 17
13. Paraphyses short and slender (Fig. 1D), apex with two small needlelike processes extended very little, without reaching base of shaft (Fig. 1D), the same length as shaft in ventral view; aedeagus with two lateral anchor-shaped spines at apex in ventral view (Fig. 1F) *S. ancorus* **sp. nov.**
- Paraphyses elongated and slender; much longer than shaft in ventral view (Figs. 6D, 7D, 14I); aedeagus without anchor-shaped spines at apex 14
14. Paraphyses with a wide lateral projection in the shape of a triangle in ventral view (Fig. 14M); anteapical and discal cells of forewings with conspicuous dark brown irregularly longitudinal spots (Fig. 12S) *S. osborni*
- Paraphyses without a wide lateral projection in the shape of a triangle in ventral view (Figs. 6D, 7D); anteapical and discal cells of forewings with small brown circular spots (Figs. 11W, Z, 12W, Z) 15
15. Paraphyses in ventral view straight and parallel (Fig. 14F2), with small ventral notch before apex (Fig. 14F1); aedeagus with preatrium as long as shaft (Fig. 14F1) *S. latens*
- Paraphyses in ventral view crossing each other, forming an 8 shape (Figs. 6D, 7D), without notch before apex; aedeagus with absent preatrium (Figs. 6E, 7E) 16
16. Paraphyses in ventral view crossing beyond half their length, without bifurcation at apex (Fig. 6D); aedeagus with dorsal apodeme longer than shaft, in lateral view hammer-shaped with curved handle (Fig. 6E) *S. springerae* **sp. nov.**
- Paraphyses in ventral view crossing each other halfway, with slight bifurcation at apex, resembling open viper's mouth (Fig. 7D); aedeagus with dorsal apodeme and shaft of similar length, in lateral view V-shaped with small internal spine at apex (Figs. 7E1-E2) *S. viperans* **sp. nov.**
17. Aedeagus in lateral view with a thin, curved shaft, with large or small spines at apex (Figs. 14E, J, L); in lateral view, shaft slightly longer than dorsal apodeme or similar in length 18
- Aedeagus in lateral view with long, thin, straight shaft (Fig. 14B), with two small spines at apex; shaft much longer than dorsal apodeme 20
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19. Aedeagus in lateral view with shaft V-shaped (Fig. 14J); dorsal apodeme shorter than shaft in lateral view (Fig. 14J). Face yellow with irregular dark spots at apex and margin (Fig. 13P) *S. loricatus*
- Aedeagus in lateral view with shaft U-shaped (Fig. 14L); dorsal apodeme of similar length to shaft in lateral view (Fig. 14L). Face pale yellow with widely distributed irregular dark spots (Fig. 13R) *S. nitridus*
20. Aedeagus in ventral view with two lateral spines at apex; length of spines greater than width of shaft in ventral view (Fig. 14N) *S. saginatus*
- Aedeagus in ventral view with two lateral spines at apex; length of spines less than width of shaft in ventral view (Fig. 14A) *S. anadamus*
21. Forewing discal cell without irregular spots, dots, or white circular spots (Figs. 11L, 12L); aedeagal shaft in apical view with 3 spines in area of gonopore (Fig. 4L) *S. lafovensis* **sp. nov.**
- Forewing discal cell with spots, dots or white circular spots (Figs. 11C, G, 12G, I, O); aedeagal shaft in apical view without spines in area of gonopore 22

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 – With paraphyses, shaft not as above 23
23. Forewing with transparent costal, discal, and anteapical cells (Figs. 12D, O). Paraphyses doubly curved in ventral view (Figs. 14C, H) 24
 – Forewing with costal, discal, and anteapical cells not transparent, usually brown (Figs. 11I, 12C, G, N). Paraphyses not doubly curved in ventral view 25
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 – Forewing with cells adjacent to claval suture brown (Fig. 12O). Aedeagus in lateral view very small, with pair of ventrolateral folds (Fig. 14I); in ventral view apex of paraphyses with visible sharp preapical ventromedial projection (Fig. 14H) *S. limbatus*
25. Aedeagus in lateral view with a narrow preatrium projected dorsally (Fig. 3K); shaft widening dorsoventrally (Figs. 3K, M) *S. freytagi* **sp. nov.**
 – Aedeagus with preatrium absent (Fig. 2M); shaft of varied forms, but never the shape described above 26
26. Aedeagus in lateral view with dorsal apodeme and shaft forming right angle (Fig. 2M) 27
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27. Paraphysis branches in ventral view strongly divergent, each with triangular preapical spine (Fig. 14K); aedeagus with a dorsal apodeme longer than shaft; style with C-shaped space between preapical lobe and apophysis *S. nigrinotus*
 – Paraphysis branches long, parallel and tapered apically in ventral view (Fig. 2L); aedeagus with a dorsal apodeme shorter than shaft (Fig. 2M); style with space between preapical lobe and apophysis narrow (Fig. 2L) *S. cientoasetenta* **sp. nov.**
28. Paraphysis in lateral view broadened with large apical and preapical hook-like spines, curving ventrally (Fig. 14G) *S. latidens*
 – Paraphysis in lateral view long, thin, apex bifurcated into two short spines (Fig. 1L) *S. balaena* **sp. nov.**

Acknowledgements

We are deeply grateful to the Department of Arthropods of the National Museum of Costa Rica for permitting us access to the entomological collections, especially to Gabriela Carmona, Maricelle Méndez and Andrés Duarte. We thank Giar-Ann Kung of the Natural History Museum of Los Angeles County, for the photos of the *Scaphytopius biflavus* holotype. We also thank the LaFOV team, led by Mauricio Montero, for all their support throughout the work. Thanks to the Vice Rector's Office for Research of the University of Costa Rica, for funding this research through project 801-C1-092 “*Taxis para fitoplasmas: un salto de explorar su presencia y diversidad hacia la identificación de insectos vectores en Costa Rica*”, and Paul Hanson for assistance and comments on the manuscript. Finally, thanks to Christopher Dietrich for his valuable comments on the current taxonomy of *Scaphytopius*.

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