# Redescription of *Pintalia variegata* (Fabricius, 1803) from Trinidad and Suriname

## (Fulgoromorpha: Delphacoidea: Cixiidae)

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**Summary:** The species *Pintalia variegata* (Fabricius, 1803) was previously only known from the short original description and a short redescription by Stål. Here the species is redescribed from material collected in Trinidad and Suriname in the 20th century. The species is morphologically distinct among *Pintalia* species based on headshape, spinulation of the hindlegs and male genitalia. Synapomorphies with *Pintalia consobrina* Stål, 1862 are presented and discussed. Our results highlight the importance of revisiting the taxa described historically using modern morphological patterns for a comprehensive reassessment of the generic boundaries in *Pintalia*.

**Keywords**: Caribbean, Guiana shield, new records, Pintaliini

## 1. Introduction

The genus *Pintalia* Stål, 1862 is among the most species rich Neotropical Fulgoromorpha genera. Currently, the genus consists of 95 species, distributed from southern North America to southern South America, including the Caribbean (Dmitriev et al. 2022). However, the monophyly of *Pintalia* is uncertain and it requires a comprehensive review. Recently, Santos et al. (2025) redescribed the original series placed in this genus by Stål (1862). This left only a few species in the genus currently insufficiently described for recognition, most notably *Pintalia discoidalis* Lethierry, 1890 and *Pintalia variegata* (Fabricius, 1803), for which no figures or sufficient description are available. *Pintalia variegata* was originally described from "*Americae Infulis*" (Fabricius 1803), "*Insulo Amer.*" on the label of the holotype; this can refer to any place in the Caribbean and no more specified records of the species have been published.

During the study of Auchenorrhyncha from the Dutch Antilles (De Haas & Den Bieman 2025), deposited in the collection of the Naturalis Biodiversity Center (RMNH), some material from nearby islands was studied. Among *Pintalia* species from Trinidad, several specimens were found which corresponded with photos of the type specimen of *Pintalia variegata*. An additional specimen of the species was found among *Pintalia* specimens from Suriname.

Here we take the opportunity to redescribe *Pintalia variegata* based on material from Trinidad and Suriname.

## 2. Material and Methods

**Studied specimens.** The type-specimen and an additional specimen of *Pintalia variegata* are deposited in the NHMD collection (Natural History Museum of Denmark, Copenhagen, Denmark) and have been studied from photos only. Additional material, used for the redescription of the species, is deposited in the RMNH collection (Naturalis Biodiversity Center, Leiden, Netherlands).

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Label data of studied specimens is quoted with "/" indicating a new line within a label and "//" indicating a new label. Square brackets "[...]" are used for comments.

**Morphological study.** Specimens were studied under a Leica MZ7.5 stereomicroscope. For male terminalia, the abdomen with the genital segment was removed after softening the specimen in a relaxing chamber for 3 hours. The abdomen was then heated in water at 80°C for 45 minutes, after which the pygofer was separated from the abdomen and photographed. The aedeagus, anal tube and gonostyli were subsequently disarticulated and photographed. Terminalia were photographed using a mirrorless camera (Sony A7 III) with a 20x microscope objective (Mitutoyo M Plan APO 20x) and 10x microscope objective (Mitutoyo M Plan APO 10x) mounted on a motorised vertical focus stacking setup (MJKZZ ultra rail set) controlled by MJKZZ Focus stacking Studio software and lit by four LED panels (Neewer ZC - 10S). Whole specimens were photographed in the same way using a macro lens Laowa 25 mm f/2.8 2.5 - 5x. After examination, specimens and genitalia were glued on a specimen card.

**Terminology.** Morphological terms in general follow Bartlett et al. (2014), nomenclature of male genitalia follows Bourgoin (1988) and Bourgoin & Huang (1990). Forewing venation follows Bourgoin et al. (2015).

## 3. Results

### *Pintalia variegata* (Fabricius, 1803) (Fig. 1-6)

**Material examined.**

**Types.** Holotype ♀: "Insulo Amer. / Schmidt / Mus. Seh. et. F.L. / Variegata F. // Type [red label] // [square green label] // NHMD918383" in coll. NHMD.

Additional material. "variegata // NHMD918369" 1♀ in coll. NHMD. Suriname: "SURINAME / NICKERIE / I.1951, D. Piet" 1♂ in coll. RMNH (ZMA.INS.1451700). Trinidad: "TRINIDAD / St. Augustin / 9-1956 / leg. R.H. Cobben" 1♀ in coll. RMNH; "TRINIDAD / Maracas baai / 29-9-1956 / leg. R.H. Cobben" 6♂ 1♀ in coll. RMNH; "TRINIDAD, W.I. / N. Range / MARACAS valley / 10-11.XII.1990 at light / Univ. of W. Indies" 2♂ in coll. RMNH (ZMA.INS.1451701 and ZMA.INS.1451702).

**Description.**

**Measurements**. Body length: ♂ 4.5-4.8 (average 4.6) mm (n=4); ♀ 5.0-5.2 mm (average 5.2) (n=4).

**Colouration.** General colouration (Figs. 1-3) of thorax brownish orange, head and pronotum lighter than mesonotum. All legs orange-brown, only apical spines of hind tibia and tarsi dark. Forewings (Fig. 2) greyish with an irregular pattern of brown spots; regular are the completely brown pterostigma, a brown band starting just anteriorly of pterostigma, a brown band over the base of the apical cells starting posteriorly of pterostigma and the brown apical margin of the forewings. Veins are concolourous with the greyish background of the forewings, cross-veins bordered brown, all veins with brown granulation, venation in apical cells just before reaching wing margin whitish yellow. Abdomen brown (Fig. 6).


**Fig. 1:** *Pintalia variegata*, A-E: holotype ♀. A: right lateral view. B: dorsal view. C: frontal view. D: ventral view. E: labels. F: non-type ♀, left lateral view. Photos: Sree Gayathree Selvantharan (NHMD).

**Structure.** Head (including eyes) almost as wide as pronotum (Fig. 3A). Vertex (Fig. 3A,C) trapezoidal, at base 1.6 times wider than at apex; apical carina elevated, straight, subapical carina weakly elevated, straight; basal compartment with posterior margin broadly concave, medially slightly incised at level of median carina, median carina in basal compartment complete; apical compartment subrectangular, without median carina. Frons (Fig. 3B-C) along median carina 1.3 times longer than wide at widest point, at widest point 2.5 times wider than at apex; apical margin of frons straight, median carina evanescent dorsally; lateral carinae thick, converging medially on the transition with vertex, forming a rounded apex of the frons (in dorso-frontal view, see Fig. 3C). Frontoclypeal suture (Fig. 3B) concavely rounded, distinctly inflected in the frons. Post- and anteclypeus (Fig. 3B) with complete median carina. Rostrum slightly surpassing hind coxae. Antennae with short scape, pedicel subglobose with inconspicuous sensory plaques, flagellum setaceous with subglobose base. Compound eyes rounded with small notch dorsad of antennae; lateral and frontal ocelli distinctive.

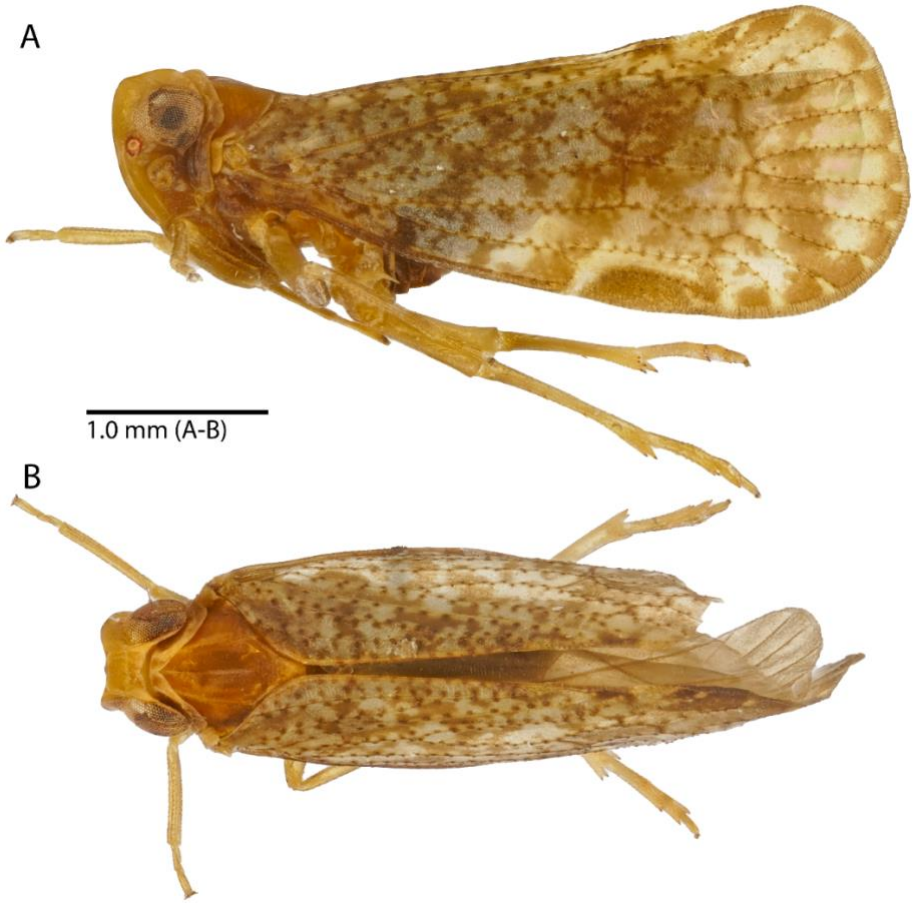


**Fig. 2:** *Pintalia variegata* ♂, Trinidad. A: left lateral view. B: dorsal view.

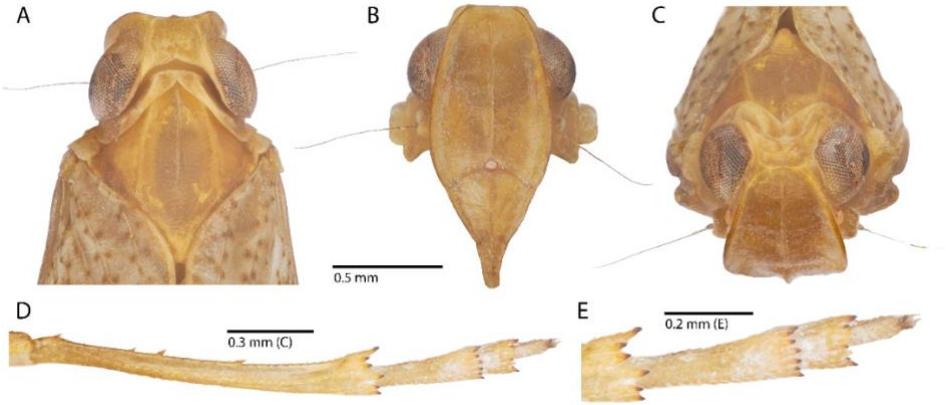


**Fig. 3:** *Pintalia variegata* ♂ head, Trinidad. A: dorsal view. B: frontal view. C: fronto-dorsal view. D: hindleg, ventral view. E: close-up of tarsomeres of hindleg.

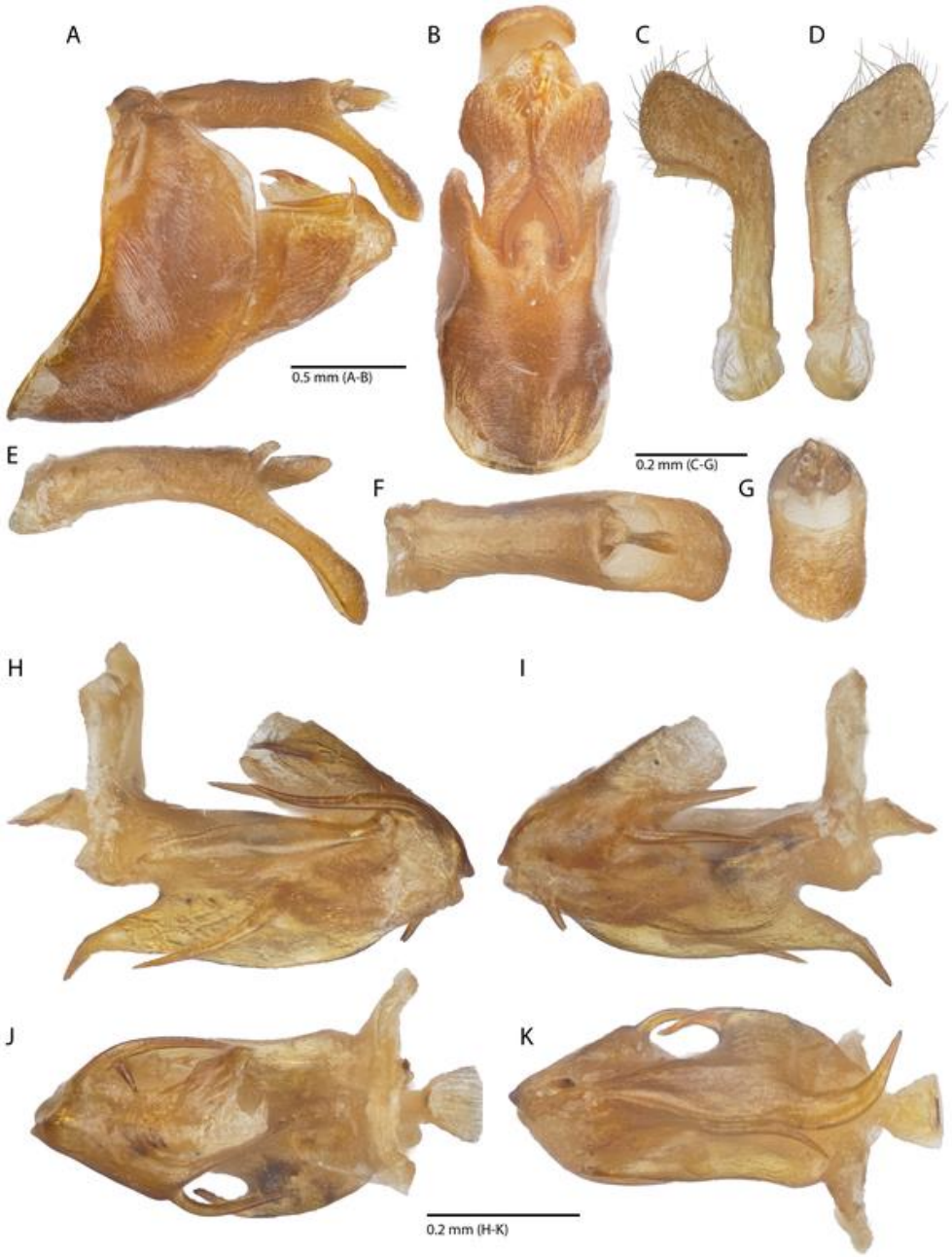


**Fig. 4:** *Pintalia variegata* ♂ terminalia, Trinidad. A: terminalia left lateral view. B: terminalia ventral view. C: left gonostylus outer view. D: left gonostylus inner view. E: anal segment left lateral view. F: anal segment dorsal view. G: anal segment caudal view. H: aedeagus left lateral view. I: aedeagus right lateral view. J: aedeagus dorsal view. K: aedeagus ventral view.

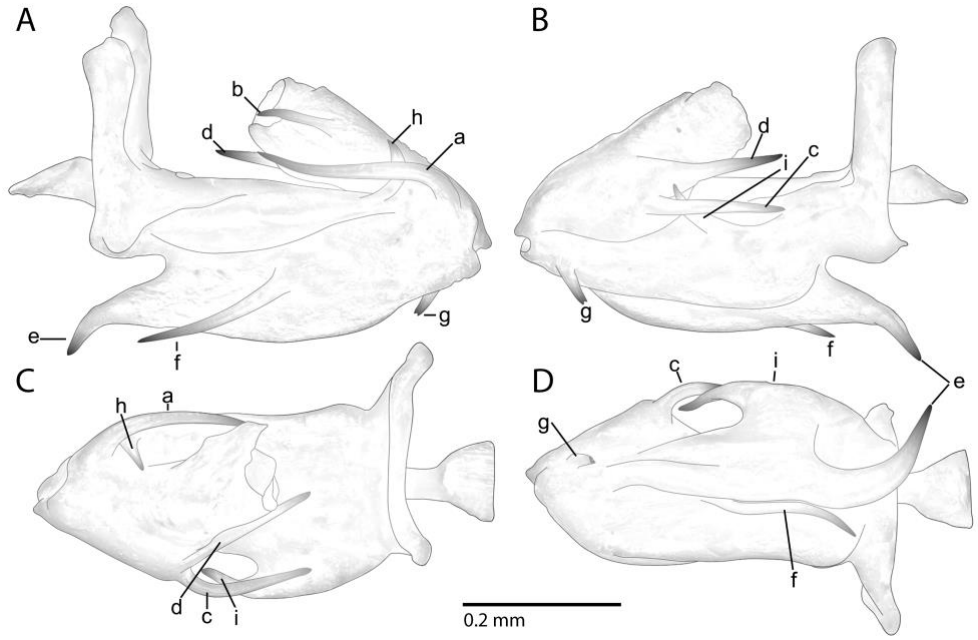


**Fig. 5:** *Pintalia variegata* ♂ aedeagus, Trinidad, line-drawings. A: left lateral view. B: right lateral view. C: dorsal view. D: ventral view.

Pronotum (Fig. 3A) in dorsal view narrow, anterior margin medially straight, posterior margin strongly angularly concave; tricarinate, median carina indistinctive, lateral carinae strongly arched around compound eyes, carina between compound eye and tegulae absent. Mesonotum (Fig. 3A) slightly longer than wide, 2.8 times longer than combined length of vertex and pronotum; tricarinate, lateral carinae from base to apex weakly diverging from median carina, median carina evanescent distally, not past the level of the lateral carinae. Hindtibiae (Fig. 3D-E) with three to four small lateral spines, apically with 6 spines (1:2:1:2); first tarsomere with 7 apical spines, with approximately the same size; second tarsomere with 2 larger lateral spines and 3 smaller intermediate spines which are distinctly separated from each other by platellae. Forewings (Fig. 2) held strongly parallel to body, widest near middle of apical cells; veins with paired granulation; costal margin with small concavity near the level of the apex of basal cell; branching pattern: RA 2-branched, RP 3-branched, MP 5-branched, CuA 2-branched; crossveins r-m1 and mcu1 in level of the first fork of MP; 12 apical and 7 subapical cells. Abdomen laterally compressed (Fig. 6).

*Male terminalia.* Pygofer (Fig. 4A-B) bilaterally symmetrical, in lateral view widest near base, posterolateral margin slightly convex, without processes, dorsally narrowing at level of anal tube; medioventral process large, sub-ovate. Gonostyli (Fig. 4C-D) in lateral view club-shaped, arm slender and straight, apex widened dorsally with anterodorsally a small bulge. Aedeagus (Fig. 4H-K, 5) with endosoma relatively short, about half the length of periandrium, in dorsal view near base expanded to the right, bearing four spines: in left lateral view with a spine at the base which is as long as the endosoma (a) and a short spine near the apex (b), in right lateral view with two more or less straight spines (c-d), directed anteriorly. Periandrium

large, dorsally widest, bearing five spines: ventrally with a plate-like expansion which ends anteriorly in a anteroventrally directed spine (e), on the left side of this plate another anteroventrally directed spine (f); near apex of periandrium ventrally with a short, apically bifurcated, spine (g), depth of bifurcation slightly variable between specimens; in left lateral view dorsally near base of endosoma with a short, curved, posterodorsally directed spine (h); in right lateral view dorso-medially with a posterodorsally directed spine (i). Anal tube (Fig. 4E-G) slender, extending distally, from level of epiproct curved posteroventrally, in caudal view with apex rounded.

*Female terminalia*. Segment X short (Fig. 6C), slightly wider than long, lateral margins straight, apically slightly converging; epiproct wide, subtriangular; paraproct narrow, subovate. Segment IX in caudal view (Fig. 6B) oval with broadly rounded margins, ventrally concave at insertion of ovipositor. Ovipositor (Fig. 6A-B,D) in lateral view directed posterodorsally, surpassing segment X in length, not in height. Gonoplac in lateral view apically pointed.

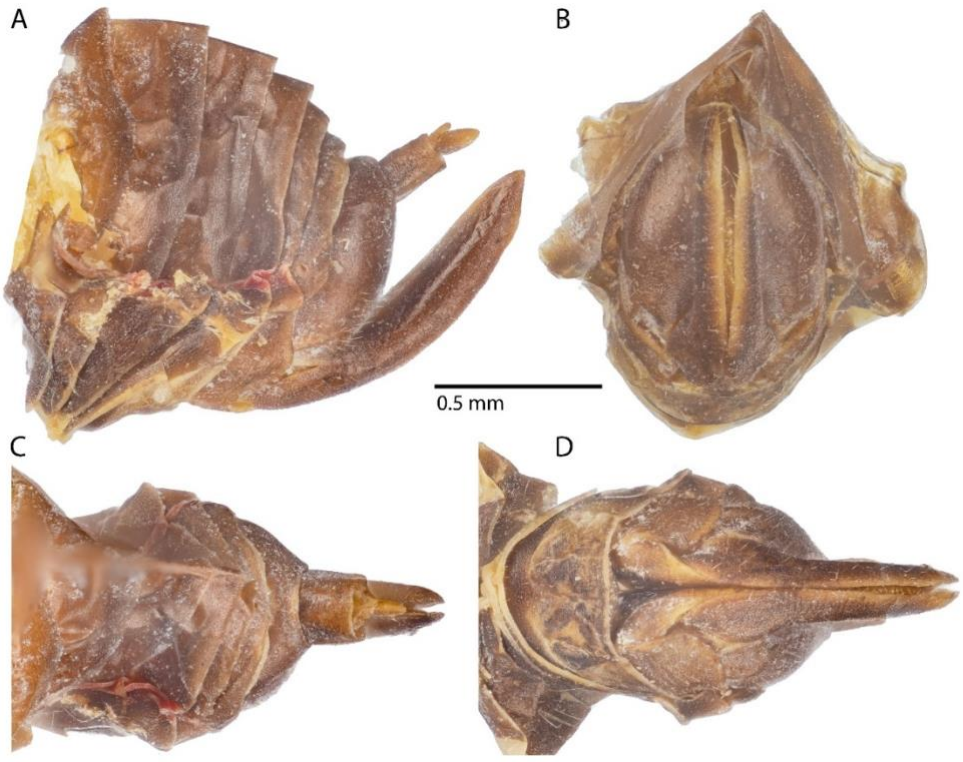


**Fig. 6:** *Pintalia variegata* ♀ terminalia, Trinidad. A: left lateral view. B: caudal view. C: dorsal view. D: ventral view.

**Diagnosis.** *Pintalia variegata* differs from most congeners in the headshape with the head (including eyes) almost as wide as pronotum, the vertex with straight apical carina, indistinctive subapical carina and median carina present in basal compartment. Hindlegs with second tarsomere with two larger lateral spines and three smaller intermediate spines which are separated from each other by distinctive platellae. Male genitalia are unique among *Pintalia* with gonostyli club-shaped with anterodorsal margin of apex with a small bulge. Male genitalia with spines present on endosoma and a large ventrally expanded plate on the periandrium, periandrium dorsally relatively wide. Female terminalia with segment X shorter than wide.

**Distribution.** "Americae Infulis" (Fabricius 1803), Suriname, Trinidad (this study).

**Biology.** The biology of *P. variegata* remains unknown.

**Remarks.** *Pintalia variegata* does not fit in one of the species groups proposed by Santos et al. (2025). However, the species bears resemblance to *Pintalia consobrina* Stål, 1862 which was redescribed by Santos et al. (2025), unfortunately no male specimens of this taxon are available for an in-depth comparison. Both species have a similar head structure with straight apical and subapical carinae of vertex, subapical carina indistinctive, median carina present in basal compartment; frons with thick lateral carinae. Both species exhibit tegmina with distinct bristle insertions in all veins and two transverse striped spots in the distal half, one before the pterostigma and the other after, both converging in the direction of the apex of the clavus. Additionally, both species have the hind tarsus with (three to) four lateral spines and the second tarsal segment with two larger lateral spines and three smaller intermediate spines, which are separated by distinctive platellae. Finally, both species have the female terminalia with segment X short and the ovipositor slightly longer, but not higher than segment X.

*Pintalia variegata* and *Pintalia consobrina* can be distinguished from each other most clearly based on the colouration; *Pintalia variegata* has the thorax orange-brown, while the thorax is brown in *Pintalia consobrina*; *Pintalia variegata* has the forewings with irregular brown spots, two incomplete brown bands and brown granulation along the veins, while *Pintalia consobrina* has the forewings with a distinctive pattern, a semicircular brown band and light granulation along the veins.

## 4. Discussion

With the new records of *Pintalia variegata*, all species in the genus can now be attributed to a specific geographical area. After this redescription, only *Pintalia discoidalis* Lethierry, 1890 remains insufficiently described for recognition, and the holotype verification is required. However, some species have been described using primarily head and thorax coloration, with highly simplified descriptions of the male terminalia (e.g., *P. obtorta* Muir, 1934; *P. punctata* Caldwell, 1944), sometimes without aedeagus spinulation (e.g. *P. fusca* Metcalf, 1938), or solely based on female specimens (e.g. *P. fasciatipennis* Stål, 1862 and *P. ustulata* Stål, 1862). In these cases, both the creation of groups and a more precise allocation within Pintaliini are problematic. Therefore, many species currently in *Pintalia* still need further supplementary description, or from association with male specimens, for better classification.

Whether *Pintalia variegata* and *Pintalia consobrina* are indeed closely related taxa (see remarks) should be further assessed when males of the latter become available. Also belonging to this group are a single female '*Pintalia nr. consobrina*' (see Santos et al. 2025) and

an undescribed taxon from Guyana in the collection of the first author. Both species differ strongly from the type species, *P. lateralis* Stål, 1862 (female) in cephalic configuration, pattern of veins, including setal bases configuration, and spots of the tegmina. These synapomorphies between *P. variegata* and *P. consobrina* and the disparity from *P. lateralis* also highlight the potential non-monophyly of *Pintalia*, making a comprehensive review with morphological and molecular data highly recommended.

The record of *Pintalia variegata* from Suriname concerns the first published record of a cixiid species from this country. The absence of additional records does not reflect scarcity of species, but rather the lack of faunistic work on Fulgoromorpha in the country. The RMNH collection holds numerous additional Cixiidae species from Suriname (pers. obs. by the first author), which will hopefully be worked on in the near future.

## 5. Zusammenfassung

Neubeschreibung von *Pintalia variegata* (Fabricius, 1803) aus Trinidad und Surinam. – Die Art *Pintalia variegata* (Fabricius, 1803) war bisher nur durch die kurze Originalbeschreibung und eine kurze Neubeschreibung von Stål bekannt. Hier wird die Art anhand von im 20. Jahrhundert in Trinidad und Surinam gesammeltem Material neu beschrieben. Die Art unterscheidet sich morphologisch von anderen *Pintalia*-Arten durch die Kopfform, die Bedornung der Hinterbeine und die männlichen Genitalien. Synapomorphien mit *Pintalia consobrina* Stål, 1862 werden vorgestellt und diskutiert. Unsere Ergebnisse unterstreichen die Notwendigkeit einer umfassenden Neubewertung der Gattungsgrenzen innerhalb der Gattung *Pintalia* sowie die Bedeutung der erneuten Untersuchung historisch beschriebener Taxa anhand moderner morphologischer Standards.

## 6. Acknowledgements

We thank Lars Vilhelmsen and Sree Gayathree Selvantharan (NHMD) for providing photos of the holotype and an additional specimen of *P. variegata*. Charlotte Hartong (RMNH) is thanked for providing the specimens used in this study for the redescription of the species.

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