

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/273258737>

# Three new species of the genus *Exphora* Signoret, 1860 (Hemiptera, Fulgoromorpha, Tropiduchidae) from Madagascar

Article in *Zootaxa* · March 2015

DOI: 10.11646/zootaxa.3926.1.7

CITATIONS

3

READS

71

2 authors:



Łukasz Junkiert

University of Silesia in Katowice

27 PUBLICATIONS 113 CITATIONS

[SEE PROFILE](#)



Marcin Walczak

University of Silesia in Katowice

72 PUBLICATIONS 101 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Use of Scanning Electron Microscopy (SEM) in Zoology – observation of claws and pad structures of insects of family Heteropterygidae. [View project](#)



The description of nymphs of stick insects of family Heteropterygidae. [View project](#)



<http://dx.doi.org/10.11646/zootaxa.3926.1.7>

<http://zoobank.org/urn:lsid:zoobank.org:pub:8D64F6D2-0ADA-4E68-9082-6A084AF88688>

## Three new species of the genus *Exphora* Signoret, 1860 (Hemiptera, Fulgoromorpha, Tropiduchidae) from Madagascar

ŁUKASZ JUNKIERT & MARCIN WALCZAK

University of Silesia, Faculty of Biology and Environmental Protection, Department of Zoology, ul. Bankowa 9, 40-007 Katowice, Poland. E-mails: [lukasz.junkiert@wp.pl](mailto:lukasz.junkiert@wp.pl); [marcin.walczak@us.edu.pl](mailto:marcin.walczak@us.edu.pl)

### Abstract

Three new species of the genus *Exphora* Signoret, 1860 (Hemiptera, Fulgoromorpha: Tropiduchidae) are described from Madagascar: *E. constanti* sp. n., *E. stroinskii* sp. n. and *E. ambatolaonaensis* sp. n. The male genitalia are described for the first time in this genus. The male genitalia, head and fore wing of the new species are illustrated with photos of habitus provided. Key to the known species of *Exphora* is given.

**Key words:** Madagascar, Tropiduchidae, *Exphora*, new species

### Introduction

The genus *Exphora* was erected by Signoret (1860) for *E. guerini*. Currently *Exphora* belongs to the tribe Gaetuliini Fennah, 1978. Among the other representatives of the tribe Gaetuliini *Exphora* is a rather small genus comprising at this moment 10 species (Signoret, 1860; Jacobi, 1917; Lallemand, 1950; Synave, 1966). *Exphora* was placed in the family Nogodinidae, however Gnezdilov (2006) did not share this view and transferred it from Nogodinidae to Tropiduchidae. Examination of unidentified tropiduchid specimens in the collection of the Royal Belgian Institute of Natural Sciences, Brussels, Belgium revealed three undescribed species belonging to the genus *Exphora* represented by a single male specimen each. Descriptions of the three new species as well as a key for all the species of the genus are given in the present paper.

### Material and methods

External structures were examined using a stereoscopic microscope Olympus SZX9. The genitalia were dissected after boiling the abdomen for 3 times (about 10 minutes) in a 10% solution of potassium hydroxide (KOH). Then the pygofer and styles were separated from the abdomen and the aedeagus extracted using thin forceps and a needle blade. The whole was then placed in glycerin. The genitalia were examined using the light microscope Nikon Eclipse. Drawings were made with a camera lucida. Photographs were taken by the Canon Eos camera with extension rings.

The holotypes bear red manuscript label of the following types: Holotype: ♂ / *Exphora constanti* sp. n. / Junkiert & Walczak det. 2014; Holotype: ♂ / *Exphora stroinskii* sp. n. / Junkiert & Walczak det. 2014; Holotype: ♂ / *Exphora ambatolaonaensis* sp. n. / Junkiert & Walczak det. 2014. Quoting the labels of specimens: (/) is used to divide data on different rows on the label, (;) is used to divide data on different labels, ([ ]) is used for author's comments.

### Abbreviations used

RBINS Royal Belgian Institute of Natural Sciences, Brussels, Belgium.

RMCA Royal Museum for Central Africa, Tervuren, Belgium.  
 NHMB Naturhistorisches Museum, Basel, Switzerland.  
 ML/MW ratio: metope length/metope width CL/CW– ratio: coryphe length/coryphe width.

### Key to species of *Exphora*

1. Metope long, 2.5 times as long as wide ..... *E. longipennata*
- Metope less than 2 times as long as wide ..... 2.
2. Metope distinctly enlarged over clypeus at almost right angle, with 2 rows of black spots (between keels) ..... *E. fumivenosa*
- Metope enlarged over clypeus with board obtuse, without black spots ..... 3
3. Body greenish, fore wing with 15 apical cells ..... *E. succinae*
- Body yellowish-brown, fore wing with 18–19 apical cells ..... 4
4. Fore wing with dark brown transvers veins ..... *E. perinetensis*
- Fore wings uniformly coloured, without darker veins ..... 5
5. Apical part of aedeagus without long needle-like processes. Aedeagal processes obtuse curved or almost stright and prolonged ..... 6
- Apical part of aedeagus with long needle-like processes directed dorsally ..... 7
6. Apical processes of aedeagus well developed, falcate, with denticles directed to each other ..... 8
- Apical processes of aedeagus without denticles directed to each other. Aedeagus long and thin or wide and robust ..... 10
7. Anal column short, placed in basal part of anal tube ..... *E. similis*
- Anal column long, placed in apical part of anal tube ..... *E. succinae*
8. Apical process of aedeagus twice longer than subapical ..... 9
- Apical process of aedeagus as long as subapical ..... *E. guerini*
9. Aedeagus with 2 distinct bulges dorsally, ventral process weakly developed ..... *E. constanti* **sp. n.**
- Aedeagus without bulges, ventral process bird-head shaped ..... *E. stroinskii* **sp. n.**
10. Aedeagus comparatively short, robust; apical margin of anal tube with deep incision ..... *E. ifanadiensis*
- Aedeagus very long; anal tube twice longer than wide with apical margin almost stright ..... 11
11. Aedeagal processes with abundant small denticles ..... *E. ambatolaonaensis* **sp. n.**
- Aedeagal processes without small denticles ..... *E. perinetensis*

### *Exphora stroinskii* Junkiert & Walczak, sp. n.

(Figs 4a, 4b)

**Description.** Head: Metope 2.5x as long as wide, weakly expanding in middle then narrowing before joining metoclypeal suture. Dorsal margin of metope almost straight. Median keel distinct, running through metope and metoclypeal suture. Metoclypeal suture elongate, triangular. Lateral keels present and distinct. In lateral view metope arcuately convex, but in central part rather straight, metoclypeal suture almost straight (Figs 1a, 1b). Eye black, round, ocelli present. Coryphe almost twice as wide as long, anterior margin convex and weakly angular, posterior margin distinctly arcuately concave (Fig. 1c).

Pronotum and mesonotum: Pronotum bluntly rounded, distinctly concave. Mesonotum weakly convex, with three parallel keels: anterior part of median keel joined to two slanting lines converging almost at right angle and thus forming an arrow-shaped structure. Both edges of arrow joined to two lateral keels.

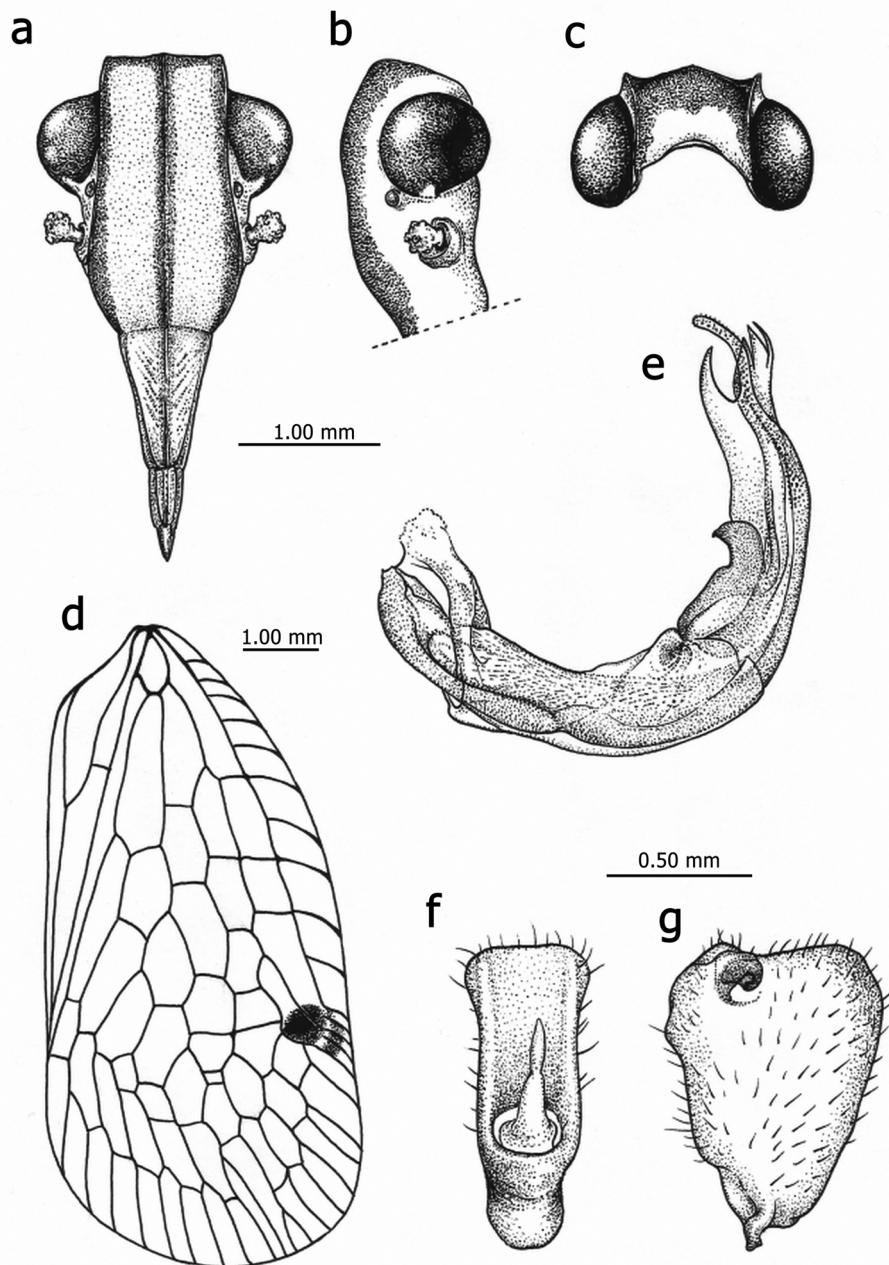
Fore wings: Clavus elongate, as long as 2/3 of whole wing length. Two longitudinal veins on clavus converge at 1/3 of their length. Two transverse veins present on the clavus. Radius bifurcate (R2) after cubitus (Cu2). Costal membrane with ten transverse veins, costal cell with two transverse veins. Stigma round and black, covering 1/3 of cell, partially entering apical fragment of costal cell. Five short parallel veinlets arise from stigma, four brown cells located among those veinlets and separated from the black stigma with a yellow line. Nineteen apical cells present at apex of fore wing (Fig. 1d). Hind wings well developed, as long as 4/5 of fore wings' length.

Legs. Tibia triangular in lateral view with concave ventral side. Lateral margin with four lateral spines present, three of which are distinct and 1 weakly visible. Lateral margin cross-striated and covered with small, barely visible bristles.

Coloration. General coloration yellowish-brown, metope with keels distinctly red. Larteral margins of tergites of abdomen brown. Wings hyaline with brown veins. Femur coloration light brown with dark brown base, tibia coloration uniformly light brown, spines brown, darker than tibia.

Male genitalia: Pygofer with hind margin strongly convex. Anal tube elongate, weakly narrowed basally and

enlarged apically in dorsal view. Anal column about 0.33x as long as anal tube (Fig. 1f). Style almost triangular with caudo-dorsal angle obtuse. Apical tooth of style wide and folded, bearing subapical tooth on inner side (Fig. 1g). Aedeagus narrow, falcate in lateral view. Ventral phallobase reaching half length of aedeagus. Each dorso-lateral phallobase lobe with one long, narrow, semicircular apical process bearing small, abundant denticles. Subapical process horn-shaped. Dorsal surface of phallobase with bird-head-shaped process medially. Apical aedeagal process leaf-shaped with two barely visible curved apical teeth (Fig. 1e).



**FIGURE 1.** *Exphora stroinskii* sp. n. a. head, frontal view; b. head, lateral view; c. head, dorsal view; d. fore wing; e. penis, lateral view; f. anal tube, dorsal view; g. style, lateral view.

**Remarks.** *Exphora stroinskii* sp. n. is similar to other species externally, but can be distinguished from related by the pattern of black round stigma, metope lacking of brown stripes, long anal tube, shape of style, aedeagus and its processes (see the key above).

**Material examined.** Holotype ♂ / *Exphora stroinskii* sp. n. / Junkiert & Walczak det. 2014 [red label]; Madagascar Est / district Sambava / Marojejy / Ambinanitelo 500m / XII-58 Raharizonina; INSTITUT / SCIENTIFIQUE / MADAGASCAR; Coll. R.I.Sc.N.B. [blue label]

**Etymology.** The name of this new species is dedicated to Dr. Adam Stroiński, the Fulgoromorphan specialist from the Museum and Institute of Zoology, Polish Academy of Science, Warsaw, Poland.

**TABLE 1.** Measurements of type specimens (in mm).

	<i>E. stroinski</i> sp. n.	<i>E. constanti</i> sp. n.	<i>E. ambatolaonaensis</i> sp. n.
Length of body	11.0	10.7	10.2
Width of metope	1.12	1.17	1.14
ML/MW	1.70	1.65	1.61
Length of coryphe	0.75	0.49	0.42
Width of coryphe	1.79	1.75	1.72
CL/CW	0.42	0.28	0.24
Width of scutellum	1.94	1.78	1.8

***Exphora constanti* Junkiert & Walczak, sp. n.**

(Figs 4c, 4d)

**Description.** Head: Metope twice as long as wide, distinctly enlarging in middle where it becomes arcuately convex then narrowing to metoclypeal suture. Upper part of metope weakly (but distinctly) concave. Median keel distinct, running through metope and metoclypeal suture. Metoclypeal suture elongate, triangular, upper margins weakly arcuately curved, lateral keels present and distinct. In lateral view metope distinctly convex, whereas metoclypeal suture almost straight. Eye black, round, ocelli present (Figs 2a, 2b). Coryphe almost twice as wide as long, anterior margin convex and weakly angular, posterior margin distinctly arcuately concave (Fig. 2c).

Pronotum and mesonotum: Pronotum bluntly rounded, distinctly concave. Mesonotum weakly convex, with 3 parallel keels: anterior part of median keel joined to two slanting lines converging almost at right angle and thus forming an arrow-shaped structure. Both edges of arrow joined to two lateral keels.

Fore wings: Clavus elongate, as long as 2/3 of the whole wing length. Two longitudinal veins on clavus converge at 1/3 of their length. Two transverse veins present on clavus. Radius bifurcate (R 2) after cubitus (Cu 2). Costal membrane with nine transverse veins, costal cell with three transverse veins. Stigma round and black, covering 1/3 of cell, partially entering apical fragment of the costal cell. 4 short parallel veinlets arise from stigma, three brown cells located among those veinlets. Nineteen apical cells present at apex of fore wing (Fig. 2d). Hind wings well developed, as long as 4/5 of the wings' length.

Legs: Tibia triangular in lateral view with concave ventral side. Lateral margin with four lateral spines present, three of which are distinct and 1 weakly visible. Lateral margin cross-striated and covered with small, barely visible bristles.

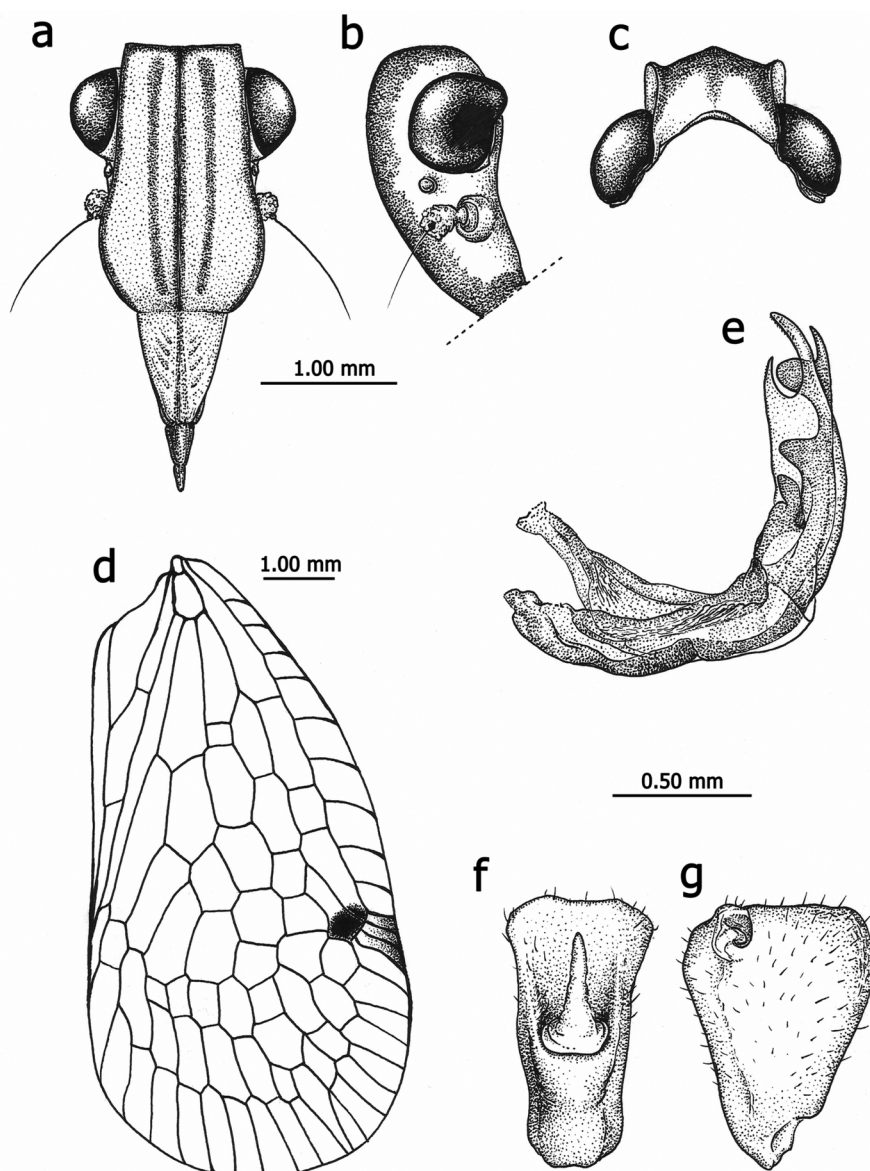
Coloration. General coloration yellowish-brown, metope with keels distinctly red, between lateral and median keels brown stripes passing along the metope. Larval margins of tergites of abdomen brown. Wings hialine with brown veins. Femur and tibia coloration uniform–yellowish-brown, spines brown, darker than tibia.

Male genitalia: Pygofer with hind margin convex. Anal tube elongate, enlarged apically in dorsal view. Anal column long, about 0.4x as long as anal tube (Fig. 2f). Style almost triangular with caudo-dorsal angle obtuse. Apical tooth of style folded, bearing subapical tooth on its inner side (Fig. 2g). Aedeagus falcate in lateral view. Ventral phallobase reaching almost half length of aedeagus. Each dorso-lateral lobe with two processes: apical one, slightly curved, narrow, twice longer than subapical, hornshaped. Hind margin with a few weakly visible denticles. Aedeagus with two distinct semicircular bulges placed ventrally. Dorsal surface of phallobase with blunt process with weak concavity placed distally (Fig. 2e).

**Remarks.** *Exphora constanti* sp. n. is similar to other species externally, but can be distinguished from related by distinct brown stripes on metope, shape of pygofer, anal tube, style and aedeagus (see the key above).

**Material examined.** Holotype ♂ / *Exphora constanti* sp. n. / Junkiert & Walczak det. 2014 [red label]; Coll.R.I.Sc.N.B. / Madagascar / Maroantsetra / III–1949 [hand written]; H.Synave det. 1965 / *Exphora* n. sp. [hand written]

**Etymology.** The name of species is dedicated to Dr. Jérôme Constant the Fulgoromorphan specialist from Royal Belgian Institute of Natural Sciences, Brussels, Belgium.



**FIGURE 2.** *Exphora constanti* sp. n. a. head, frontal view; b. head, lateral view; c. head, dorsal view; d. fore wing; e. penis, lateral view; f. anal tube, dorsal view; g. style, lateral view .

***Exphora ambatolaonaensis* Junkiert & Walczak, sp. n.**

(Figs 4 e, 4f)

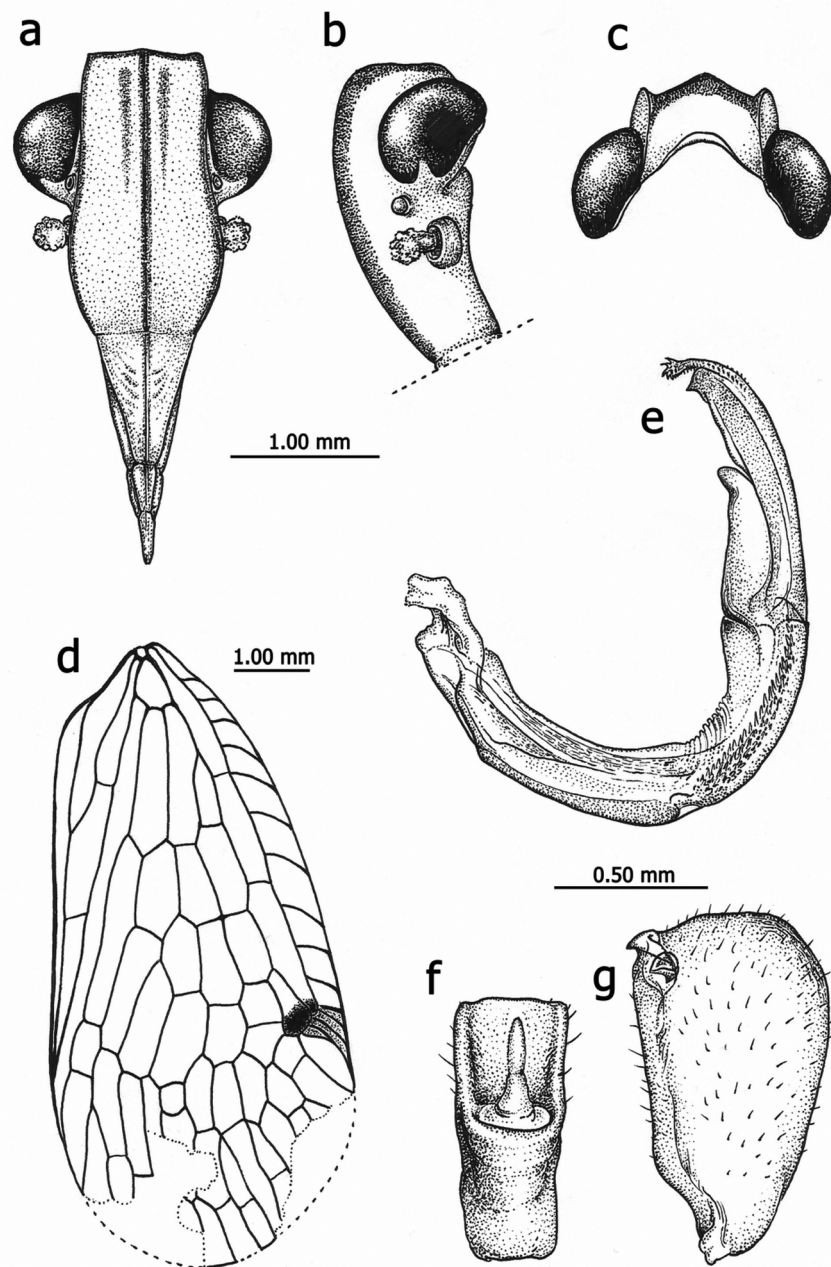
**Description.** Head: Metope twice as long as wide, distinctly enlarging in middle where it becomes angularly convex then narrowing to metoclypeal suture. Dorsal margin of metope almost straight. Median keel distinct, running through metope and metoclypeal suture. Metoclypeal suture elongate, triangular. Lateral keels present and distinct. In lateral view metope distinctly convex, whereas metoclypeal suture almost straight. Eye black, round, ocelli present (Figs. 3a, 3b). Coryphe almost one and a half as wide as long, anterior margin convex and strongly angular, posterior margin distinctly arcuately concave (Fig. 3c).

Pronotum and mesonotum: Pronotum bluntly rounded, distinctly concave, posterior margin black. Mesonotum weakly convex, with 3 parallel keels: anterior part of median keel joined to two slanting lines converging almost at right angle and thus forming an arrow-shaped structure. Both edges of arrow joined to two lateral keels. Between keels brown stripes present.

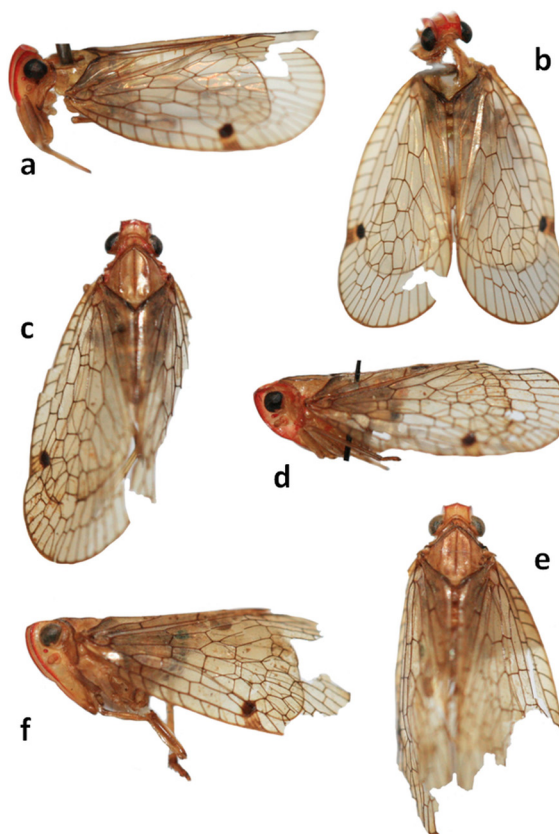
Fore wings: Clavus elongate, as long as 2/3 of the whole wing length. Two longitudinal veins on clavus converge at 1/3 of their length. Two transverse veins present on the clavus. Radius (R 2) bifurcate below cubitus (Cu 2). Costal membrane with 8 transverse veins, costal cell with 2 transverse veins. Stigma angular and black, covering 1/3 of cell, partially entering the apical fragment of costal cell. Five short parallel veinlets arise from stigma, four brown cells located among those veinlets (Fig. 3d). Hind wings well developed, as long as 4/5 of the fore wings' length.

Legs. Tibia triangular in lateral view with concave ventral side. Lateral margin with four lateral spines present. Lateral margin cross-striated and covered with small, barely visible bristles.

Coloration. General coloration yellowish-brown, metope with keels red, between lateral and median keels two delicate brown stripes, placed on the upper part of metope. Larteral margins of tergites of abdomen brown. Wings hyaline with brown veins. Legs brown, generally darker than body.



**FIGURE 3.** *Exphora ambatolaonaensis* sp. n. a. head, frontal view; b. head, lateral view; c. head, dorsal view; d. fore wing; e. penis, lateral view; f. anal tube, dorsal view; g. style, lateral view.



**FIGURE 4.** Habitus of holotype males specimens, *E. stroinskii* sp. n. a. lateral view; b. dorsal view; *E. constanti* sp. n. c. dorsal view; d. lateral view; *E. ambatolaonaensis* sp. n. e. dorsal view; f. lateral view.

Male genitalia: Pygofer with hind margin convex. Anal tube elongate, straight in all its length in dorsal view. Anal column long, about 0.4x as long as anal tube (Fig. 3f). Style elongated, almost oval. Apical tooth of style weakly folded, bearing subapical tooth on inner side (Fig. 3g). Aedeagus narrow, falcate in lateral view. Ventral phallobase reaching more than half length of aedeagus. Each dorso-lateral lobe armored with comb of abundant denticles. Aedeagus with slightly curved, narrow apical processes bearing small denticles apically. Subapical process with small single denticle, directed dorsally. Dorsal surface of the phallobase with elongated blunt process with delicate distal concavity (Fig. 3e).

**Remarks.** *Exphora ambatolaonaensis* sp. n. is similar to other species externally, but can be distinguished from related by shape of pygofer, long anal tube, style and aedeagus (see the key above).

**Material examined.** Holotype ♂ / *Exphora ambatolaonaensis* sp. n. / Junkiert & Walczak det. 2014 [red label]; Coll. R.I.Sc.N.B. / Madagascar Ambatolaona [hand written] / H.Synave det. 195 [lack of date] / *Exphora* n. sp. [hand written]

**Etymology.** The name of species is connected with place where the specimen was collected, Ambatolaona (Lamberton), Madagascar.

## Discussion

No data on ecology of the genus *Exphora* is available. The material is represented only by single specimens and as a result the distribution and geographical range of mentioned species are poorly known. Moreover, most species are represented only by male specimens. Two species: *E. fumivenosa* and *E. longipennata* are known only from females. External morphological data are insufficient, due to the high similarity between the species. On the basis of morphological characters of representatives belonging to this genus an analysis of wings shows that the number of costal cells may vary between species (8–12) and the number of cells can be different even within the single



specimen ( $\pm 2-3$  cells). The number of apical cells is constant and only exceptionally the difference is 1 cell. According to this character there are two groups of species: those with 14–15 apical cells (*E. fumivenosa*, *E. succinae*) and the second group with 18–19 apical cells (remain species). Among the material the specimen of *Exphora ambatolaonaensis* **sp. n.** was damaged and as a result the number of apical cells is not known, but the detailed study of wing morphology indicates the species belongs to the second group with 18–19 apical cells. According to the colouration of body which is rather uniform (yellowish-brown), *E. succinae* is greenish, and the characteristic black spots on the head are present in *E. fumivenosa*. Considering the morphological characters useful in species determination the most certain are male genitalia. Further detailed study concerning description morphology, distribution and biology of all known species of this genus should be provided.

## Acknowledgments

We thank Jérôme Constant (RBINS), Eliane De Coninck (RMCA), Daniel Burckhardt and Isabelle Zürcher (NHMB) for the opportunity to examine the material, their support and hospitality during visits in collections. We also would like to thank Karina Wieczorek and Mariusz Kanturki from University of Silesia, Department of Zoology, Katowice, Poland for their help and support.

## References

- Gnezdilov, V.M. (2006) On the systematic position of the Bladinini Kirkaldy, Tonginae Kirkaldy, and Trienopinae Fennah (Homoptera, Fulgoroidea). *Zoosystematica Rossica*, 15, 293–297.
- Jacobi, A. (1917) Siopa. In: *Voeltzkow Reise in Ostafrika i. d. Jahren 1903–1905. Vol. III*. E. Scheweizerbart'sche Verlagsbuchhandlung, Stuttgart, pp. 535.
- Lallemand, V. (1950) Title unknown. *Mémoires de l'Institut des Sciences de Madagascar, Series A*, 4, 87–92.
- Signoret, V. (1860) Faune des hémiptères de Madagascar. 1ère partie. Homoptères. *Annales de la Société Entomologique de France, Series 3*, 8, 177–206. [Paris]
- Synave, H. (1966) Homoptères de Madagascar. *Verhandlungen der Naturforschenden Gesellschaft in Basel*, 77, 55–75.