

## A new genus representing a new tribe of the family Issidae (Hemiptera: Auchenorrhyncha: Fulgoroidea) from the forest canopy of French Guiana

### Новый род, представляющий собой новую трибу семейства Issidae (Hemiptera: Auchenorrhyncha: Fulgoroidea), с лесных древесных крон Французской Гвианы

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*Guianaphryna dendrophila* **gen. et sp. nov.** is described from the forest canopy of Northeastern French Guiana and represents a new tribe, *Guianaphrynini* **trib. nov.**, of the subfamily Thioniinae. This tribe is characterized by the peculiar structure of the forewings bearing pustules and lacking transverse veins, and of the 3-lobed hind wings with an intermediate poorly sclerotized area between the remigial and remigio-vannal lobes which is replacing the cubital cleft, as well as with a strong intermediate vein between *CuP* and *Pcu* at the middle of the wing and rudimentary furcation of the second anal vein.

*Guianaphryna dendrophila* **gen. et sp. nov.** описан с крон деревьев северо-восточной Французской Гвианы и представляет собой новую трибу – *Guianaphrynini* **trib. nov.** – подсемейства Thioniinae. Эта триба характеризуется специфическим строением передних крыльев, несущих пупырышки и лишенных заметных поперечных жилок, и 3-лопастных задних крыльев с промежуточной слабо склеротизованной областью между ремигиальной и ремигио-ваннальной лопастями, замещающей кубитальную выемку, а также с массивной поперечной жилкой между *CuP* и *Pcu* в средней части крыла и рудиментарным ветвлением второй анальной жилки.

**Key words:** planthoppers, systematics, morphology, Neotropics, canopy, Issidae, Thioniinae, new tribe, new genus, new species

**Ключевые слова:** фулгориодные цикадовые, систематика, морфология, Неотропика, кроны деревьев, Issidae, Thioniinae, новая триба, новый род, новый вид

## INTRODUCTION

Despite of a limited knowledge, many species of the family Issidae apparently inhabit the canopy of tropical forests. In the last 10 years, several genera and species were recorded and described from the forest canopies of the Neotropical and Oriental Regions (Gnezdilov et al., 2010; Gnezdilov, 2015; Gnezdilov & Bartlett, 2018; Meng et al., 2013, 2017). In the Western Palearctic region, issids usually occur on grasses,

bushes, and lower branches of trees (Gnezdilov et al., 2014); however, the overwintering larvae of *Issus coleoptratus* (Fabricius, 1781) were found in the United Kingdom in the forest canopy at the 8 m height (Badmin, 2010).

In this paper, one more species from the forest canopy of Northeastern French Guiana is described. This new species represents a new genus and a new tribe of the subfamily Thioniinae Melichar *sensu* Wang et al. (2016) based on the peculiar structure

of the head and forewings, as well as on the shape and venation of the hind wings. The issid fauna of French Guiana as well as the fauna of South America in general are still poorly known in comparison to that of the Old World (Gnezdilov, 2013). Currently, six species and five genera, including the new genus and species described below, are known from French Guiana: *Dracela annulipes* Signoret, 1861, *Guianaphryna dendrophila* **gen. et sp. nov.**, *Heremon cribratum* (Melichar, 1906), *Oronoqua deina* Fennah, 1947, *Thionia herbacea* (Spinola, 1839), and *Th. ovata* Melichar, 1906 (Spinola, 1839; Signoret, 1861; Melichar, 1906; Metcalf, 1958; Gnezdilov et al., 2010). A record of *Thionia coriacea* (Fabricius, 1803) from the country by Bergroth (1910) needs verification, as Fabricius (1803) reported only South America as the type locality for this species.

## MATERIAL AND METHODS

The morphological terminology follows Gnezdilov (2003) and Gnezdilov et al. (2014), but the wing venation terminology follows Gnezdilov & Bartlett (2018). *R*, *M*, *CuA*, *CuP*, *Pcu*, *A* are abbreviations for main veins (stocks); *R* corresponds to *ScP+R(+MA)*, *RA* and *RP* of Bourgoin et al. (2014); *M* corresponds to *MP* of these authors. Branches of main veins and cross-veins between them are indicated as follows: *CuA* 2 – cubitus anterior with two branches; *A*<sub>1</sub> – first anal vein; *A*<sub>1,2</sub> – second branch of first anal vein; *cup-pcu* – vein between *CuP* and *Pcu*; *icua* – intermediate (*i*) vein between branches of *CuA*; etc.

The drawings were made using a Leica MZ95 light microscope with a camera lucida attachment. The photos were taken using a Leica MZ8 microscope with an attached Nikon video camera SMZ 1500. The images were produced using the software packages ACT-2U Combine Z5 and Adobe Photoshop.

The holotype of the new species is deposited in the Muséum national d'Histoire naturelle, Paris, France.

## SYSTEMATICS

Family **Issidae** Spinola, 1839

Subfamily **Thioniinae** Melichar, 1906

Tribe **Guianaphrynini trib. nov.**

Type genus *Guianaphryna* gen. nov. (gender feminine).

**Diagnosis.** Metope protruding (in lateral view), without carinae but with many pustules (Figs 1–5). Forewings without visible intermediate veins but with many pustules between longitudinal veins (Figs 1, 2, 7). Hind wings well developed, 3-lobed, with remigial and remigio-vannal lobes almost equal in width and with anal lobe narrower; cubital cleft replaced by poorly sclerotized area and looking like a narrow intermediate lobe separating remigial and remigio-vannal lobes; *CuA* and *CuP* are fused twice (medially and apically); strong intermediate vein between *CuP* and *Pcu* (*cup-pcu*) situated near wing middle; second anal vein with rudimentary second branch (*A*<sub>2,2</sub>) (Figs 9, 10).

**Included genera.** Type genus only.

**Comparison.** The new tribe is well distinguishable from Thioniini by the following hind wings characters: presence of an intermediate area between the remigial and remigio-vannal lobes, which is replacing the cubital cleft; development of a strong intermediate vein between *CuP* and *Pcu* at the middle part of the wing; rudimentary furcation of the second anal vein (Figs 9, 10).

Genus ***Guianaphryna* gen. nov.**

Type species *Guianaphryna dendrophila* **sp. nov.**

**Diagnosis.** Metope wider than long medially (Fig. 4). Lower half of metope vertical and concave. Male subbrachypterous. Forewings without hypocostal plate. Forewing clavus half as long as entire wing, open, *Pcu+A*<sub>1</sub> runs nearly into apex of clavus (Figs 7, 8); *CuA* rudimentary, developed only in basal half of wing. Forewing vein sequence: *R* 2, *M* 2, *CuA* 1. Hind wing vein sequence: *R* 1 (*R*<sub>1,1</sub> reduced), *M* 1, *CuA*



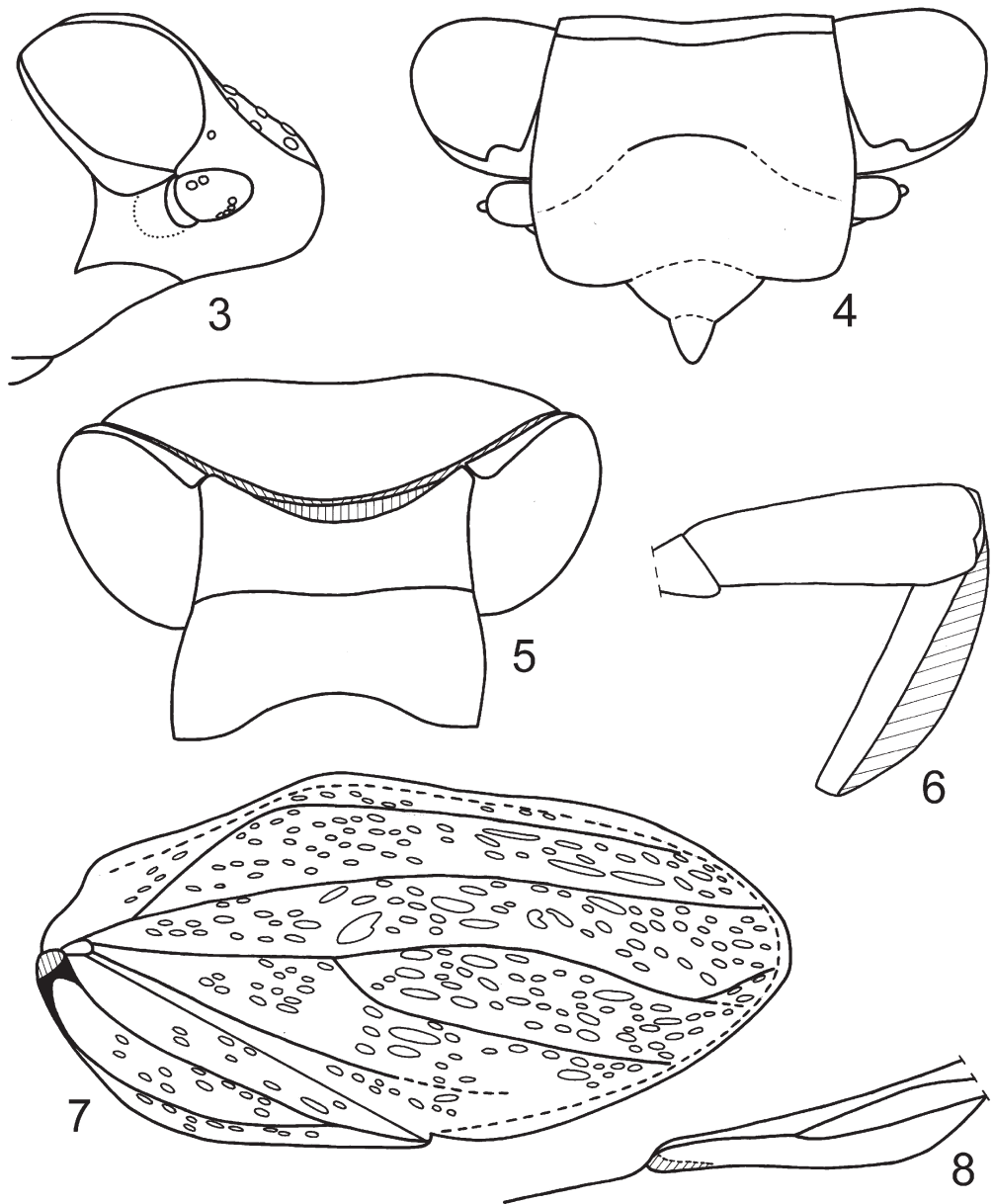
**Figs 1–2.** *Guianaphryna dendrophila* gen. et sp. nov., holotype: 1, dorsal view; 2, lateral view.

2, *CuP* 1, *Pcu* 3 (furcated apically),  $A_1$  3 ( $A_{1,1}$  furcated apically),  $A_2$  1 ( $A_{2,2}$  reduced) (Figs 9, 10). *Pcu* and  $A_{1,1}$  very close but not fused medially.

**Description** (Figs 1–10). Metope wide, well visible from above (Fig. 1, 5). Coryphe and upper half of metope joined at obtuse angle (in lateral view) (Fig. 2, 3). Coryphe transverse, 3.5 times as wide as long medially, without carinae (Figs 1, 5). Anterior

margin of coryphe straight, posterior margin concave. Metopoclypeal suture convex. Clypeus without carinae. Postclypeus large, smooth. Rostrum nearly reaching hind coxae. Second and third segments of rostrum nearly equal in length. Third segment of rostrum slightly narrowing apically (conical). Ocelli vestigial. Pedicel elongatedly cylindrical. Pronotum slightly shorter than mesonotum, without carinae but with 3 transverse rows of pustules. Paradiscal fields of pronotum very narrow, invisible behind the eyes. Paranotal lobes of pronotum wide and short. Tegulae small. Mesonotum with smooth median carina. Forewings nearly oval, exceeding abdomen, narrowing apically, without hypocostal plate and transverse veins but with many

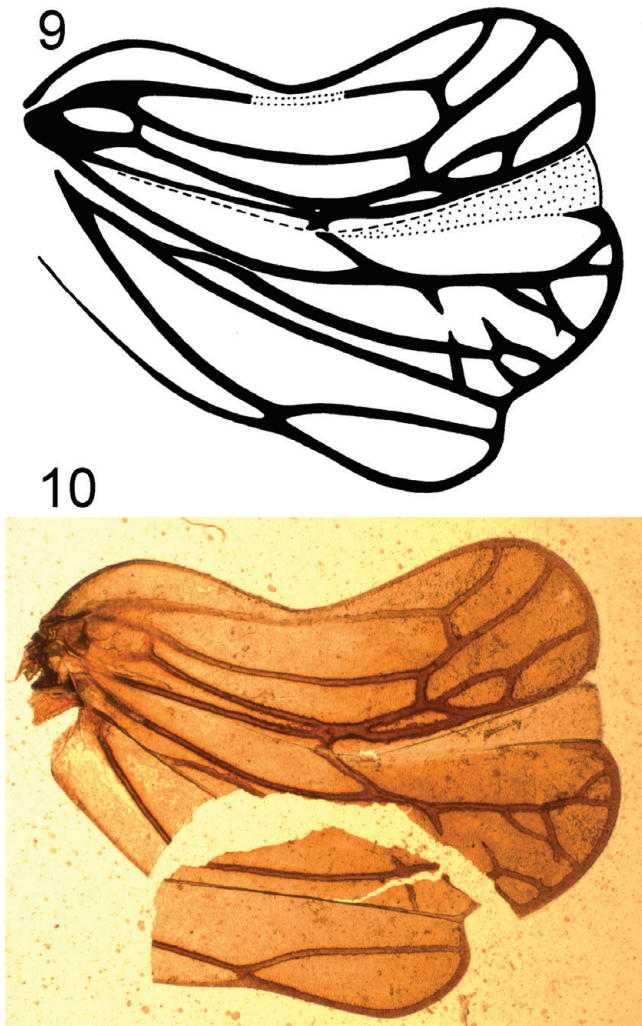
pustules between longitudinal veins (Fig. 7). Each forewing with single bulge on basal half of first radial vein (Fig. 1). Basal cell small. *R* furcated not far from basal cell; *M* furcated in basal third of wing. *CuA* distinct only in basal half of wing. *Pcu* and  $A_1$  fused in apical third of clavus. Apex of clavus distinct (Fig. 8). Hind wing with strongly concave costal margin, with remigial, remigio-vannal and anal lobes, but without visible



**Figs 3–8.** *Guianaphryna dendrophila* gen. et sp. nov., holotype: 3, head, lateral view; 4, same, frontal view; 5, same, dorsal view; 6, fore leg (tarsus missing); 7, fore wing; 8, apex of clavus.

coupling lobe. Poorly sclerotized (lighter in coloration compared to other parts of wing) intermediate area between remigial and remigio-vannal lobes replacing “typical” cubital cleft (Figs 9, 10); thus, formally, hind wing with two weak cubital clefts, anal cleft and slightly concave posterior

margin at point of rudimentary furcation of  $A_2$ . Remigial and remigio-vannal lobes almost equal in width, anal lobe narrower. Anal cleft deeper than cubital one. Basal cell large. Hind wing vein sequence:  $R$  1 ( $R_{1,1}$  reduced),  $r-m$  1,  $M$  1,  $m-cua$  1,  $CuA$  2,  $icua$  1,  $CuP$  1,  $cup-pcu$  1,  $Pcu$  3 (furcated apically),



**Figs 9–10.** *Guianaphryna dendrophila* gen. et sp. nov., holotype, hind wing.

$A_1$  3 ( $A_{1,1}$  furcated apically),  $ia_1$  1,  $A_2$  1 ( $A_{2,2}$  reduced).  $CuA$  and  $CuP$  fused medially and apically.  $Pcu$  very close to  $A_{1,1}$ , but both not fused medially. Fore femur and tibia leaf-shaped, flattened (Fig. 6). Hind tibia with two lateral spines in its apical half. First and second metatarsomeres nearly equal in length. First metatarsomere with two lateroapical and four (3 + 1) intermediate spines arranged in arc. Second metatarsomere with only two lateroapical spines.

*Included species.* Type species only.

*Comparison.* The new genus is well distinguishable from the other Neotropical genera by the characters of head as well as fore and hind wings mentioned above for the new tribe. Externally, the new genus resembles members of the Oriental tribe Parahira-ciini Cheng et Yang, 1991 by the protruding metope and by the forewings with pustules, however, the hind wing structure (including venation) and the structure of male genitalia are different.

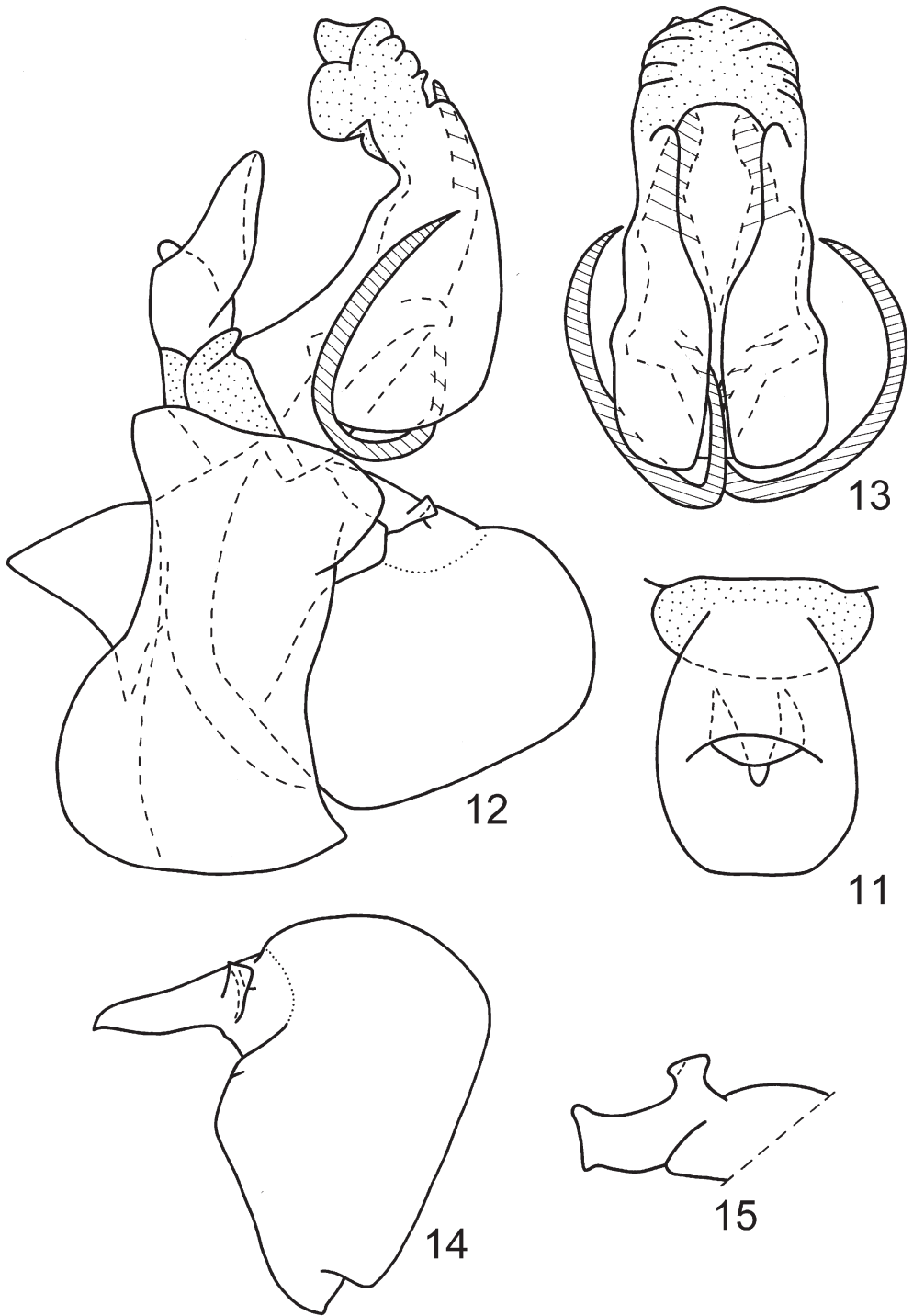
*Etymology.* The generic name is derived from the combination of Guiana and Greek “φρόνος” (toad) referring to the rounded shape of the body and to the head and forewings with pustules which are similar to the toad’s skin. The gender is feminine.

***Guianaphryna dendrophila* sp. nov.**

(Figs 1–15)

*Holotype.* Male, **French Guiana**, “23–VIII–1994 / P.E. Roubaud”, “Muséum Paris / 2001 / Coll. Générale”, “Guyane Fr. / piste de Kaw / PK 39 / Arbre 7 Canopée”, “MNHN(EH) 24000”.

*Description.* Colouration. Metope and coryphe brown to dark brown, with light yellow pustules (Figs 1, 2). Metope with dark brown median line and light yellow band above metopoclypeal suture. Lateral parts of head dark brown to black, with wide light yellow band below pedicel. Postclypeus, scape, and pedicel dark brown. Anteclypeus light yellow. Rostrum light yellow with dark brown apex. Pro-, mesonotum and forewings brown to dark brown, with light yellow pustules. Hind wings light brown with dark brown veins (Fig. 10). Epister-



**Figs 11–15.** *Guianaphryna dendrophila* gen. et sp. nov., holotype, male genitalia: 11, anal tube, dorsal view; 12, genital block, lateral view; 13, penis, ventral view; 14, style, lateral view; 15, capitulum of style, dorsal view.

nae and epimerae dark brown above and light yellow below. Fore and middle coxae, trochanters, and basal parts of femora light yellow. Main parts of fore and middle femora dark brown to black, with light yellow stripes and spots. Fore tibiae and tarsi dark brown with light yellow stripes and dots. Middle tibiae dark brown basally and with light yellow distal halves. Middle tarsi dark brown. Hind femora dark brown with light yellow basal parts. Hind tibiae light yellow with brown to dark brown basal parts. First and second metatarsomeres light yellow. Third metatarsomeres brown. Apices of leg spines black. Second abdominal sternite light yellow. Abdominal sternites III and IV dark brown with a pair of large yellow spots laterally. Abdominal tergites yellowish brown.

External structure of body as mentioned for this genus.

Male genitalia (Figs 11–15). Anal tube 1.4 times as long as wide, truncate apically (in dorsal view) (Fig. 11). Anal column (paraproct) small and short. Pygofer wide; hind margin concave, with process in its upper part (lateral view) (Fig. 12). Phallobase curved, wide basally and narrowing to apex (in lateral view). Apical part of phallobase poorly sclerotized, with many folds. Each dorsolateral phallobase lobe with expansion above ventral aedeagal hooks. Ventral phallobase lobe wide and long, broadly rounded apically (Fig. 13). Apical aedeagal processes narrow, slightly visible above upper phallobase margin. Aedeagus with pair of long, narrow and pointed ventral hooks strongly curved and directed to ventral side of phallobase (Figs 12, 13). Style massive, with wide and short neck (Fig. 14). Capitulum of style long (in lateral view), not narrowing apically, truncate (in dorsal view) (Fig. 15), with wide lateral tooth. Connective with wide cup (Fig. 12).

Total length 4.6 mm.

**Etymology.** The species name is derived from Greek “δένδρον” (tree) and “φίλος” (attracted), adjective referring to the habitat of this species.

## DISCUSSION

Apparently, we are just at the early stages of discovery of the Issidae fauna of the Neotropics, as well as accumulation of taxonomical knowledge about the subfamily Thioniinae.

*Guianaphryna dendrophila* **gen. et sp. nov.** is a specialized taxon, which could be distinguished by the flattened fore femur and tibia, as well as by the absence of the intermediate carinae on the metope. Some characters, like the absence of transverse veins on the forewings and the presence of the pustules between the longitudinal veins, are also known for representatives of Parahiraciini, e.g. for *Nisoprincessa palawana* Gnezdilov, 2017 (Gnezdilov, 2017). The poorly sclerotized and folded apical part of the phallobase of *G. dendrophila* **gen. et sp. nov.** is also known for species of *Oronoqua* Fennah, 1947, *Incasa* Gnezdilov et O’Brien, 2008 and *Waorania* Gnezdilov et Bartlett, 2018 and, apparently, this is an important character of many other unstudied Thioniinae.

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