

Review of the genus *Togoda* Melichar, 1906
(Hemiptera, Auchenorrhyncha, Fulgoroidea,
Tropiduchidae), with descriptions of three new species
from tropical Africa and Madagascar

Vladimir M. GNEZDILOV

DIRECTEUR DE LA PUBLICATION / *PUBLICATION DIRECTOR*: Gilles Bloch
Président du Muséum national d'Histoire naturelle

RÉDACTRICE EN CHEF / *EDITOR-IN-CHIEF*: Laure Desutter-Grandcolas

ASSISTANTE DE RÉDACTION / *ASSISTANT EDITOR*: Anne Mabilie (zoosyst@mnhn.fr)

MISE EN PAGE / *PAGE LAYOUT*: Anne Mabilie

COMITÉ SCIENTIFIQUE / *SCIENTIFIC BOARD*:

Nesrine Akkari (Naturhistorisches Museum, Vienne, Autriche)
Maria Marta Cigliano (Museo de La Plata, La Plata, Argentine)
Serge Gofas (Universidad de Málaga, Málaga, Espagne)
Sylvain Hugel (CNRS, Université de Strasbourg, France)
Marco Isaia (Università degli Studi di Torino, Turin, Italie)
Rafael Marquez (CSIC, Madrid, Espagne)
Jose Christopher E. Mendoza (Lee Kong Chian Natural History Museum, Singapour)
Annemarie Ohler (MNHN, Paris, France)
Jean-Yves Rasplus (INRA, Montferrier-sur-Lez, France)
Wanda M. Weiner (Polish Academy of Sciences, Cracovie, Pologne)

COUVERTURE / *COVER*:

Togoda sp. (Nigeria: Ekiti, Ikere). Credits: Babajide Agboola.

Zoosystema est indexé dans / *Zoosystema is indexed in*:

- Science Citation Index Expanded (SciSearch®)
- ISI Alerting Services®
- Current Contents® / Agriculture, Biology, and Environmental Sciences®
- Scopus®

Zoosystema est distribué en version électronique par / *Zoosystema is distributed electronically by*:

- BioOne® (<http://www.bioone.org>)

Les articles ainsi que les nouveautés nomenclaturales publiés dans *Zoosystema* sont référencés par /
Articles and nomenclatural novelties published in Zoosystema are referenced by:

- ZooBank® (<http://zoobank.org>)

Zoosystema est une revue en flux continu publiée par les Publications scientifiques du Muséum, Paris / *Zoosystema is a fast track journal published by the Museum Science Press, Paris*

Les Publications scientifiques du Muséum publient aussi / *The Museum Science Press also publish*:

Adansonia, *Geodiversitas*, *Anthropozoologica*, *European Journal of Taxonomy*, *Naturae*, *Cryptogamie* sous-sections *Algologie*, *Bryologie*, *Mycologie*, *Comptes Rendus Palevol*.

Diffusion – Publications scientifiques Muséum national d'Histoire naturelle
CP 41 – 57 rue Cuvier F-75231 Paris cedex 05 (France)
Tél. : 33 (0)1 40 79 48 05 / Fax: 33 (0)1 40 79 38 40
diff.pub@mnhn.fr / <https://sciencepress.mnhn.fr>

© Publications scientifiques du Muséum national d'Histoire naturelle, Paris, 2025
ISSN (imprimé / *print*): 1280-9551/ ISSN (électronique / *electronic*): 1638-9387

Review of the genus *Togoda* Melichar, 1906 (Hemiptera, Auchenorrhyncha, Fulgoroidea, Tropiduchidae), with descriptions of three new species from tropical Africa and Madagascar

Vladimir M. GNEZDILOV

Zoological Institute, Russian Academy of Sciences,
Universitetskaya Emb. 1, 199034 Saint Petersburg (Russia)
vmgnezdilov@mail.ru
VGnezdilov@zin.ru

Submitted on 12 February 2025 | Accepted on 21 March 2025 | Published on 30 September 2025

[urn:lsid:zoobank.org:pub:44B9F8A0-391B-4C00-AE1B-23D3E5494409](https://zoobank.org/pub:44B9F8A0-391B-4C00-AE1B-23D3E5494409)

Gnezdilov V. M. 2025. — Review of the genus *Togoda* Melichar, 1906 (Hemiptera, Auchenorrhyncha, Fulgoroidea, Tropiduchidae), with descriptions of three new species from tropical Africa and Madagascar. *Zoosystema* 47 (23): 473-488. <https://doi.org/10.5252/zoosystema2025v47a23>. <http://zoosystema.com/47/23>

KEY WORDS

Trienopini,
identification key,
morphology,
new species,
Afrotropical Region.

ABSTRACT

The tropiduchid genus *Togoda* Melichar, 1906 is reviewed, with a type species, *Togoda africana* Melichar, 1906, redescribed and three new species from the Central African Republic, Mozambique, and Madagascar described and illustrated. A key to species is given. Wing morphology of Trienopini Fennah, 1954 is discussed.

RÉSUMÉ

Révision du genre *Togoda* Melichar, 1906 (Hemiptera, Auchenorrhyncha, Fulgoroidea, Tropiduchidae), avec la description de trois nouvelles espèces d'Afrique tropicale et de Madagascar.

Le genre de tropiduchidés *Togoda* Melichar, 1906 est révisé, l'espèce type, *Togoda africana* Melichar, 1906, est redécrite et trois nouvelles espèces de la République centrafricaine, du Mozambique et de Madagascar sont décrites et illustrées. Une clé des espèces est donnée. La morphologie des ailes des Trienopini Fennah, 1954 est discutée.

MOTS CLÉS

Trienopini,
clé d'identification,
morphologie,
nouvelle espèce,
région afrotropicale.

INTRODUCTION

The genus *Togoda* Melichar, 1906 belongs to the tribe Trienopini Fennah, 1954 of the subfamily Tropiduchinae Stål, 1866 represented by five Afrotropical genera with 21 species (Metcalf 1958; Gnezdilov 2007, 2013; Bourgoïn 2024). *Togoda* clearly differs from other genera of the tribe by large metopial proboscis. The genus was established by L. Melichar for a single species, *Togoda africana* Melichar, 1906, described after long series of specimens collected by L. Conradt in Bismarckburg in Togo (Melichar 1906). Soon after Schmidt (1910) described another species, *T. transvaalensis* Schmidt, 1910, from Zoutpansberg (Transvaal) in South Africa. Since that time the genus was never in a focus of the taxonomic study.

Togoda africana was erroneously recorded by Metcalf (1958) from Angola referring to Melichar (1906) who mentioned “Westafrica” in fact referring to Togo. Schmidt (1910) mentioned this species also from Cameroon, but noted that these specimens are twice larger than those from Togo. Finally Gnezdilov (2022) recorded *T. africana* from the canopies of Ghana, but the reexamination of these specimens (females) did not confirm our previous identification and currently this material is identified as *Togoda* sp. until the males will be available for study. Thus currently *T. africana* is authentically known only from the type locality in Togo.

T. africana is here redescribed based on the specimens from Bismarckburg (topotypes) and the male genitalia structures are illustrated for the first time. Three new species of the genus are described from the Central African Republic, Mozambique, and Madagascar. I had no material available for study on *T. transvaalensis* which is included in the key based on Schmidt’s original description. Thus up to date the genus *Togoda* Melichar comprising five species known from tropical Africa and here is recorded for the first time from Madagascar.

MATERIAL AND METHODS

Morphological terminology follows Anufriev & Emeljanov (1988) for structures of the head, Gnezdilov & Bartlett (2018) – for wing venation, and Gnezdilov (2013) – for male and female genitalia.

Photographs were taken using a Canon 5D Mark IV digital camera equipped with a lens Canon MP-E 65mm f/2.8 1-5x macro and Canon Macro Twin Lite MT-26EX-RT flash and SEM Hitachi TM3000. Images are produced using Helicon Focus v. 7.6.4 and Adobe Photoshop software. The genital segments of male specimens examined were macerated in 10% KOH and figured in glycerin jelly (Brunel Micro Ltd, UK) using Leica MZ9.5 light microscope with camera lucida attached.

The map of Africa is designed by freepik.com (<https://ru.freepik.com/free-photos-vectors/map-of-africa>).

Label information is quoted, with “/” indicating new line and “//” indicating next label.

Right/left sides of genital structures are designated based on the position of genital structures inside the insect in the direction from its head to apex of abdomen (see the legends to Figs 8-10).

The material examined, including the type specimens of the species described below, are deposited in the Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia (ZIN) and in the Muséum national d’Histoire naturelle, Paris, France (MNHN).

SYSTEMATICS

Family TROPIDUCHIDAE Stål, 1866
Subfamily TROPIDUCHINAE Stål, 1866
Tribe Trienopini Fennah, 1954

Genus *Togoda* Melichar, 1906

Togoda Melichar, 1906: 233.

TYPE SPECIES. — *Togoda africana* Melichar, 1906, by monotypy.

DISTRIBUTION. — Tropical Africa (Nigeria, Ghana, Togo, Central African Republic, South African Republic, Mozambique, Tanzania: Zanzibar Island) and Madagascar (Fig. 11).

COMPOSITION. — Five species.

DIAGNOSIS. — Coryphe transverse. Metope long and wide, nearly parallel-sided (in dorsal and frontal views), protruding in shape of wide proboscis (in lateral view). Coryphe and metope joint at obtuse angle in lateral view. Postclypeus large, with median carina. Metopoclypeal suture straight. Scapus short, cylindrical. Pedicel 4-5 times longer than scapus, elongate, twice as long as wide, slightly convex dorsally, covered with setae and sensory organs (Fig. 1D). Ocelli absent. Rostrum long, narrow, reaching hind coxae or slightly surpassing them; third segment slightly longer than second one, narrowing and bent apically (Fig. 7B). Pronotum large, with distinct lateral carinae diverging posteriorly, wide paraclypeal fields behind the eyes and wide paranotal lobes; posterior margin strongly concave. Median part of pronotum hanging over coryphe. Mesonotum 1.5 times as long as pronotum, without carinae. Forewing with loop-shaped process of precostal margin basally and with semicircular lobe on wing margin behind claw-shaped apex of clavus, both with marginal setae (Figs 1; 2). Marginal cell below the semicircular lobe distinctly concave. Tegulae large. Fore wings without hypocostal plate, but with narrow precostal field, with transverse veins and with a wide subcostal field in its basal fifth; clavus open. Hind wings well developed, slightly shorter than fore wings (Fig. 7A). Hind tibia with two large lateral spines on the apical half and one small lateral spine on the proximal half. First and second metatarsomeres nearly equal in length, with dense long hair-shaped setae ventrally. Second metatarsomere with only two latero-apical spines. Pygofer with widely and slightly concave lower margin (Fig. 9J). Penis strongly curved in lateral view. Apical part of aedeagus weakly sclerotized and apparently sometimes swollen. Styles massive, fused at its basal halves (Fig. 9I), with short capitulum, without neck and with a strong comb on the margin below capitulum. Finger-shaped process of the style large, curved and turned posteriorly and ventrally. Abdominal sternite III large, with triangularly protruding hind margin overhanging above other sternites (Figs 4B, D; 5B, D). Female sternite VII with weakly convex medially hind margin. Gonopods large, triangular-shaped, flat, with large marginal teeth (Fig. 3C, D).

KEY TO *TOGODA* MELICHAR, 1906

1. Fore wings dull green, with transverse double broken brown stripe in its basal third. Metope distinctly narrower between eyes. Metopial proboscis and postclypeus joint at obtuse angle in lateral view. Distribution: South African Republic *T. transvaalensis* Schmidt, 1910
- Fore wings yellowish light brown to black. Metope with nearly parallel lateral margins. Metopial proboscis and postclypeus joint at nearly right angle in lateral view (Fig. 6) 2
2. Metope with two weak carinae medially and groove between them (Fig. 6G). Postclypeus with strong triangular-shaped median carina (Figs 5D, 6H). Fore and middle femora flattened or nearly foliate. Distribution: Madagascar *T. carinata* n. sp.
- Metope without carinae. Postclypeus with tiny median carina. Legs not flattened neither foliate 3
3. Fore wings large, with 1/3 of its length behind apex of clavus in lateral view (Figs 4). Metopial proboscis distinctly notched frontally (Fig. 6B, D). Phallobase short, 1/3 of aedeagus length, symmetric (Figs 8D, E; 9D, F) 4
- Fore wings small, with 1/5 of its length behind apex of clavus in lateral view (Fig. 5A, B). Metopial proboscis without notch frontally (Fig. 6F). Phallobase long, nearly as long as aedeagus, asymmetric (Fig. 10D, E). Distribution: Mozambique *T. minima* n. sp.
4. Coryphe-metope margin keel-shaped. Metopial proboscis weakly concave frontally (Fig. 6B). Male anal tube narrowing apically in dorsal view (Fig. 8B). Aedeagus wide, with four subapical processes (Fig. 8D, E, F). Distribution: Togo *T. africana* Melichar, 1906
- Coryphe-metope margin smooth, without keel. Metopial proboscis deeply notched frontally (Fig. 6D). Male anal tube deeply concave apically in dorsal view (Fig. 9C). Aedeagus narrow, with two subapical processes (Fig. 9D, E, F). Distribution: Central African Republic *T. excisa* n. sp.

Togoda africana Melichar, 1906
(Figs 2A, B; 4A, B; 6A, B; 7; 8)

Togoda africana Melichar, 1906: 233, fig. 55.

MATERIAL EXAMINED. — Togo • 1 ♂; “Togo / Bismarckburg / 22.IX-1.X.92 / L. Conradt S.”; ZIN; 1 ♀; “Togo / Bismarckburg / 23.XI-2.XII.92 / L. Conradt S.”; ZIN; 1 ♂; “Togo / Bismarckburg / 9-11.V.93 / L. Conradt S.”; ZIN; 1 ♀; “Togo / Bismarckburg / 12-14.IV.93 / L. Conradt S.”; ZIN.

DIAGNOSIS. — Coryphe-metope margin keel-shaped. Metopial proboscis weakly concave frontally. Fore wings dark brown to black, with rich elongate venation. Phallobase short, aedeagus wide in lateral view, with four narrow subapical processes – three on left side and one on right side. Male anal tube narrowing apically in dorsal view.

DISTRIBUTION. — Central Togo.

DESCRIPTION

Structure (Figs 2A, B; 4A, B; 6A, B; 7)

Coryphe transverse, 1.5 times as wide as long medially, smooth, without carinae, with slightly convex or nearly straight anterior margin (Fig. 4A). Coryphe-metope margin keel-shaped (Fig. 6A). Eyes large, diameter of each eye nearly as large as width of metope between the eyes. Metope, pro- and mesonotum densely covered with traces of larval sensory pits (pustules). Metopial proboscis weakly concave ventrally in frontal view (Fig. 6B). Post- and anteclypeus with distinct median carina. Pedicel slightly flattened laterally, with area of dense setae dorsally (Fig. 6A). Fore wings large, nearly oval, narrowing apically, with 1/3 of its length behind apex of clavus in lateral view (Fig. 4B). Basal cell small, loop-shaped. Radius and median running from the

basal cell separately, but nearly from one point. Fore wings with small number of transverse veins. Forewing vein branching sequence: R 5-8, firstly furcating closely to basal cell; M 10-14, firstly furcating closely to basal cell; M₁ and M₂ furcating again in basal wing third – M₂ before M₁; CuA 2-3, furcating at the same point as M₁; CuA₁ and CuA₂ terminating at concave cell behind apex of clavus, CuA₁ sometimes furcating also apically (in one specimen right wing with CuA 2 and left wing with CuA 3). Pcu joint A₁ in apical fourth of clavus. Clavus long, 2/3 of wing length. Hind wings bi-lobed, without cubital cleft and with weak vannal cleft; anterior margin with long and narrow coupling lobe (Fig. 7A). Precostal margin with dense macrosetae at its basal third and with sparse marginal microsetae. Hind wing vein branching sequence (Fig. 7A): R 2, furcating before wing middle; r-m 1; M 1; m-cua 1; CuA 3, firstly furcating at wing middle and CuA₂ furcating apically; cua-cup 1; CuP 1; cup-pcu 1; Pcu 1; A₁ 1; A₂ 1. Legs not flattened neither foliate. Hind tibia with 9-12 spines apically. First metatarsomere with two latero-apical and 4-6 intermediate spines arranged in an arc apically. Arolium of pretarsus not protruding beyond claw apices, sometimes with notched hind margin (in dorsal view). Dorso-lateral plates of arolium long and narrow.

Coloration (Fig. 4A, B)

Metope, pronotum, mesonotum, and fore wings dark brown to black (on fore wings). Head laterally light yellow to light brown and black above brown scapi. Anteclypeus and rostrum yellowish light brown. Pedicels dark brown to black, with green area of setae dorsally. Third segment of rostrum

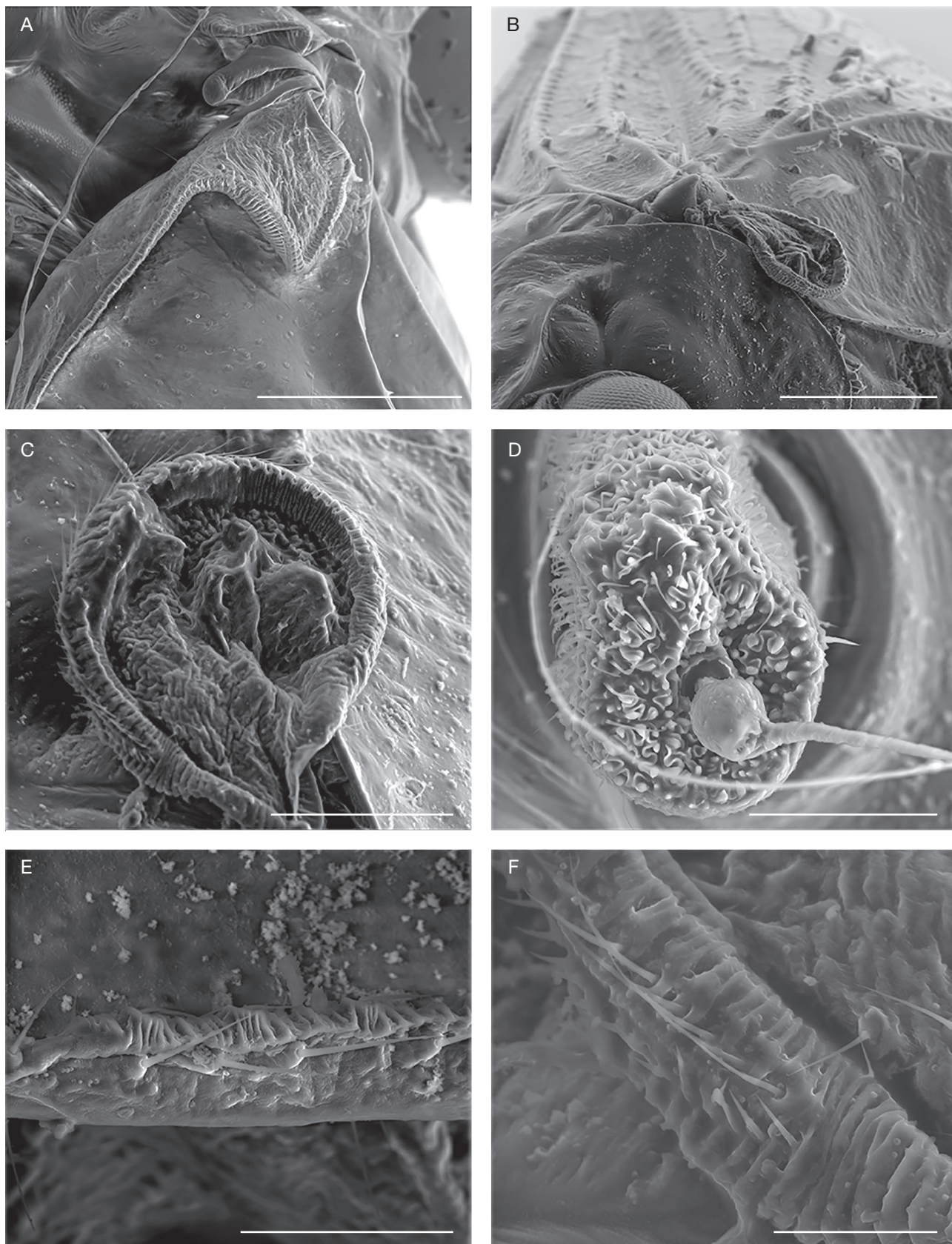


FIG. 1. — Forewing and pedicel structure of Trienopini: **A**, *Trienopa flavida* Signoret, 1860 (Madagascar), male, basal part of forewing, with ear-shaped process of precostal margin; **B**, *Togoda* sp. (Ghana), female, pronotum and basal part of forewing, with ear-shaped process of precostal margin; **C**, *Togoda* sp. (Ghana), female, ear-shaped process of precostal margin dorsally; **D**, *Togoda* sp. (Ghana), female, pedicel; **E**, *Togoda* sp. (Ghana), female, precostal margin of forewing at its middle; **F**, *Togoda* sp. (Ghana), female, ear-shaped process margin. Scale bars: A, 400 μ m; B, 500 μ m; C, 200 μ m; D, E, 100 μ m; F, 50 μ m.

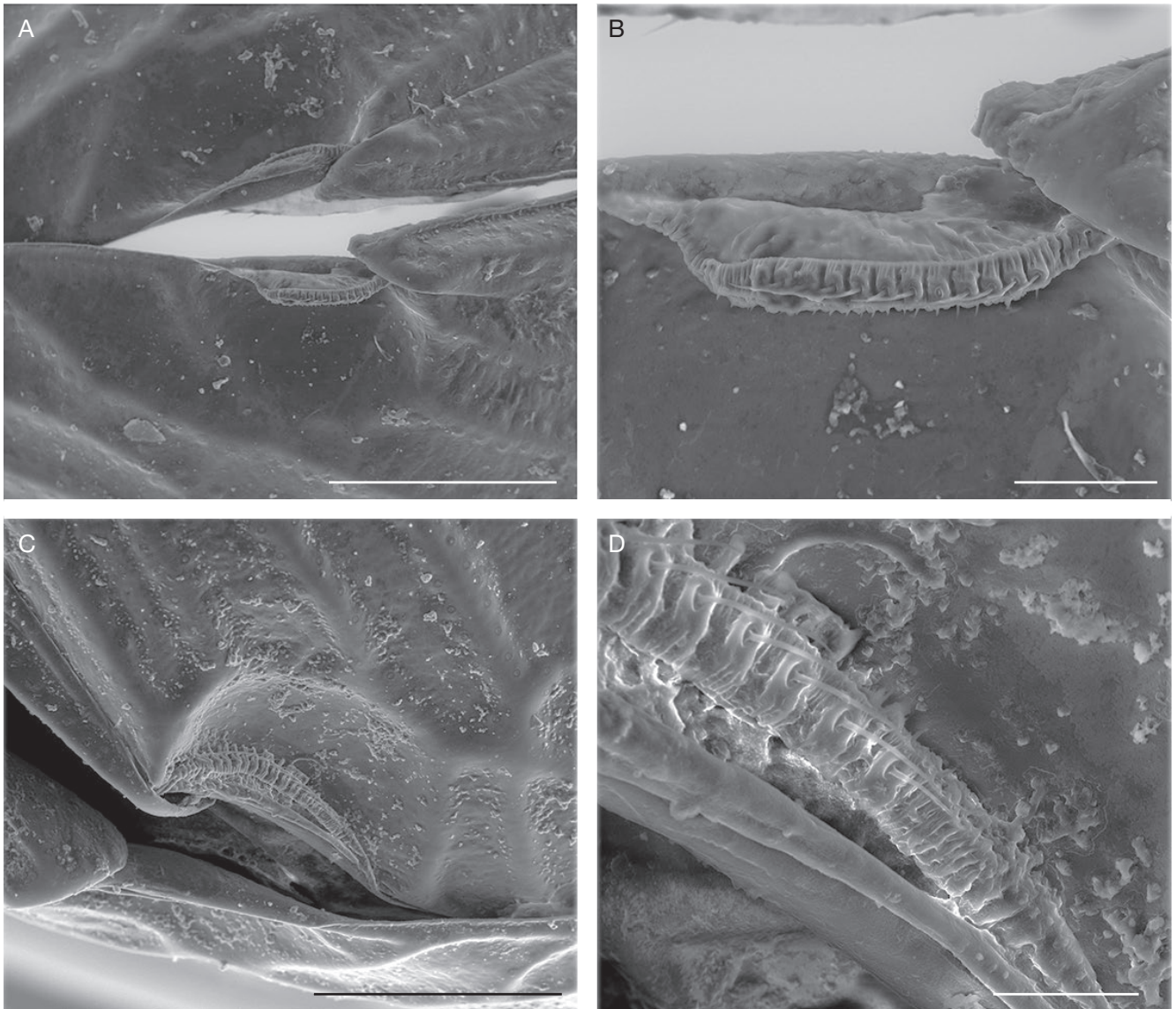


FIG. 2. — Forewing structure of *Togoda* spp.: **A, B**, *Togoda africana* Melichar, 1906, Togo (Bismarckburg), male: **A**, apex of forewing clavus, dorsal view; **B**, semicircular process of forewing margin behind claval apex; **C, D**, *Togoda excisa* n. sp., female paratype: **C**, semicircular process of forewing margin behind claval apex; **D**, margin of semicircular process. Scale bars: A, 500 μ m; B, 100 μ m; C, 400 μ m; D, 50 μ m.

and flagellum dark brown to black. Postclypeus dark brown, sometimes pale laterally. Precostal margins of fore wings and semicircular lobes behind apex of clavus reddish. Hind wings brown to black. Legs greenish brown to dark brown or black, with yellowish light brown trochanters. Apices of leg spines black. Claws dark brown to black. Dorso-lateral plates of arolium dark brown to black. Abdomen light yellow to dark brown.

Male terminalia (Fig. 8)

Pygofer vertically elongate, with right upper angle (below anal tube), hind margins straight, lower margin weakly concave (Fig. 8A). Anal tube short, wide, narrowing apically in a convex margin (in dorsal view) (Fig. 8B, C). Anal column short, 0.3 as long as anal tube. Phallobase short, nearly 0.3

as long as aedeagus, without processes. Aedeagus curved, horseshoe-shaped, asymmetrical, with straight apical part, cylindrical, with small denticles ventrally and laterally. Aedeagus with four subapical horn-shaped narrow processes directed downwards – three on left side (longest one near to ventral surface (Fig. 8E, *c*), twice shorter one near to dorsal surface (Fig. 8E, *b*), and smallest one above them at the middle (Fig. 8E, *d*) and one long (as long as longest left one) on right side (Fig. 8D, *a*). Style with short apical tooth, large lateral tooth, and distinctly convex hind margin (Fig. 8G, *hm*, *at*, *lt*). Connective with widely opened short cup (Fig. 8D, *cp*).

Measurement

Total length. Males: 5.0–5.5 mm. Females: 5.5–6.0 mm.

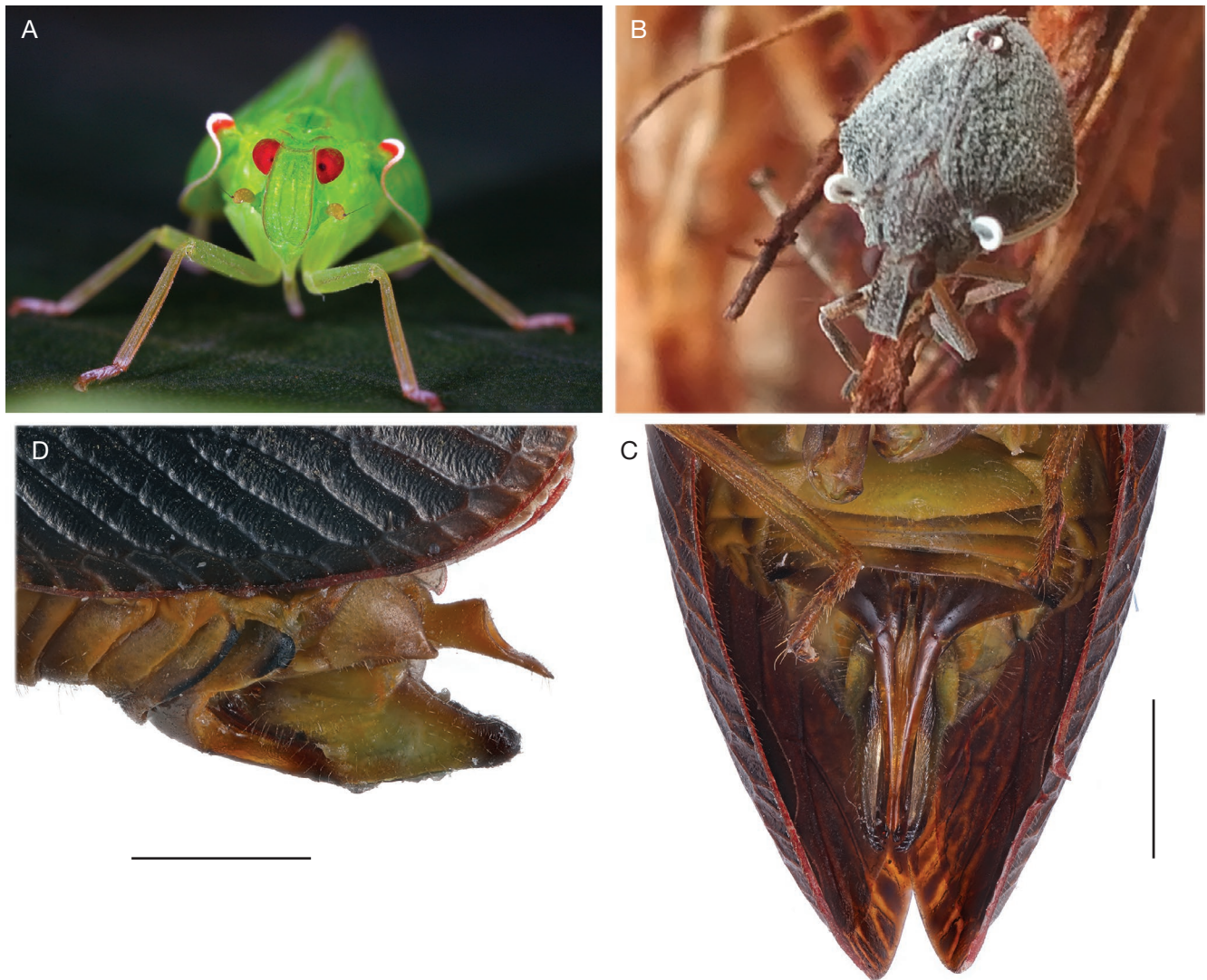


FIG. 3. — Habitus of Trienopini: **A**, *Trienopa typica* (Distant, 1909) (Seychelles); **B**, *Togoda* sp. (Nigeria: Ekiti, Ikere); **C**, *Togoda* sp. (Ghana), ovipositor, lateral view; **D**, *Togoda* sp. (Ghana), female, abdomen, ventral view. Scale bars: 1 mm. Credits: A, Gernot Kunz; B, Babajide Agboola.

Togoda excisa n. sp.
(Figs 2C, D; 4C, D; 6C, D; 9)

[urn:lsid:zoobank.org:act:583816E8-B828-4066-AE0C-B8B92486619C](https://zoobank.org/act:583816E8-B828-4066-AE0C-B8B92486619C)

TYPE MATERIAL. — **Holotype.** Central African Republic • ♂; “Boukoko / Rep. Centrafric. [print] / 20 IV.1967 [hand written in ink] / Michael Boulard [print]” [blue] // “MoLoFo” [hand written in ball pen] // “Museum Paris / MNHN(EH) / 16569” [print, white]; MNHN.

Paratype. Central African Republic • ♀; “Boukoko–RCA [print] / 30-1-1969 [hand written in ink] / Michael Boulard [print]” [blue] // “Museum Paris / MNHN(EH) / 16568 [print, white]”; MNHN.

DIAGNOSIS. — Coryphe-metope margin smooth, without keel. Metopial proboscis deeply notched frontally. Male anal tube deeply concave apically in dorsal view. Aedeagus narrow, with two long subapical processes.

ETYMOLOGY. — Species name referring to deeply concave apically male anal tube.

DISTRIBUTION. — Southwestern Central African Republic (Lobaye Prefecture).

DESCRIPTION

Structure (Figs 2C, D; 4C, D; 6C, D)

Coryphe twice as wide as long medially, with weak median carina and nearly straight anterior margin (Fig. 4C). Metope densely covered with pustules (Fig. 6D). Coryphe-metope margin smooth, without keel (Fig. 6C). Metopial proboscis deeply notched frontally (Fig. 6D). Diameter of each eye nearly as wide as metope. Post- and anteclypeus with tiny median carina. Fore wings large and wide, with 1/3 of its length behind apex of clavus (Fig. 4D). Pcu joint A₁ in

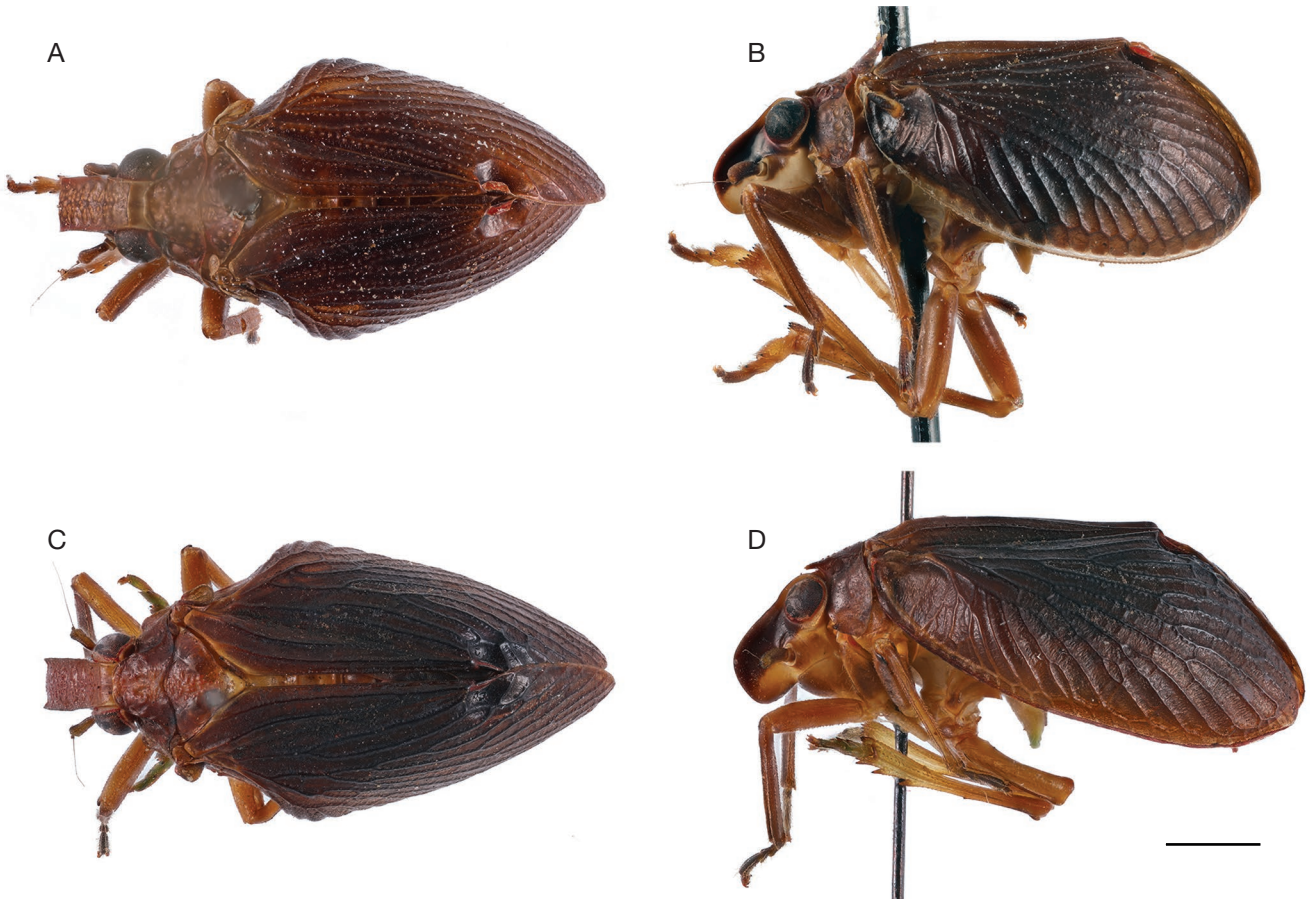


FIG. 4. — Habitus of *Togoda* spp.: **A, B**, *Togoda africana* Melichar, 1906, Togo (Bismarckburg), male, dorsal view (**A**) and lateral view (**B**); **C, D**, *Togoda excisa* n. sp., female paratype, dorsal view (**C**) and lateral view (**D**). Scale bar: 1 mm.

apical fourth of clavus. Clavus long, $2/3$ of wing length. Basal cell narrow. Radius and median running from the same point on basal cell, both firstly furcating closely to basal cell in basal wing third. Forewing vein branching sequence: R 5-7; M 13-16, M_1 and M_2 furcating before wing middle and again apically; CuA 2, furcating after M in basal wing third. Legs not flattened neither foliated. Hind tibia with ten spines apically. First metatarsomere with two latero-apical and five intermediate spines arranged in an arc.

Coloration (Fig. 4C, D)

Coryphe yellowish light brown. Metope brown to dark brown. Head laterally dark brown to black above antenna and light brown below it. Scapi and pedicels brown. Postclypeus light brown to brown frontally. Anteclypeus yellow. Rostrum yellow, with black apex. Pro- and mesonotum brown to dark brown. Fore wings dark brown to black. Basal process of forewing precostal margin yellowish light brown to dark brown. Fore and middle coxae and hind trochanters brown. Fore femora and tibiae yellowish brown. Fore and middle tarsi brown. Middle femora with brown

stripes in female. Third tarsomeres and claws brown. Apices of leg spines black. Female abdominal sternites light yellow except black sternite VII. Hind margins of gonopods and anterior connective laminae of gonapophyses VIII dark brown to black.

Male terminalia (Fig. 9)

Pygofer elongated dorso-ventrally, with hind margins deeply concave in their third (in lateral view) (Fig. 9A). Anal tube elongated, nearly twice as long as wide medially, convex laterally and deeply concave apically (in dorsal view) (Fig. 9B, C). Anal column small and wide. Penis narrow (Fig. 9D, E, F). Phallobase short, $1/3$ of aedeagus length, symmetric. Aedeagus with denticles in its proximal half and with two long narrow subapical processes directed downwards – one on left side (Fig. 9D, E, *c*) and one – on right side, almost dorsally (Fig. 9D, E, *f*, *b*). Style with weakly convex hind margin and large apical tooth (Fig. 9H, G, *at*). Connective with small elongate cup (Fig. 9D).

Measurement

Total length. Male: 5.5 mm. Female: 6.5 mm.

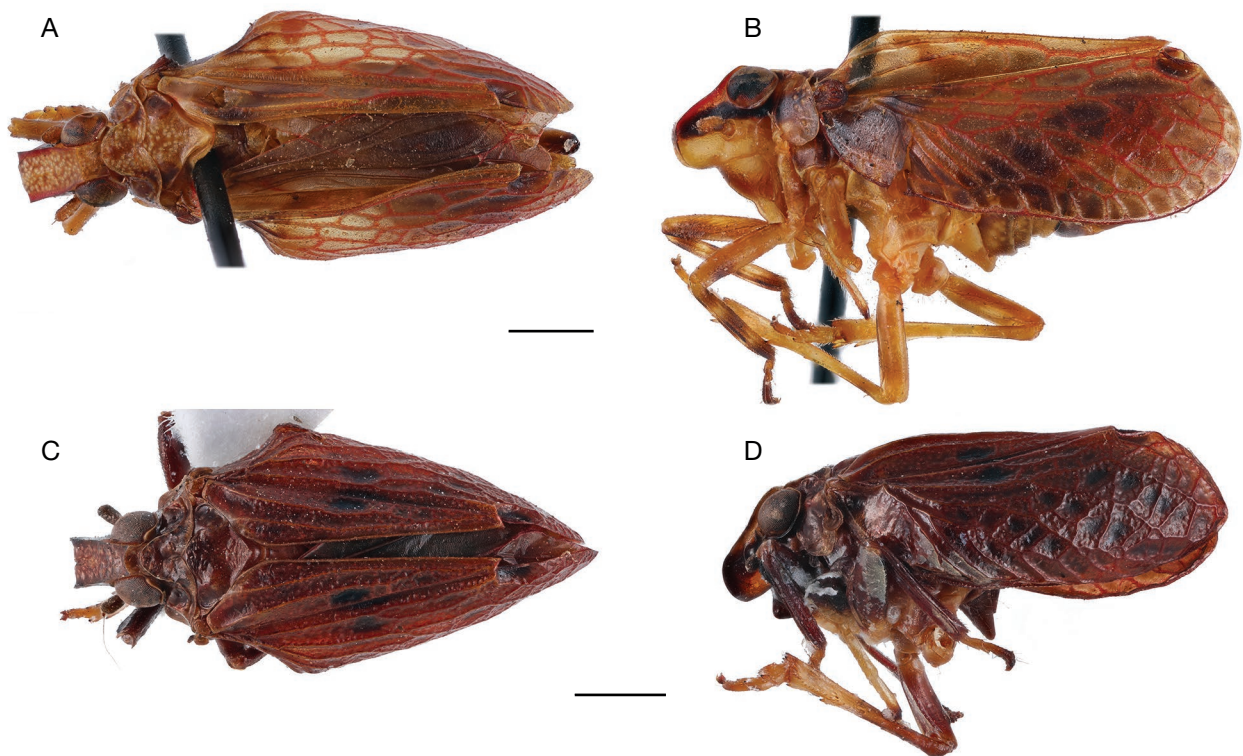


FIG. 5. — Habitus of *Togoda* spp.: **A, B**, *Togoda minima* n. sp., female paratype, dorsal view (**A**) and lateral view (**B**); **C, D**, *T. carinata* n. sp., holotype, dorsal view (**C**) and lateral view (**D**). Scale bar: 1 mm.

Togoda minima n. sp.
(Figs 5A, B; 6E, F; 10)

[urn:lsid:zoobank.org:act:B19D2836-E909-4258-8652-D09F1F525DFD](https://doi.org/10.21203/rs.3.rs-1111111/v1)

TYPE MATERIAL. — **Holotype.** Mozambique • ♂; “Museum Paris / Moçambique / Vallée du Pungouí / Guengére / G. Vasse 1906” [grey blue] // “Février” [white] // “Museum Paris / MNHN(EH) / 16572” [white]; MNHN.

Paratype. Mozambique • ♀; “Museum Paris / Mozambique / Vila Pery / P. Lesne 1928” [grey blue] // “Mars” [white] // “Museum Paris / MNHN(EH) / 16571” [white]; MNHN.

DIAGNOSIS. — Fore wings small, with 1/5 of its length behind apex of clavus in lateral view. Metopial proboscis without notch frontally. Phallobase long, nearly as long as aedeagus, asymmetric.

ETYMOLOGY. — Species name referring to small fore wings.

DISTRIBUTION. — Central Mozambique (Nhamatanda District).

DESCRIPTION

Structure (Figs 5A, B; 6E, F)

Coryphe weakly transverse, 1.5 times as wide as long medially, without carinae, anterior margin straight, posterior margin nearly straight (Fig. 5A). Metope, pro- and mesonotum densely covered with pustules (Fig. 6F). Coryphe-metope margin keel-shaped (Figs 5B; 6E). Metopial proboscis without notch frontally (Fig. 6F). Post- and anteclypeus with fine median carina medially which is running from the middle of

postclypeus throughout anteclypeus. Eyes large, diameter of each eye nearly as wide as coryphe. Median part of pronotum with a groove medially. Fore wings rather short, nearly oval, surpassing by 1/5 of its length beyond abdominal apex in male and reaching abdominal apex in female (Fig. 5B). Basal cell narrowly oval. Radius and median running from basal cell by one short stem or from one point and firstly furcating near to the cell in basal fifth of wing. Forewing vein branching sequence: R 5, all branches terminating at costa not reaching wing margin; r-m 4; M 10, firstly furcating near to basal cell, M₁ and M₂ again furcating after wing middle; im 12; m-cua 4-6; CuA 2, furcating near wing middle; icua 3. Pcu joint A₁ near to wing middle. Clavus long, 4/5 of wing length. Legs not flattened neither foliated. Hind tibia with nine spines apically. First metatarsomere with two latero-apical and 7-9 intermediate spines arranged in an arc apically.

Coloration (Fig. 5A, B)

General coloration yellowish brown. Head laterally light yellow below antennae, with wide black stripe above scapi. Coryphe, pronotum, and mesonotum yellowish brown. Each paranotal lobe of pronotum with large dark brown to black area proximally. Mesonotum sometimes with dark brown lateral parts. Metope brown to dark brown, with reddish lateral margins and light yellow pustules. Postclypeus yellowish brown to dark brown, with pale median carina. Anteclypeus light yellow. Rostrum light yellow, with black apex. Scapi and

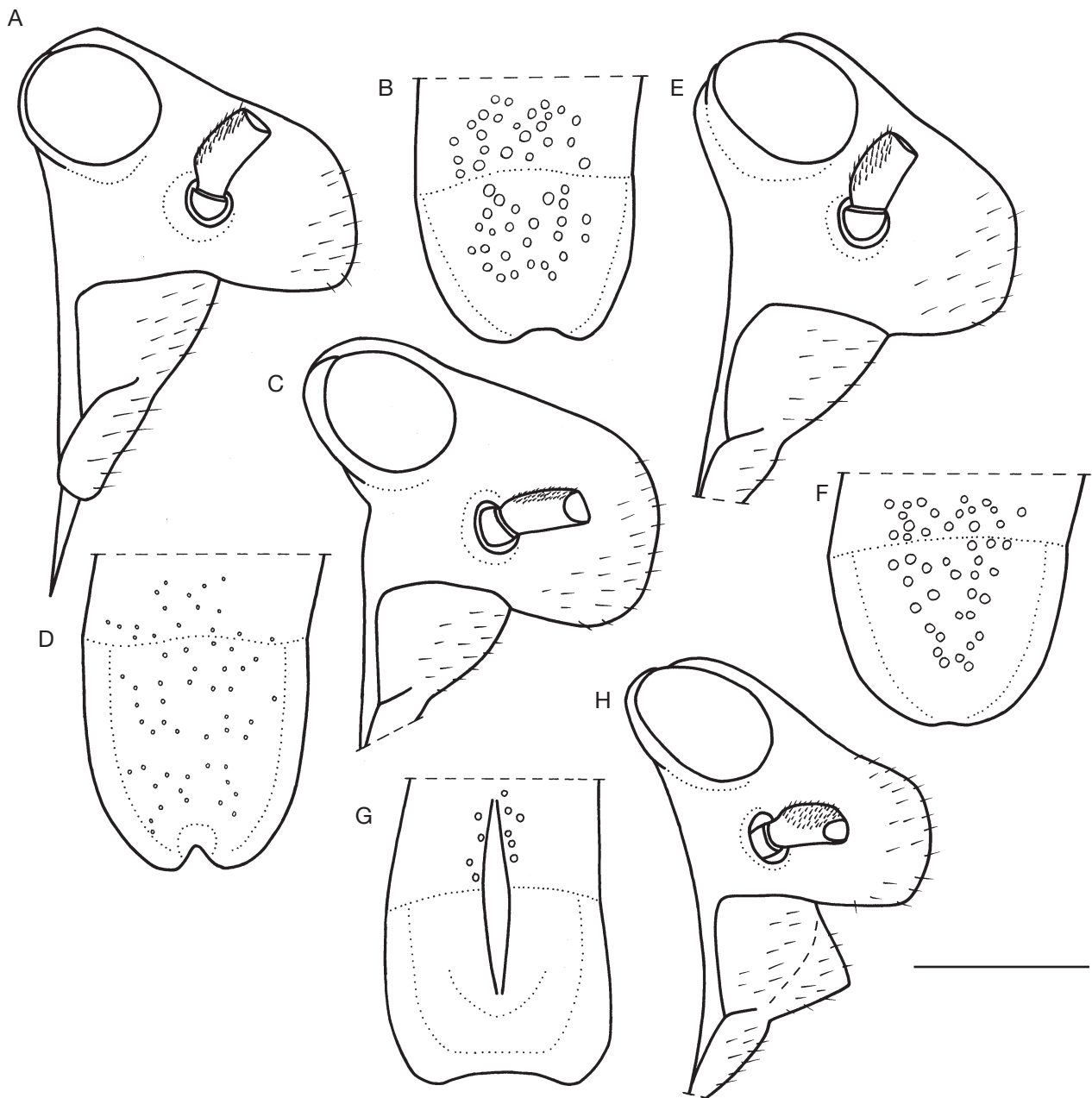


FIG. 6. — Head of *Togoda* spp.: **A, B**, *T. africana* Melichar, 1906, male, Togo (Bismarckburg), head, lateral view (**A**), metopial proboscis, frontal view (**B**); **C, D**, *T. excisa* n. sp., paratype, head, lateral view (**C**), metopial proboscis, frontal view (**D**); **E, F**, *T. minima* n. sp., paratype, head, lateral view (**E**); metopial proboscis, frontal view (**F**); **H, G**, *T. carinata* n. sp., metopial proboscis, frontal view (**G**); holotype, head, lateral view (**H**). Scale bar: 0.5 mm.

pedicels brown. Each paranotal lobe of pronotum with large dark brown to black area proximally. Mesonotum sometimes with dark brown lateral parts. Forewing yellowish brown to dark brown, with basal subcostal field brown to dark brown, some cells of corium sometimes dark brown to black, and veins reddish brown. Basal processes of forewing precostal margins dark brown to black. Hind wings dark brown. Fore femora light yellowish brown to dark brown. Fore tibiae with three dark brown bands. Fore tarsi dark brown. Apices of leg spines black. Claws dark brown. Thorax and abdomen below

light yellow. Abdominal sternite III light yellow. Abdominal sternites IV–VI yellowish brown. Female sternite VII with black laterally hind margin. Gonoploc margins dark brown, with black teeth. Gonocoxae VIII dark brown, with black hind margins proximally. Male genital block yellowish brown.

Male terminalia (Fig. 10)

Pygofer wide in dorsal half, with strongly convex hind margins (in lateral view) (Fig. 10A). Anal tube elongate, twice as long as wide medially, narrowing to truncate apex (in dorsal view) (Fig. 10C).

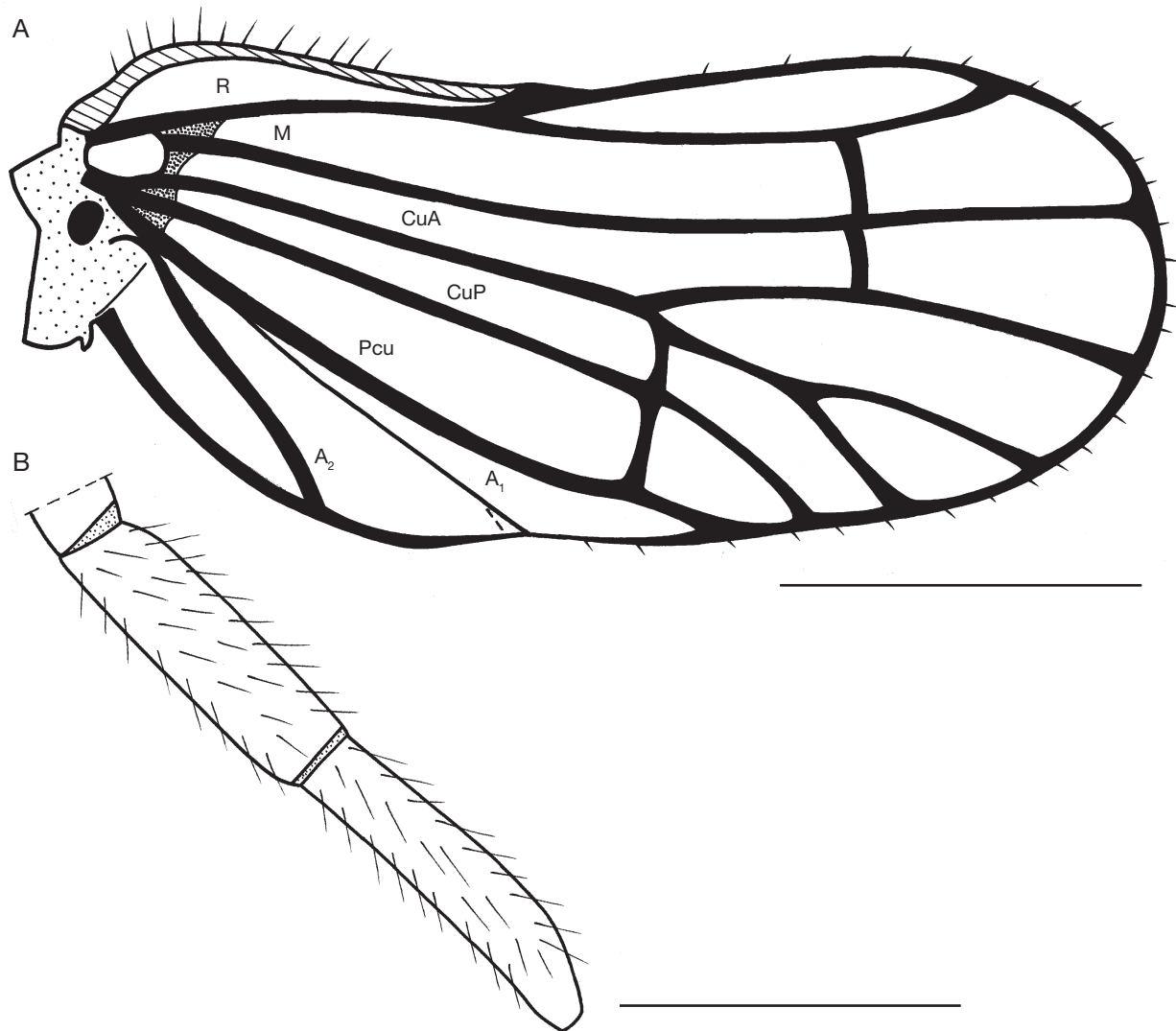


FIG. 7. — *Togoda africana* Melichar, 1906, Togo (Bismarckburg), male: **A**, right hind wing; **B**, rostrum. Abbreviations: **A1**, first anal vein; **A2**, second anal vein; **CuA**, cubitus anterior; **CuP**, cubitus posterior; **M**, median vein; **Pcu**, postcubitus; **R**, radial vein. Scale bars: A, 1 mm; B, 0.5 mm.

Apex of anal tube slightly turned downwards (in lateral view) (Fig. 10B). Anal column short and wide. Penis wide, horse-shoe shaped (in lateral view) (Fig. 10D, E). Phallobase long, nearly as long as aedeagus, assymetric, with ventral lobe shifted to the left side and narrowing apically. Aedeagus with a single hook-shaped subapical process turned downwards (Fig. 10D, E, *a*) on right side. Phallobase with long and wide plate-shaped process, with a short tooth-shaped projection apically, turned upwards on right side (Fig. 10D, *e*) and narrow pointed apically and turned upwards on left side (Fig. 10D, E, *f*). Style with nearly straight hind margin and large apical tooth (Fig. 10F, G, *at*). Connective with elongate large cup (Fig. 10D).

Female terminalia

Anal tube elongate, narrowing to truncate apex.

Measurement

Total length. Male: 6.0 mm. Female: 6.5 mm.

Togoda carinata n. sp.
(Figs 5C, D; 6H, G)

[urn:lsid:zoobank.org:act:130482F9-1D65-4A8E-85DB-38991CE24644](https://zoobank.org/act:130482F9-1D65-4A8E-85DB-38991CE24644)

TYPE MATERIAL. — **Holotype**. Madagascar • ♀; “Madagascar Est / distr. Mananara – N. / Antanambe VII / Vadon et Peyrieras” [print with hand written date] // “Museum Paris / MNHN(EH): / 16570” [print]; MNHN.

DIAGNOSIS. — Metope with two weak carinae medially and groove between them. Postclypeus with strong triangular-shaped median carina. Fore and middle femora flattened or nearly foliate.

ETYMOLOGY. — Species name referring to strong carina of postclypeus.

DISTRIBUTION. — Northeastern Madagascar (Mananara Nord District).

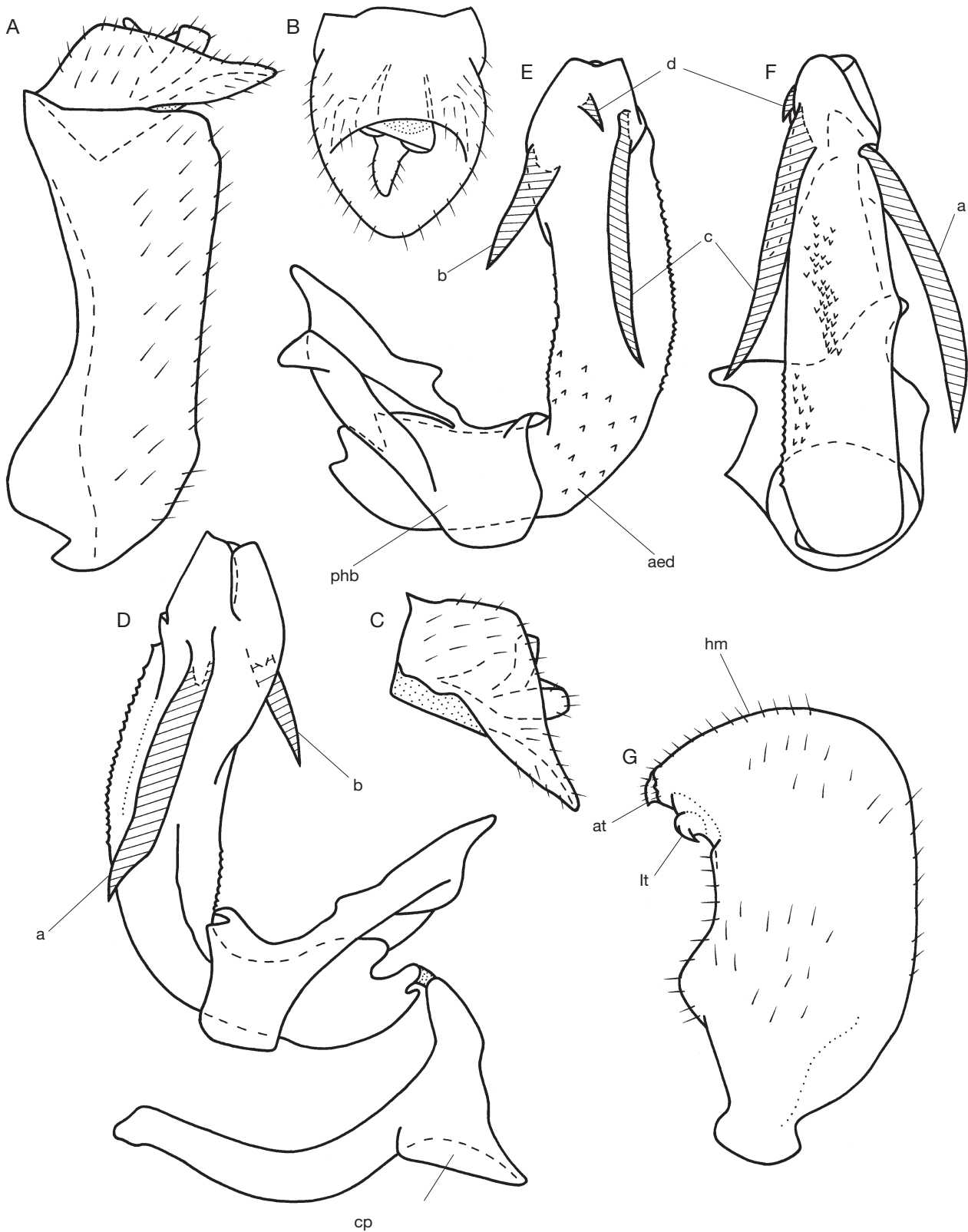


FIG. 8. — *Togoda africana* Melichar, 1906, Togo (Bismarckburg), male genitalia: **A**, pygofer and anal tube, lateral view; **B**, anal tube, dorsal view; **C**, anal tube, lateral view; **D**, penis, right lateral view; **E**, penis, left lateral view; **F**, penis, ventral view; **G**, style, lateral view. Abbreviations: **a-d**, processes of aedeagus; **aed**, aedeagus; **at**, apical tooth of style; **cp**, cup of connective; **hm**, hind margin of style; **lt**, lateral tooth of style; **phb**, phallobase. Not to scale.



FIG. 9. — *Togoda excisa* n. sp., holotype, male genitalia: **A**, pygofer and anal tube, lateral view; **B**, anal tube, lateral view; **C**, anal tube, dorsal view; **D**, penis, left lateral view; **E**, penis, ventral view; **F**, penis, right lateral view; **G**, style, lateral view; **H**, capitulum of style, dorsal view; **I**, styles, ventral view; **J**, pygofer, caudal view. Abbreviations: **at**, apical tooth of style; **b**, **c**, processes of aedeagus; **lt**, lateral tooth of style. Not to scale.

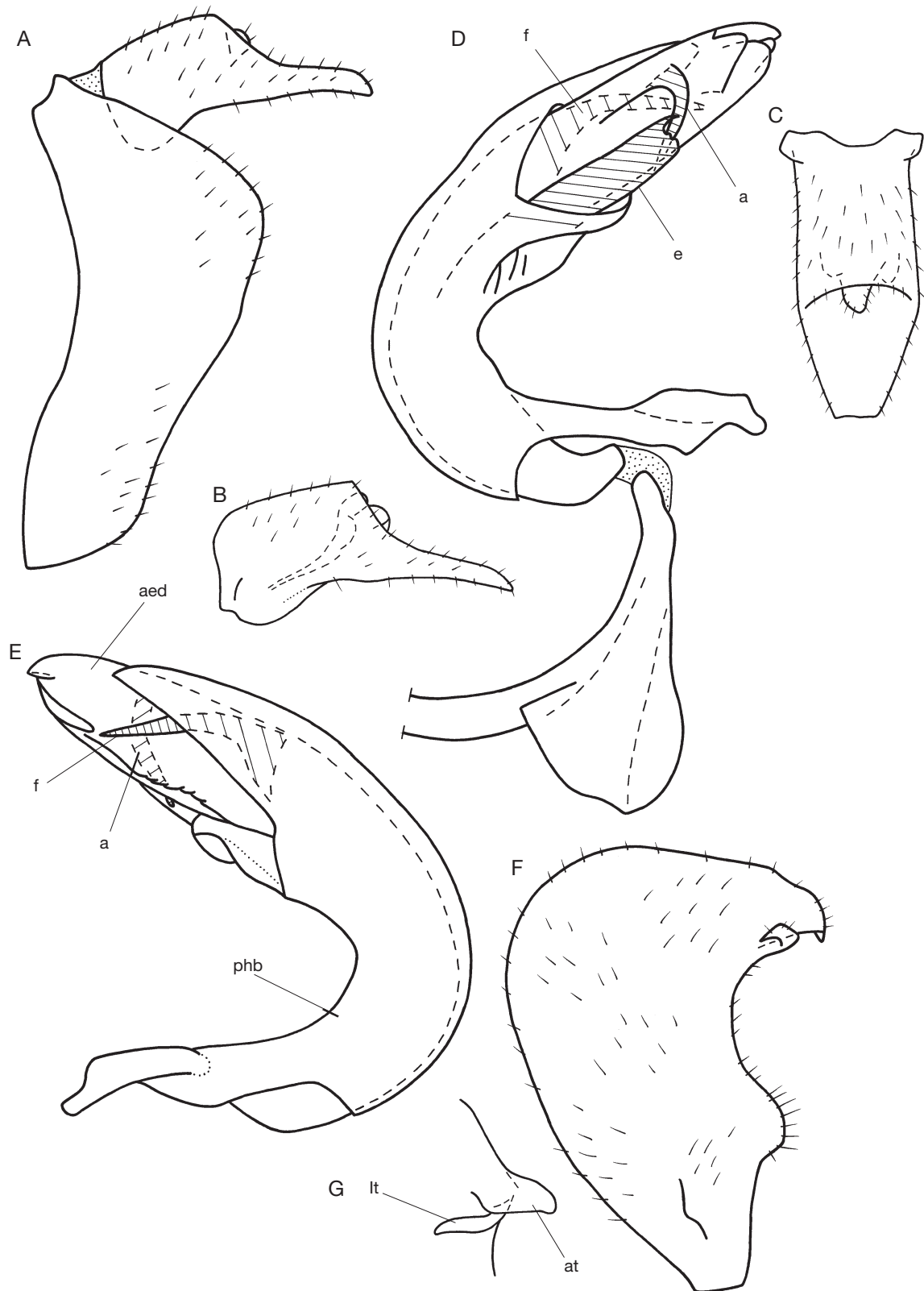


FIG. 10. — *Togoda minima* n. sp., holotype, male genitalia: **A**, pygofer and anal tube, lateral view; **B**, anal tube, lateral view; **C**, anal tube, dorsal view; **D**, penis, right lateral view; **E**, penis, left lateral view; **F**, style, lateral view; **G**, capitulum of style, dorsal view. Abbreviations: **a**, **e**, **f**, processes of phallobase and aedeagus; **aed**, aedeagus; **at**, apical tooth of style; **lt**, lateral tooth of style; **phb**, phallobase. Not to scale.



FIG. 11. — Distribution of the genus *Togoda* Melichar, 1906. Abbreviations: ●, *Togoda* sp.; ●, *T. africana* Melichar, 1906; ●, *T. carinata* n. sp.; ●, *T. excisa* n. sp.; ○, *T. minima* n. sp.; ●, *T. transvaalensis* Schmidt, 1910. Not to scale.

DESCRIPTION

Structure (Figs 5C, D; 6H, G)

Coryphe three times as wide as long medially, smooth, without carinae; anterior margin convex; posterior margin concave (Fig. 5C). Metope with two weak carinae medially and groove between them, with sparse pustules (Fig. 6G). Coryphe-metope margin keel-shaped. Postclypeus with strong triangular-shaped median carina (Fig. 5D; 6H). Anteclypeus with fine median carina. Eyes large, diameter of each eye 1.5-2 times as width of coryphe. Fore wings nearly oval, protruding beyond ovipositor apex (Fig. 5D). Basal cell small and oval. Radius and median running from the same point on the basal cell. Radius and median firstly furcating closely to basal cell in basal wing fifth. Many transverse veins between branches of median vein. Forewing vein branching sequence: R 5; r-m 6; M 5; CuA 2, furcating near to wing middle. Fore and middle femora flattened or nearly foliate. Hind tibia with ten spines apically. First metatarsomere with two latero-apical and five intermediate spines arranged in arc apically.

Coloration (Fig. 5C, D)

Generally brown to dark brown. Coryphe reddish brown. Metope dark brown, with yellowish pustules. Head laterally with wide black stripe above antennae. Scapi, pedicels, and postclypeus dark brown to black. Anteclypeus light yellow. Rostrum light yellow, with black apex. Pro- and mesonotum reddish brown to dark brown. Fore wings reddish brown, with large oval black spot on each clavus, between Pcu and first anal vein, and with several large black spots inside of cells on corium including oval one between posterior branch of median and CuA in front of claval spot. Hind wings dark brown. Fore and middle coxae, femora, and tibiae dark brown. Trochanters light yellow. Hind femora dark brown. Hind tibiae dark brown proximally and light yellow distally. First and second tarsomeres of fore and middle tarsi light yellow; third tarsomeres dark brown. Hind tarsi light yellow. Claws dark brown to black. Apices of leg spines black. Abdominal sternites dark brown. Ovipositor yellowish brown.

Measurement

Total length. Female: 5.5 mm.

Togoda sp. (Figs 1B-F; 3C, D)

MATERIAL EXAMINED. — **Ghana** • 2 ♀; Angu village; 98 m; 5°02.007'N, 1°45.602'W; sweeping trees and shrubs in forest and forest edge; 1.V.2022; Z. Assan & V. M. Gnezdilov leg.; ZIN • 2 ♀; Kakum National Park; 5°21.198'N, 1°23.034'W; 202 m; sweeping in the forest canopy at 11–40 m; 4–6.V.2022; V. M. Gnezdilov leg.; ZIN.

NOTES. — The specimens from Ghana are close to *Togoda africana* Melichar and *T. excisa* n. sp. based on metopial proboscis with frontal concavity. Final identification needs examination of male.

Togoda sp.

MATERIAL EXAMINED. — **Tanzania** • 2 ♀; “Zanzibar / Africa or. 1892 / N 143–1924”; ZIN.

NOTES. — Final identification needs examination of male.

DISCUSSION

The tribe Trienopini is characterized by unique synapomorphy – the presence of ear-shaped (or loop-shaped) process (or projection) of forewing precostal margin basally bearing dense marginal setae (Fig. 1 A, B, C, F) same as on forewing precostal margin along its whole length (Fig. 1E). Another character of the tribe is the presence of semicircular lobe of forewing margin behind claw-shaped apex of clavus also bearing marginal setae (Fig. 2). Both ear-shaped processes and semicircular processes of forewings apparently may stick out perpendicularly to forewing plane in alive specimens (Fig. 3A, B), but became pressed to fore wings in dry specimens. There is no data on behavior neither ecology of Trienopini taxa and currently it is impossible to explain the role of these forewing processes and lobes.

Apparently the center of origin and speciation of the tribe Trienopini is located in Western Equatorial Africa as main part of genera (*Fritzruehlia* Schmidt, 1924, *Ingoma* Fennah, 1954, *Togoda* Melichar, 1906, and *Trienopa* Signoret, 1860) are found in this region with subsequent distribution to Eastern and Southern Africa and Madagascar, with surrounding islands like Zanzibar and the Seychelles (Schmidt 1924; Melichar 1906; Metcalf 1958; Gnezdilov in press). Currently Madagascar is one of the hot spots for *Trienopa* biodiversity with an outshift to the Seychelles from where only one species, *Trienopa typica* (Distant, 1909), apparently closely related to Madagascar *T. flavida* Signoret, 1860, is recorded. As Trienopini species have rather well developed fore and hind wings the ancestors of modern island taxa, e.g. *Togoda* and *Trienopa* species, could be carried from continental Africa by wind dispersal across water barriers to the islands of Indian Ocean. Such a possibility was hypothesized by Ross (1968) to explain the origins of New World species of the genus *Exitianus* Ball, 1929

(Cicadellidae) by long-distance trans-Atlantic dispersal from Africa received the most support from the analyses according to Zahniser & Dietrich (2015).

Distinct metopial proboscis of *Togoda* species makes them superficially similar to some members of the tribe Parahiraciini Cheng & Yang, 1991 of the family Issidae, e.g. the genus *Bardunia* Stål, 1863 (Gnezdilov 2011, figs 1–18) which is apparently convergent in these planthopper families. While cuspidal apex of forewing clavus also known for Parahiraciini, e.g. the genera *Thabena* Stål, 1866 and *Pseudochoutagus* Che, Zhang & Wang, 2011 (Gnezdilov 2015, figs 7, 8), may be connected with coleopterization of fore wings.

The genus *Togoda* Melichar is currently distributed across continental tropical Africa from its west to south-east and to Zanzibar and Madagascar, with five species described so far. Males are needed to find out which species are presented in Nigeria, Ghana, and Zanzibar as well as to confirm species status of *T. transvaalensis* Schmidt, 1910.

Acknowledgements

I am glad to thank Prof. Dr Thierry Bourgoïn and Dr Adeline Soulier-Perkins (Paris, France) for their kind permissions to study the specimens, Dr Vladimir V. Neimorovets (Saint Petersburg, Russia) and Mr. Konstantin A. Benken (Equipment Sharing Centre “Taxon” (<https://www.ckp-rf.ru/ckp/3038/>), Saint Petersburg, Russia) for taking photos, Dr Babajide Agboola (University of Ibadan, Nigeria, Ekiti Biodiversity Survey Project, <https://www.inaturalist.org/projects/ekiti-biodiversity-survey-project> and Ekiti State Forestry Commission) and Mr. Gernot Kunz (Graz, Austria) for their permissions to use the photos of *Togoda* sp. from Nigeria and *Trienopa typica* (Distant, 1909) from the Seychelles, and Prof. Dr Hannelore Hoch (Berlin, Germany) and anonymous reviewer for their valuable comments on the manuscript.

The study was performed in the framework of the Russian State Research project No. 125012901042-9.

REFERENCES

- ANUFRIEV G. A. & EMELJANOV A. F. 1988. — Cicadinea (Auchenorrhyncha), in LEHR P. A. (ed.), *Keys to the Insects of the Far East of the USSR, Vol. 2, Homoptera and Heteroptera*. Nauka, Leningrad: 12–495. (in Russian).
- BALL E. D. 1929. — A supplemental revision of the genus *Athyana* in North America (Homoptera: Cicadellidae). *Transactions of American Entomological Society* 55 (1): 1–8.
- BOURGOIN T. 2024. — FLOW (Fulgoromorpha Lists on The Web): a world knowledge base dedicated to Fulgoromorpha. Available from: <http://flow.hemiptera-databases.org/flow/> (accessed on 1st December 2024).
- CHE Y. L., ZHANG Y. L. & WANG Y. L. 2011. — A new genus of the tribe Issini Spinola (Hemiptera: Fulgoroidea: Issidae) from China. *Zootaxa* 3060: 62–66. <https://doi.org/10.11646/zootaxa.3060.1.4>
- CHENG C. L. & YANG C. T. 1991. — Nymphs of Issidae of Taiwan (4) (Homoptera). *Plant Protection Bulletin Taichung* 33 (4): 334–343.
- DISTANT W. L. 1909 — “Sealark” Rhynchota. IV. In: The Percy Sladen Trust expedition to the Indian Ocean in 1905. Vol. 2.

- Transactions of the Linnean Society of London*. Ser. 2. Zoology 13: 29-48, 1 plate. <https://doi.org/10.1111/j.1096-3642.1909.tb00408.x>
- FENNAH R. G. 1954. — The higher classification of the family Issidae (Homoptera: Fulgoroidea) with descriptions of new species. *Transactions of the Royal Entomological Society of London* 105 (19): 455-474. <https://doi.org/10.1111/j.1365-2311.1954.tb00772.x>
- GNEZDIROV V. M. 2007. — On the systematic positions of the Bladinini Kirkaldy, Tonginae Kirkaldy, and Trienopinae Fennah (Homoptera, Fulgoroidea). *Zoosystematica Rossica* 15 (2): 293-297. <https://doi.org/10.31610/zsr/2006.15.2.293>
- GNEZDIROV V. M. 2011. — Revision of the genus *Bardunia* Stål (Hemiptera, Fulgoroidea, Issidae). *Deutsche Entomologische Zeitschrift* 58 (2): 221-234. <https://doi.org/10.1002/mmnd.201100025>
- GNEZDIROV V. M. 2013. — Contribution to the taxonomy of the family Tropiduchidae Stål (Hemiptera, Fulgoroidea) with description of two new tribes from Afrotropical Region. *Deutsche Entomologische Zeitschrift* 60 (2): 179-191. <https://doi.org/10.1002/mmnd.201300024>
- GNEZDIROV V. M. 2015. — First coloured species of the genus *Thabena* Stål (Hemiptera, Fulgoroidea, Issidae) from Vietnam with general notes on the genus. *Acta Zoologica Academiae Scientiarum Hungaricae* 61 (4): 329-339. <https://doi.org/10.17109/AZH.61.4.329.2015>
- GNEZDIROV V. M. 2022. — *Euroxenus vayssieresi* (Bonfils, Attie et Reynaud, 2001) (Hemiptera, Auchenorrhyncha: Issidae) in Western Africa. *Entomological Review* 102 (2): 236-242. <https://doi.org/10.1134/S0013873822020087>
- GNEZDIROV V. M. (in press). — Revision of the genus *Ingoma* Fennah, 1954 (Hemiptera, Auchenorrhyncha, Fulgoroidea, Tropiduchidae), with the description of a new subgenus and three new species from the Congo Basin. *Zoosystema*.
- GNEZDIROV V. M. & BARTLETT C. R. 2018. — A new genus and two new species of the family Issidae (Hemiptera, Auchenorrhyncha: Fulgoroidea) from Amazonian Ecuador. *Proceedings of the Entomological Society of Washington* 120 (1): 62-75. <https://doi.org/10.4289/0013-8797.120.1.62>
- MELICHAR L. 1906. — Monographie der Issiden (Homoptera). *Abhandlungen der K. K. Zoologisch-botanischen Gesellschaft in Wien* 3 (4): 1-327.
- METCALF Z. P. 1958. — *General catalogue of the Homoptera*. Fs. 4. Pt. 15. *Fulgoroidea. Issidae*. Baltimore: Waverly Press, 561 p.
- ROSS H. H. 1968. — The evolution and dispersal of the grassland leafhopper genus *Exitianus*, with keys to the Old World species (Cicadellidae: Hemiptera). *Bulletin of the British Museum (Natural History) Entomology* 22: 1-30. <https://doi.org/10.5962/bhl.part.9949>
- SCHMIDT E. 1910. — Die Issinen des Stettiner Museums. (Hemiptera – Homoptera.). *Entomologische Zeitung* 71: 146-221.
- SCHMIDT E. 1924. — Neue Zikaden aus dem tropischen Africa. *Societas entomologica* 6: 21-23.
- SIGNORET V. 1860. — Faune des Hémiptères de Madagascar. Pt. 1. Homopères. *Annales de la Société entomologique de France* (Ser. 3) 8: 177-206, 2 plates.
- STÅL C. 1863. — Hemipterorum exoticorum generum et specierum nonnullarum novarum descriptions. *Transactions of the Entomological Society of London* (Serie 3) 1: 571-603. <https://doi.org/10.1111/j.1365-2311.1863.tb01303.x>
- STÅL C. 1866. — Hemiptera Homoptera Latr. *Hemiptera Africana* 4: 1-276.
- ZAHNISER J. N. & DIETRICH C. H. 2015. — Phylogeny, evolution, and historical biogeography of the grassland leafhopper tribe Chiasmini (Hemiptera: Cicadellidae: Deltocephalinae). *Zoological Journal of the Linnean Society* 175 (3): 473-495. <https://doi.org/10.1111/zoj.12292>

*Submitted on 12 February 2025;
accepted on 21 March 2025;
published on 30 September 2025.*