

## A NEW SPECIES OF THE GENUS *EXPHORA* SIGNORET, 1860 FROM MADAGASCAR (HEMIPTERA: AUCHENORRHYNCHA: FULGOROMORPHA: TROPIDUCHIDAE)

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*Abstract*—A new species of the genus *Exphora* Signoret, 1860 (Tropiduchidae, Elicinae, Elicini) is described from Madagascar: *Exphora linnavuorii* sp. n. An identification key to all *Exphora* species is provided.

*Key words*: new species, planthopper, taxonomy.

### INTRODUCTION

The genus *Exphora* was established by Signoret (1860) with its type species *E. guerini* Signoret, 1860, originally into the family Nogodinidae. It was recently transferred into the Tropiduchidae Gaetuliini (Gnezdilov, 2007), which was since synonymized with the tribe Elicini (subfamily Elicinae) (Gnezdilov, 2013). The genus currently includes 11 species (Bourgoin 2015) with the following described *Exphora linnavuorii* sp. n. and three other species recently described - *E. constanti* Junkiert & Walczak 2015, *E. stroinskii* Junkiert & Walczak 2015 and *E. ambatolaonaensis* Junkiert & Walczak 2015 (Junkiery and Walczak, 2015).

*Exphora* species are characterized by rather small (about one-centimeter long) bodies and ochre-brown to ochre-green body coloration (Synave, 1966). Almost nothing is known about their biology. The genus is endemic to Madagascar.

Examination of unidentified tropiduchid specimens in the collection of the Museum National d'Histoire Naturelle Paris, France (MNHN) revealed an undescribed species belonging to the genus *Exphora*, represented by one male and one female specimen. The authors are very pleased to name this new species in honor of Rauno Linnavuori.

### MATERIAL AND METHODS

External structures were examined using a stereoscopic microscope Olympus SZX9. The genitalia were dissected after boiling the abdomen for 3 times for about 10 minutes in a 10% solution of potassium hydroxide (KOH). The pygofer and

styles were then separated from the abdomen and the aedeagus was extracted using thin forceps and a needle blade. All segments were then placed in glycerin. The same procedure was used to examine the female genitalia. The genitalia were examined using a light microscope Nikon Eclipse. Illustrations were made with a camera lucida. Photographs were taken using a Canon Eos camera with extension rings. Terminology for the wing venation follows Bourgoin *et al.*, (2014), male genitalia Bourgoin (1987) and female genitalia Bourgoin (1993).

### Abbreviations used:

ML/MW- ratio: length of metope/ width of metope

CL/CW – ratio: length of coryphe/ width of coryphe

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.

Type specimens are deposited in MNHN.

### IDENTIFICATION KEY

The full key to *Exphora* species is given in Junkiert & Walczak, 2015.

1. Aedeagal processes with abundant small denticles. . . . .  
.. *E. ambatolaonaensis* Junkiert & Walczak, 2015
- Aedeagal processes without small denticles . . . . .  
.. *E. linnavuorii* sp. n.

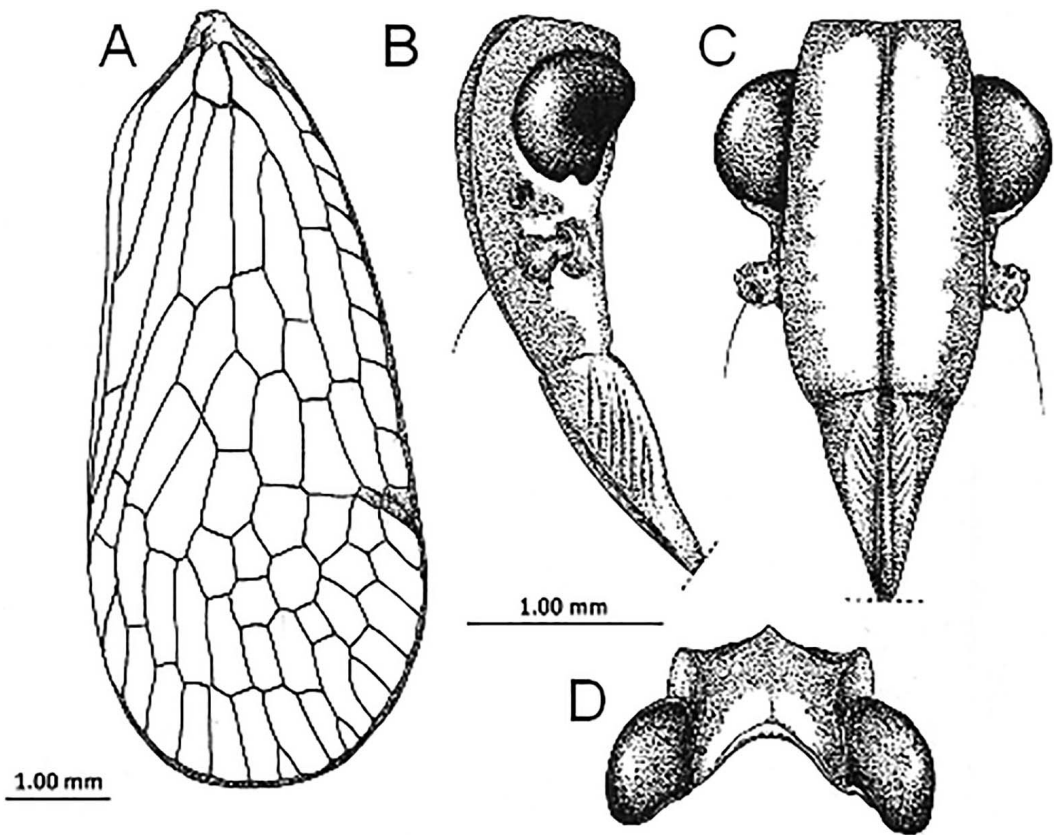


Fig. 1. *Exphora linnavuorii*, sp. n. A. fore wing, B. head lateral view, C. head frontal view, D. head dorsal view.

TAXONOMIC DESCRIPTION:

**TROPIDUCHIDAE STÅL, 1866**  
**ELICINAE MELICHAR, 1915,**  
**ELICINI MELICHAR, 1915**  
**EXPHORA SIGNORET, 1860**  
*Exphora linnavuorii*, new species

Figs. 1-4

**DESCRIPTION:** **Head** metope 2 x as long as wide, slightly widening in the lower part and then slightly narrowing right before the linkage with metoclypeal suture. Dorsal margin of metope slightly concave. Median keel distinct, running through metope and metoclypeal suture. Metoclypeal suture elongate, triangular. Lateral keels present and distinct, slightly arched-bent at the front (Fig. 1C). In lateral view, metope slightly arcuately convex at the whole length. Metoclypeal suture also slightly arcuately convex (Fig. 1B). *Eye* greyish-black, slightly round, ocelli present. Cory-

phe averagely as long as wide with distinctly concave surface and visibly ascended edges. Anterior margin convex and weakly angular, posterior margin distinctly arcuately concave (Fig. 1D). **Thorax:** *Pronotum* distinctly concave, arrow shaped, with front edge slightly sharp and the hind edge angular and concave. *Mesonotum* clearly flat, 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, of hyperpterism type (Fig. 1A). Costal area well developed with 10 cells between CA and Pc+CP; SCP+R short, separating; RA two-branched; RP with 3 terminals; MP separating before nodal line; M1+2 separating after nodal line, 5 terminals; M3+4 separating, before nodal line; M4 single, M3 with 3 terminals; 4 transverse m-cu; CuA

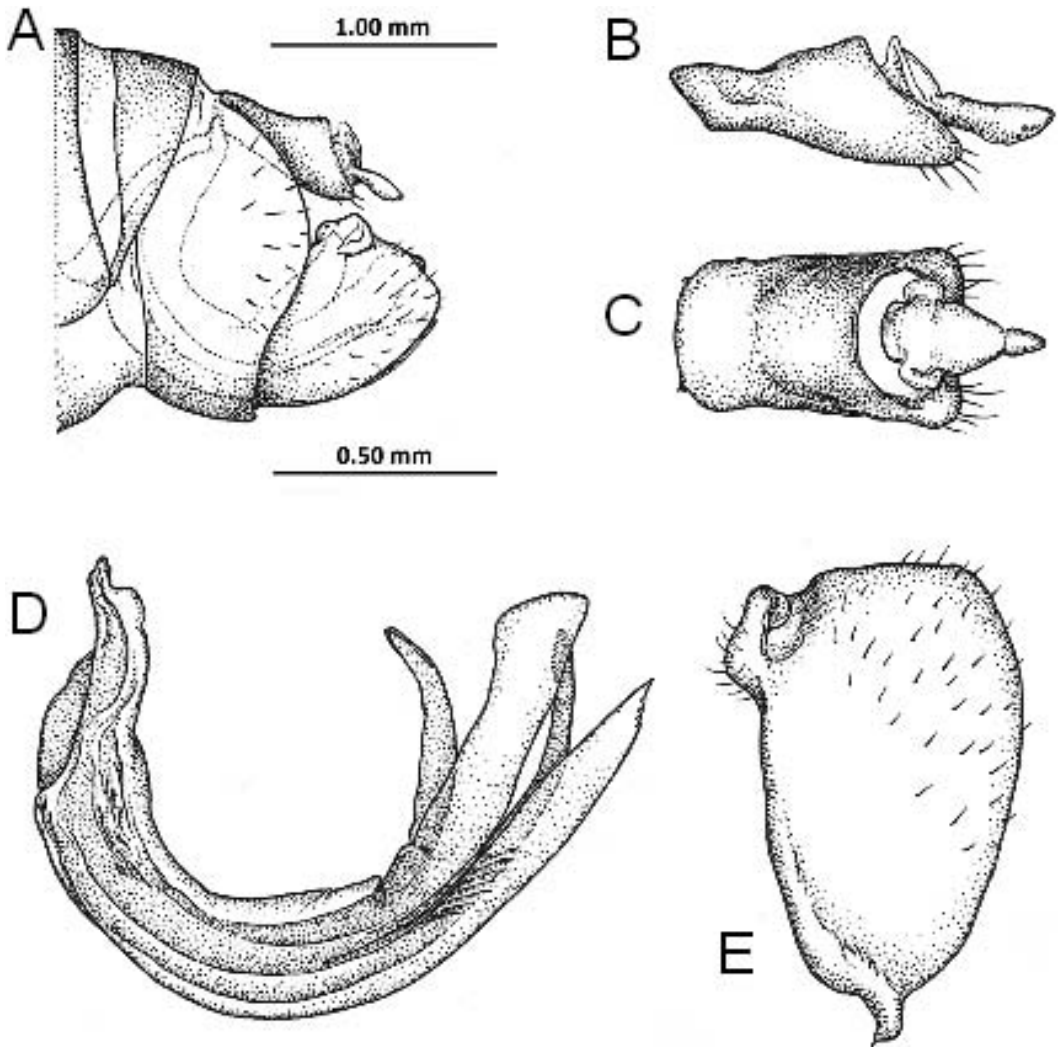
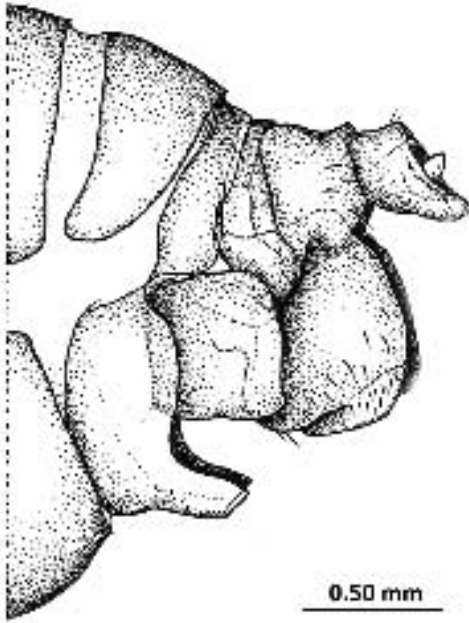


Fig. 2. *Exphora linnavuorii*, sp. n. male genitalia **A**, external male genitalia, **B**, anal tube lateral view, **C**, anal tube dorsal view, **D**, aedeagus lateral view, **E**, gonostyle lateral view.

forking before nodal line and before MP; CuA1 with 2 terminals; one distal transverse vein connecting CuP and PCu+A1; A1 running parallel to posterior margin of clavus; C1 based well before C5, C2, C3 and C4 of equal length, C2 and C4 in contact sharing MP margin, C3 twice shorter than C1 or C5. Sixteen ( $\delta$ ) or seventeen ( $\text{♀}$ ) apical cells. Stigma longitudinal and yellow-light brown, barely visible. Hind wings well developed, as long as  $5/6$  of fore wings' length. Eleven apical cells. *Legs* triangular, margins covered with small bristles; tibiae I-II slightly longer than femur, tibiae III triangular, much

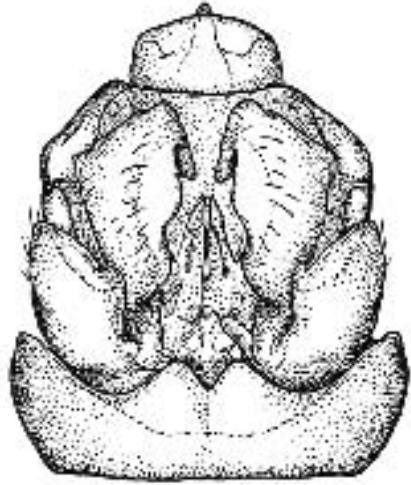
longer than femur, lateral margin with four spines, three of which distinct and one weakly visible. Lateral margin cross-striated and covered with small, barely visible bristles. Metatibiotarsal formula: 3(4)/2/2. **COLORATION**: general body ocher-light brown, metope with keels distinctly red (female: blood-red). *Wings* hyaline, with light-brown veins. Veins passing through stigma visibly lighter in colour. *Legs* the same colour as the rest of the body, in the male, anterior and median legs with darker colour shade. In male, dorsal part of body darker – with hardly visible spots. In female, body ocher-light-brown.

A

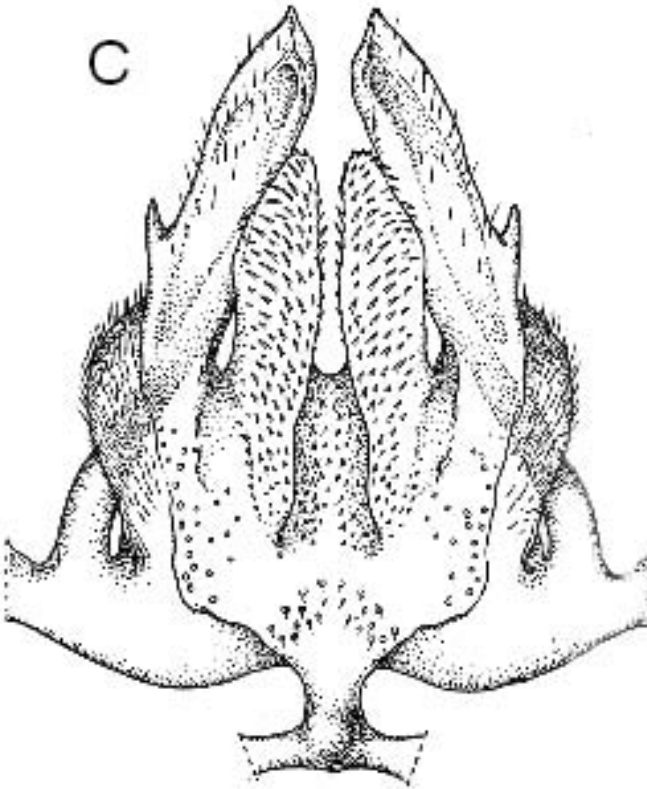


0.50 mm

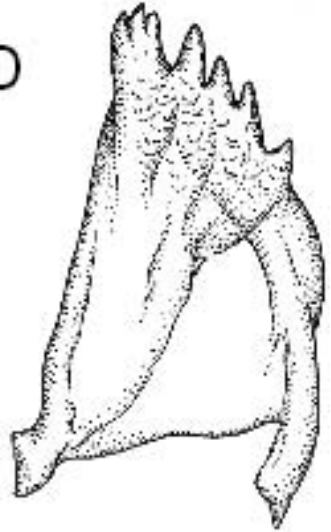
B



C



D



0.20 mm

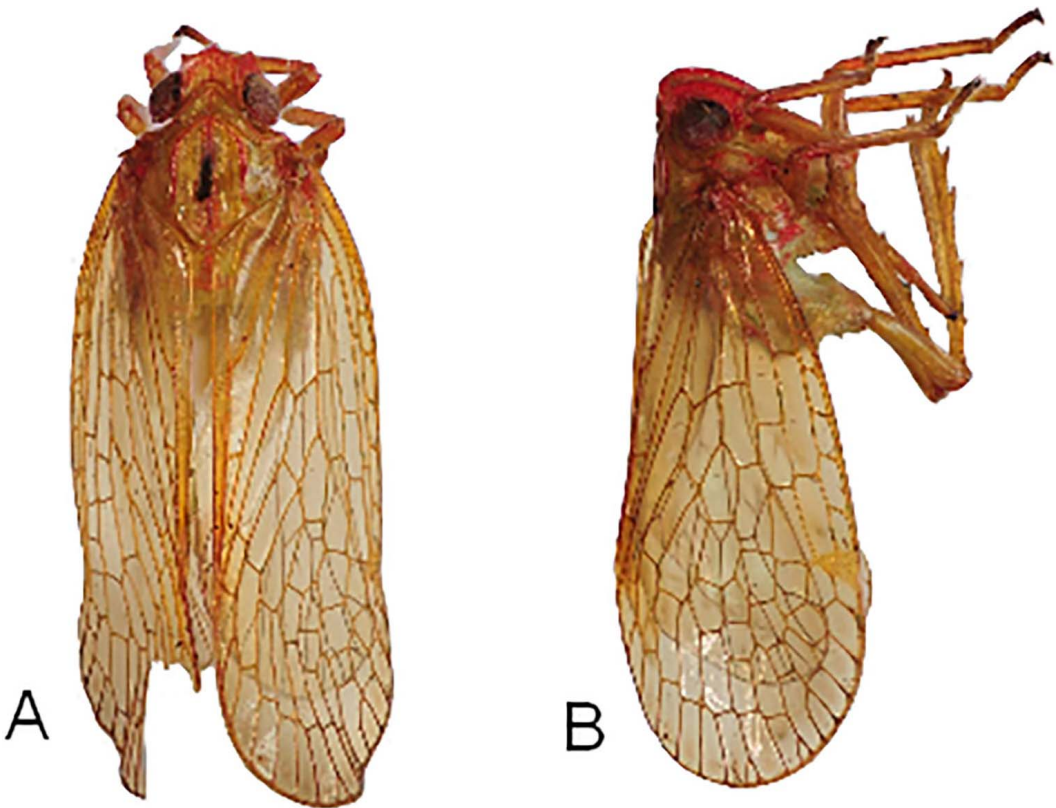


Fig. 4. *Exphora linnavuorii*, sp. n. habitus of holotype male specimen. **A**, dorsal view, **B**, lateral view.

**GENETALIA: Male** (Fig. 2A–E): pygofer with hind margin strongly convex. Anal tube elongate, weakly narrowed basally and enlarged apically in dorsal view (Fig. 2B, C). Gonostyle oval with caudo-dorsal angle obtuse; capitulum wide and folded, bearing subapical tooth on inner side (Fig. 2E). Aedeagus s.l. narrow, falcate in lateral view. Ventral phallobase reaching half length of aedeagus. Each dorso-lateral phallobase lobe with one long, narrow, sharp-ended apical process. Ventral process – Aedeagus s.s. elongated arched-bent. Apical part of aedeagal process semicircular, enlarged apically (Fig. 2D). Female genitalia (Fig. 3A–D): genitalia with anal tube relatively short, broadly rounded in dorsal view. Gonapophyses VIII (first valvulae) almost triangular, strongly sclerotized and bearing four teeth on dorsal margin, and a triple relatively large tooth at

apex (Fig. 3D). Gonapophyses VIII not visible externally, covered by gonoplacs. Gonapophyses IX (second valvular) well developed, sclerotized with apical ends not confluent, bearing very small abundant spikes (Fig. 3C). Endogonocoxal process with one distinct tooth at lateral margin, well sclerotized, acute at apex. Gonoplac (third valvula) semicircular in lateral view with dorsal margin slightly convoluted innerly (Fig. 3A, B). Median part of sternite VII sinuous at ventral side with distinct incision in middle.

**MATERIAL EXAMINED:** HOLOTYPE: 1 specimen, Holotype ♂ // *Exphora linnavuorii* sp. n. // Junkiert & Walczak det. 2015 [red label]; ANDRINGITRA Sud // Andrianony, cirque // Manjarivolo, 1650m // 26 – X / 3 – XI – 1970; F D H M 1; MUSEUM PARIS // Madagascar Centre // mission C. N. R. S. // R. C. P. n° 225; Museum Paris //

Fig. 3. *Exphora linnavuorii*, sp. n. female genitalia **A**, external female genitalia lateral view, **B**, external female genitalia ventral view, **C**, gonapophyses IX, **D**, gonapophyses VIII (first valvulae).

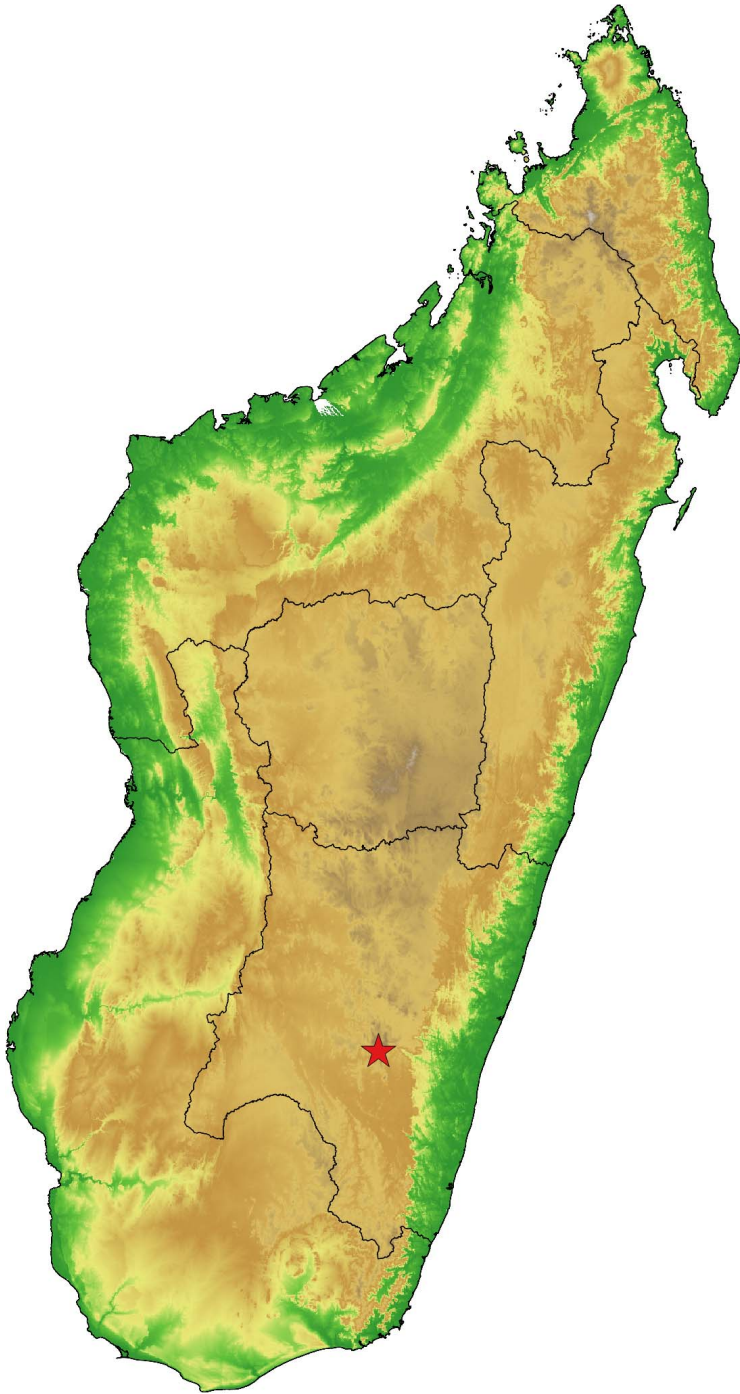


Fig. 5. Distribution of *E. linnavuorii*, sp. n. in Madagascar.

Table 1. Measurements of the type specimens (in mm) of *Exphora linnavuorii*, sp. n.

	Sex	
	Male	Female
length of body	9.25	9.70
length of metope	1.66	1.80
width of metope	0.98	1.04
ML/MW	1.69	1.73
length of coryphe	0.36	0.38
width of coryphe	0.62	0.66
CL/CW	0.58	0.58
length of fore wing	7.70	8.00
width of fore wing	3.6	3.70
length of mesonotum	1.64	1.70
width of mesonotum	1.86	1.96

MNHN (EH)// 6624; PARATYPE: 1 specimen, Paratype ♀ // *Exphora linnavuorii* sp. n. // Junkiert & Walczak det. 2015 [red label]; ANDRINGITRA Sud// Andrianony, cirque// Manjarivolo, 1800m// 26 – X / 3 – XI – 1970// F D H M 2// MUSEUM PARIS// Madagascar Centre// mission C. N. R. S.// R. C. P. n° 225; Museum Paris// MNHN (EH)// 6625

ETYMOLOGY: This new species is dedicated to Professor Rauno Linnavuori.

REMARKS: *Exphora linnavuorii* sp. n. is similar to other species in the genus externally, but can be distinguished from them by its light-coloured stigma on tegmina (stigma black in all other species) and the specific shape of aedeagus and its processes. Interestingly, with 16–17 apical cells, *E. linnavuorii* it is the first and only species of the genus standing between the two previously recognized group having respectively 14–15 and 18–19 apical cells. Figure 5 shows the distribution of the species in Madagascar.

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