

A new species of *Bama* McAlpine (Diptera, Platystomatidae) from New Guinea

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ABSTRACT

Bama McAlpine is a genus of Platystomatidae restricted to Papua New Guinea. Here, we present the description of the new species, *Bama (Bama) dichroma*. Additionally, we provide an updated identification key and a distribution map for all known species of *Bama*.

Introduction

The genus *Bama* (Platystomatidae, Platystomatinae) includes two subgenera: *Bama (Bama)* and *Bama (Polimen)* (McAlpine, 2001). The subgenus *Bama (Bama)* was proposed by McAlpine (2001) based on *Xiria papuana* Hennig, 1940 and included all species, *Bama bipunctatum* (Hendel, 1914) and *Bama strigatum* (Hennig, 1940), except *B. (Polimen) shinonagai* McAlpine, 2001, which was named as the sole species in the subgenus.

Later, McAlpine (2015) revised *Bama*, described 13 new species in the subgenus *Bama*, and synonymized *Bama strigatum* with *B. papuanum*. The genus occurs in Papua New Guinea and probably many more species occur on mainland New Guinea (including Indonesian, West New Guinea) (McAlpine, 2015).

Currently, *Bama* is composed of 16 species: *B. (B.) aurantium* McAlpine, 2015; *B. (B.) bickeli* McAlpine, 2015; *B. (B.) bipunctatum*; *B. (B.) brevitarse* McAlpine, 2015; *B. (B.) divergens* McAlpine, 2015; *B. (B.) flavifrons* McAlpine, 2015; *B. (B.) flexifer* McAlpine, 2015; *B. (B.) grande* McAlpine, 2015; *B. (B.) gressitti* McAlpine, 2015; *B. (B.) ismayi* McAlpine, 2015; *B. (B.) martini* McAlpine, 2015; *B. (B.) monstrans* McAlpine, 2015; *B. (B.) papuanum*; *B. (B.) robertsi* McAlpine, 2015; *B. (B.) signifer* McAlpine, 2015; and *B. (P.) shinonagai* McAlpine, 2001 (McAlpine, 2015).

In this contribution, *Bama (Bama) dichroma* sp. nov. is described, and its external morphology and terminalia are illustrated. An updated key based on McAlpine (2015), and a distributional map to all known species of *Bama*, are also given.

Material and methods

All the specimens studied were borrowed from the Natural History Museum, London UK. In order to observe the terminalia, the abdomen of some specimens was removed and treated with 10% KOH solution overnight, then neutralized with acid acetic and washed in distilled water, dehydrated in an alcoholic series (60%, 70%, 80%, 90%, and 100%), dissected, placed on a depression, with glycerin, and photographed. The dissected abdomens are stored in glycerin in a microvial attached to the pin of the specimen.

Photos were obtained at the Photo studio of Staatliche Museum für Naturkunde, Stuttgart, Germany. Equipment used: Canon EOS 5DsR, Canon macro photo lens MP-E 65mm 1:2.8; software used: Photoshop 2021, Helicon Focus 8.1.0. The map (Fig. 3) was made using QGIS 3.16.11, Google Earth Pro 7.3.6.9345. Shape files were obtained in geoBoundaries (Runfola et al., 2020). The terminology used follows Galinskaya and Shatalkin (2013), Galinskaya and Ovtshinnikova (2015), Bodner and Freidberg (2016), and Cumming and Wood (2017).

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Results

Bama McAlpine, 2001

Bama McAlpine, 2001: 165. Type species: *Xiria papuana* Hennig, 1940 (original designation); McAlpine, 2015: 26 (new species, new synonym, key).

Diagnosis: two orbital setae; face without medial carina; arista micropubescent; scutellum bare; mid tibia with one large terminal ventral spur, longer than tibial diameter, any additional spurs very small; stem vein setose dorsally on base of *Rs* before level of humeral; *cua* cell bare or with a microtrichose only along anterior margin and distally; lower calypter reduced, not or only slightly larger than that of alula; female with abdominal tergite 3 much longer than tergites 4–5 (McAlpine, 2001, 2015).

Key to the adults of *Bama*, adapted from McAlpine (2015)

1. Scutellum dorsally bare, laterally setulose; lateral scutellar setae shorter than basal scutellar seta; wing with one stripe bordering *C* vein, one complete subcostal band, and a band on *r-m* (McAlpine, 2001: figs. 76–78; McAlpine, 2015: fig. 53) *B. (P.) shinonagai* McAlpine
 - Scutellum covered by pruinescence, without lateral setulae; all scutellar setae of similar size; wing marks not as above 2
 2. Anterior half of wing dark brown, males with darker spots around veins R_{4+5} and M_1 (McAlpine 2015: figs. 23–24) 3
 - Anterior half of wing hyaline or pale yellow; R_{4+5} and M_1 without dark spots (McAlpine, 2015: figs. 1 & 3) 6
 3. Medial segment of M_4 with distal brown stripe; *dm-m* straight; palpus dark grey-brown; males only: R_{4+5} and M_1 veins with darker spots (McAlpine, 2015: figs. 23–26) *B. (B.) gressitti* McAlpine
 - M_4 completely hyaline; *dm-m* sinuous; palpus variable in color; males only: R_{4+5} and M_1 veins uniform in color (McAlpine 2001: fig. 8) 4
 4. R_{2+3} slightly curved at level of *r-m*; *dm-m* hyaline; acrostichal setae absent; arista bare throughout its length, with lanceolate apical expansion at least in female (McAlpine, 2015: figs. 17–20) *B. (B.) signifier* McAlpine
 - R_{2+3} abruptly curved at level of *r-m*; *dm-m* with infuscate band; one acrostichal seta; arista uniformly micropubescent (McAlpine, 2015: fig. 8) 5
 5. Palpus elongated, yellowish; r_{4+5} with posterodistal hyaline mark; male terminalia with distal lobe on glans (McAlpine, 2015: figs. 7–10) .. *B. (B.) flexifer*
 - Palpus short, dark brown; r_{4+5} with medial light brown band; male terminalia without distal lobe on glans (Figs.: 1a–e & 2 a–e) *B. (B.) dichroma* sp. nov.
 6. CuA_2 shape with middle projection; wing hyaline with dark brown fasciae, including medial band, discal band and broad apical band; fore femur entirely brown; hind femur yellow (McAlpine, 2015: figs. 1–2) *B. (B.) bipunctatum* (Hendel)
 - CuA_2 shape with projection on apical portion; wings and legs variable (McAlpine, 2015: fig. 3) 7
 7. Halter knob dark brown to black; cell *cua* largely hyaline 8
 - Halter knob white or yellow; cell *cua* with apical portion often partly brown 9
 8. Basal section of R_{4+5} and M_1 almost straight, diverging at apex; wing hyaline with brown marks on *sc*, half of r_1 , half of r_{2+3} , medial band ending at *dm*, one discal band, *dm-m* with subtriangular mark, and two distal black dots in r_{4+5} (McAlpine, 2015: figs. 3–4) *B. (B.) divergens* McAlpine
 - Apical section of R_{4+5} and M_1 curved and parallel; wing hyaline with medial, and pre-apical bands (McAlpine, 2015: figs. 5–6) *B. (B.) robertsi* McAlpine

9. Hind basitarsus less than one third length of hind tibia; *dm-m* curved, but not oblique; wing diffuse and irregular brown marks, at least in males (McAlpine, 2015: figs. 11–16) *B. (B.) brevitarse* McAlpine
 - Hind basitarsus more than one-third length of hind tibia; *dm-m* with oblique orientation; wing markings not as above 10
 10. Scutellum yellowish orange 11
 - Scutellum black or dark yellow 13
 11. Mid coxa with brush-like setae on dorsal surface (McAlpine, 2015: figs. 39–41) *B. (B.) aurantium* McAlpine
 - Mid coxa without such brush-like setae 12
 12. Wing hyaline with subcostal and discal bands, one apical stripe on r_{4+5} and one stripe on apical segment of M_1 ; *r-m* and *dm-m* of similar size (McAlpine, 2015: figs. 35–38) *B. (B.) martini* McAlpine
 - Wing hyaline with inconspicuous infuscate brown on *r-m* and *dm-m*; *dm-m* more than two times longer than *r-m* (McAlpine, 2015: figs. 33–34) *B. (B.) grande* McAlpine
 13. Frons yellow, with small black marks on sides of ocellus; fore femur entirely dark brown; wing hyaline with one subtriangular band on subcostal vein, one medial band joined with one discal band posteriorly, one Costal stripe on distal 1/3 (McAlpine, 2015: fig. 21) *B. (B.) flavifrons* McAlpine
 - Frons largely black; fore femur yellow at least on basal third; wing markings not as above 14
 14. M_1 segment between *r-m* and *dm-m* as long as of *dm-m*; wing with one medial and one discal band (McAlpine, 2015: fig. 22) *B. (B.) ismayi* McAlpine
 - M_1 segment between *r-m* and *dm-m* shorter than *dm-m*; wing marks not as above 15
 15. Fore femur yellow basally, brown distally; wing with one medial band ending at M_1 , an inclined band on discal cell; M_1 segment between *r-m* and *dm-m* as long as *r-m*; dorsal surface at distal margin of mid coxae with setae; male with hind basitarsus broadened and compressed (McAlpine, 2015: figs. 27–32) *B. (B.) bickeli* McAlpine
 - Fore femur entirely yellow; wing marks not as above; M_1 segment between *r-m* and *dm-m* shorter than *r-m*; dorsal surface at distal border of mid coxae with one seta; male with hind basitarsus slender, cylindrical 16
 16. Wing of male hyaline with one costal yellow stripe, one brown medial band, posteriorly joined with one preapical band; apex of with dark brown; M_1 segment between *r-m* and *dm-m* as long as *r-m*; mid coxae with finger-like extension on ventral surface; lobe of preglans with many peg-like spinules (McAlpine, 2015: figs. 42–47) *B. (B.) monstrans* McAlpine
 - Wing of male with one discal band; one costal stripe, one stripe at M_1 on distal portion; M_1 segment between *r-m* and *dm-m* shorter than *r-m*; mid coxa with dorsal extension narrow, but less elongate; lobe of preglans without spinules (McAlpine, 2015: figs. 48–52) *B. (B.) papuanum* (Hennig)

Bama (Bama) McAlpine, 2001 s. str.

Bama (Bama) McAlpine, 2001: 166. Type species: *Xiria papuana* Hennig, 1940 (original designation).

Diagnosis: Postpedicel rounded distally; scutellum without setulae, dorsally subshiny, covered with fine pubescence; lower calypter with very short lobe, scarcely larger than area of axillary lobe (McAlpine, 2001).

***Bama (Bama) dichroma* sp. nov.**

urn:lsid:zoobank.org:act:5F0BFC0F-4B58-41B1-895C-3E5BCC6FFF97 (Figs. 1a–e; Figs. 2a–e)

Diagnosis: *Bama dichroma* sp. nov. is similar to *B. flexifer*, *B. gressitti* and *B. signifier* in the presence of a broad costal stripe, covering cells *sc*, r_1 , r_{2+3} , and r_{4+5} . It differs from *B. gressitti* in lacking an infuscate stripe

on M_4 and lacking darker dots on R_{4+5} and M_1 . It differs from *B. signifer* in having a band on $dm-m$. It can be distinguished from *B. flexifer* in having cell r_{4+5} completely dark brown with one medial light brown stripe, whereas *B. flexifer* has hyaline dot near apex of cell r_{4+5} .

Head: (Figs. 1a-c) frons rectangular, longer than wider, dark brown; two orbital setae, of same size, inner vertical seta convergent, outer vertical seta divergent; ocellar setae reduced, divergent; postocellar setae reduced, erect; silver pruinescence on fronto-orbital plate, parafacialia, and postgena; pedicel dark brown; postpedicel 2.5 times height of pedicel, covered by whitish microtrichia; arista longer than face, micropubescent; face dark brown; gena about 1/5 height of eye; clypeus dark brown, short, about height of pedicel; palpus dark brown; proboscis dark brown.

Thorax: (Figs.: 1a–1b, and 1d) scutum with dark blue-green metallic luster, with lateral borders dark brown; one postpronotal seta; two notopleural setae; one supra-alar seta; one intra-alar seta; one postalar seta; one prescutellar acrostichal seta; one prescutellar dorsocentral seta; scutellum dark brown, flat, V-shaped in dorsal view; three scutellar setae, of same size; one anepisternal seta. Legs: coxae yellowish; femora yellowish; tibiae and tarsi dark brown; fore coxa with four setae at distal border of ventral surface; fore femur with row of long setae on distal half ventrally; mid coxa with five setae on ventral surface; mid tibia with one apical spur; hind coxa with two setae on posterior surface, and one seta on anterior surface. Wings (Fig. 1d): hyaline; costal stripe broad, dark brown, covering the cells sc , r_1 , r_{2+3} , and r_{4+5} , with one hyaline triangular mark at $r-m$ level, and one hyaline band on cell r_{4+5} ; one light brown band on apex of discal cell, covering $dm-m$; Sc straight, incomplete but ending near C ; R_1 straight; R_{2+3} sinuous at $r-m$ level; second segment of M_1 sinuous; R_s with fine microtrichia dorsally; R_1 and R_{4+5} setulose dorsally; lower

calypter reduced to linear fringe; halter with base of rod brown, apical part and knob pale yellow.

Abdomen: (Fig. 1e) oval; dark brown, with metallic blue green luster; sparsely covered by whitish microtrichia; female with tergite 3 longer than tergites 4–5; male tergite 5 with three lateral marginal setae. Male terminalia: (Figs. 2a-d) in lateral view, epandrium round, covered by setae (Fig. 2a); cercus globose, covered by setae; lateral as long as epandrium, with setae at apex; inner surstylus shorter than lateral surstylus; one apical preniseta, fang like in ventral view (Fig. 2b); cercus bilobate; ejaculatory apodeme fanlike (Fig. 2c); aedeagus cylindrical; preglans reduced; glans well developed, half as wide as long, without process or lobe; terminal filaments Y-shaped, unequal size, the longer one about the same width of glans; (Fig. 2d). Female terminalia: (Fig. 2e) oviscape conical, length and width similar; taenia longer than oviscape; eversible membrane with scale-like denticles; sternite 8 narrow and pointed; cercus fused, with two setae; three (2+1) spermathecae, drop-like, atrium reduced, basal disc absent.

Sexual dimorphism Substantial sexual dimorphism was not observed in the specimens studied.

Type Material: Holotype female and six paratypes, two males and four females, all deposited at the Natural History Museum, London.

Holotype. (1): Stn. No. | 78; (2): NEW GUINEA: | Madang Dist., | Finisterre Mts. | Moro C 5550ft. 30.x-15.xi.1964; (3): M.E. Bacchus. | B.M. 1965-120; (4): NHMUK 013444736 | Qr code; (5): *Bama* | *dichroma* | det. J.P.V. Rodrigues, 2023; (6): HOLOTYPE (female).

Paratypes with same data as holotype, except: (4) NHMUK 013444733, and (6) PARATYPE (female); (4) NHMUK 013444734, and (6) PARATYPE (female); (4) NHMUK 013444735, and (6) PARATYPE (female); (4) NHMUK 013444737, and (6) PARATYPE (male); (4) NHMUK 013444738, and (6) PARATYPE (female); (4) NHMUK 013444740, and (6) PARATYPE (male).

Distribution: Papua New Guinea, Finisterre Mountains (Fig. 3).

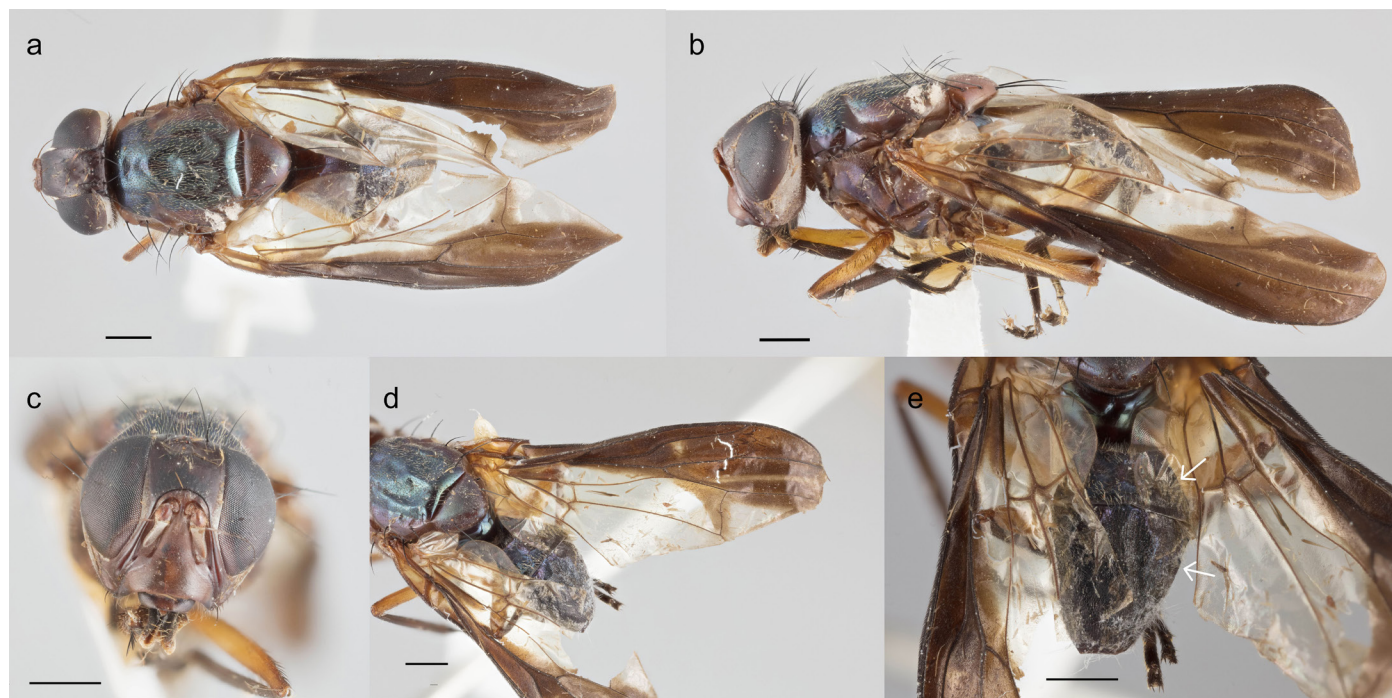


Figure 1. *Bama dichroma* sp. nov. (a) habitus dorsal; (b) habitus lateral; (c) head frontal; (d) wing dorsal; (e) abdomen dorsal, setae indicate the syntergite 1+2 and tergite 3. Scale: 1mm. Figs.: 1a–c and 1e holotype, Fig. 1d paratype female.

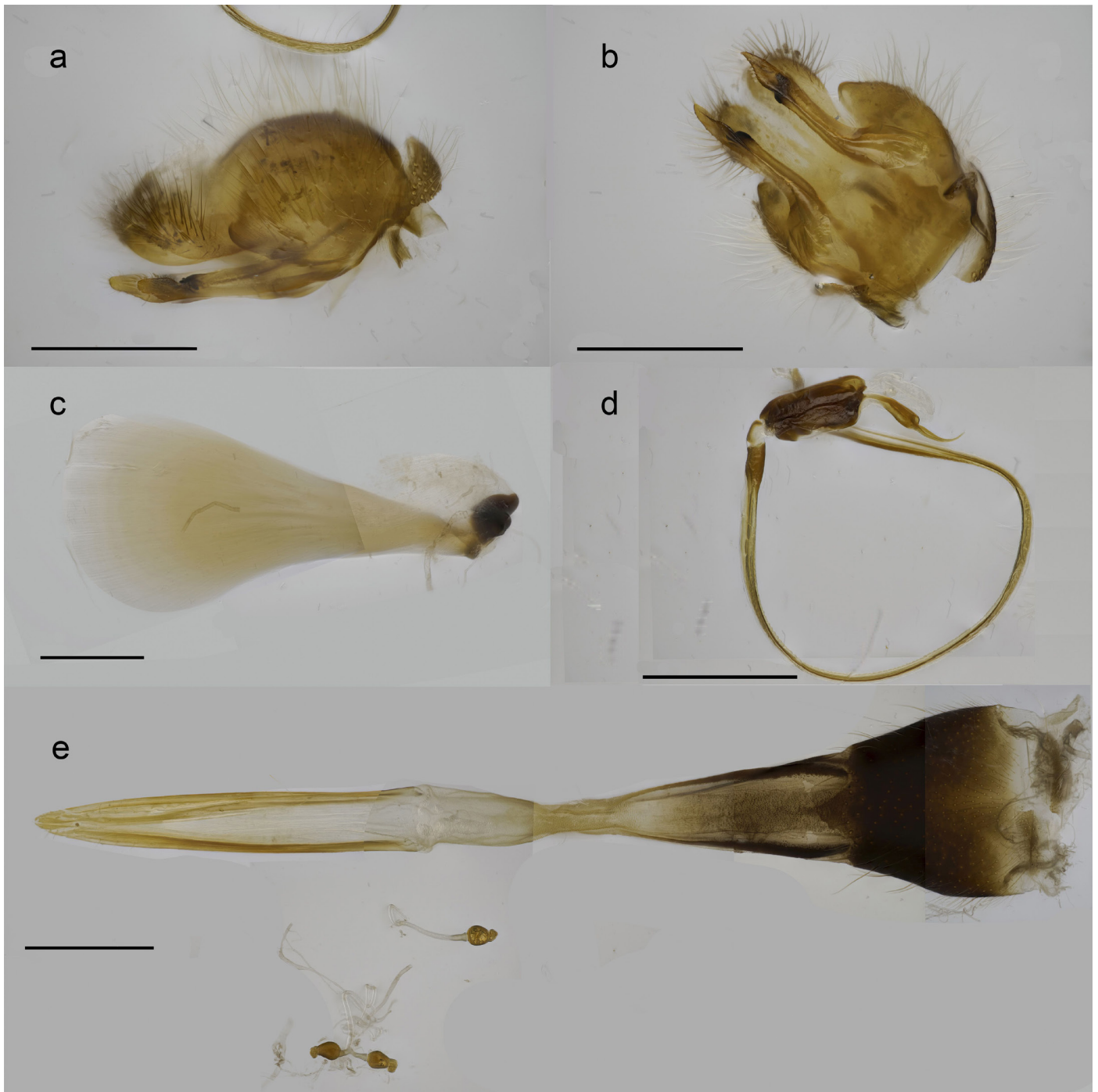


Figure 2. *Bama dichroma* sp. nov. terminalia. (a) male terminalia in lateral view; (b) male terminalia in ventral view; (c) male ejaculatory apodeme; (d) male aedeagal complex; (e) female terminalia with spermathecae. Scale: 0.5mm.

Etymology: The epithet *dichroma* is formed from the union of *di*=two and *chroma*=color, Greek, an allusion of the wing pattern, half wing dark brown and half hyaline. Gender neutral.

Discussion

The inclusion of *B. dichroma* sp. nov. in *Bama* is corroborated by the presence of two orbital setae (Figs. 1a, b), by the second segment

of M_1 sinuous (Fig. 1d), by the abdominal tergite 3 enlarged and the reduction of tergites 4 and 5 in females (Fig. 1e: white setae), and by the presence of an aedeagus with pair of terminal filaments of unequal size, arising from a bulb (Fig. 2d) (McAlpine, 2001, 2015). The differences in the palpus, r_{4+5} and the patterns between *B. flexifer*, *B. gressitti*, and *B. signifer* distinguish *B. dichroma* as a new species. Currently, the genus is composed of 17 species, 16 in the subgenus (*Bama*) and one in the (*Polimen*).

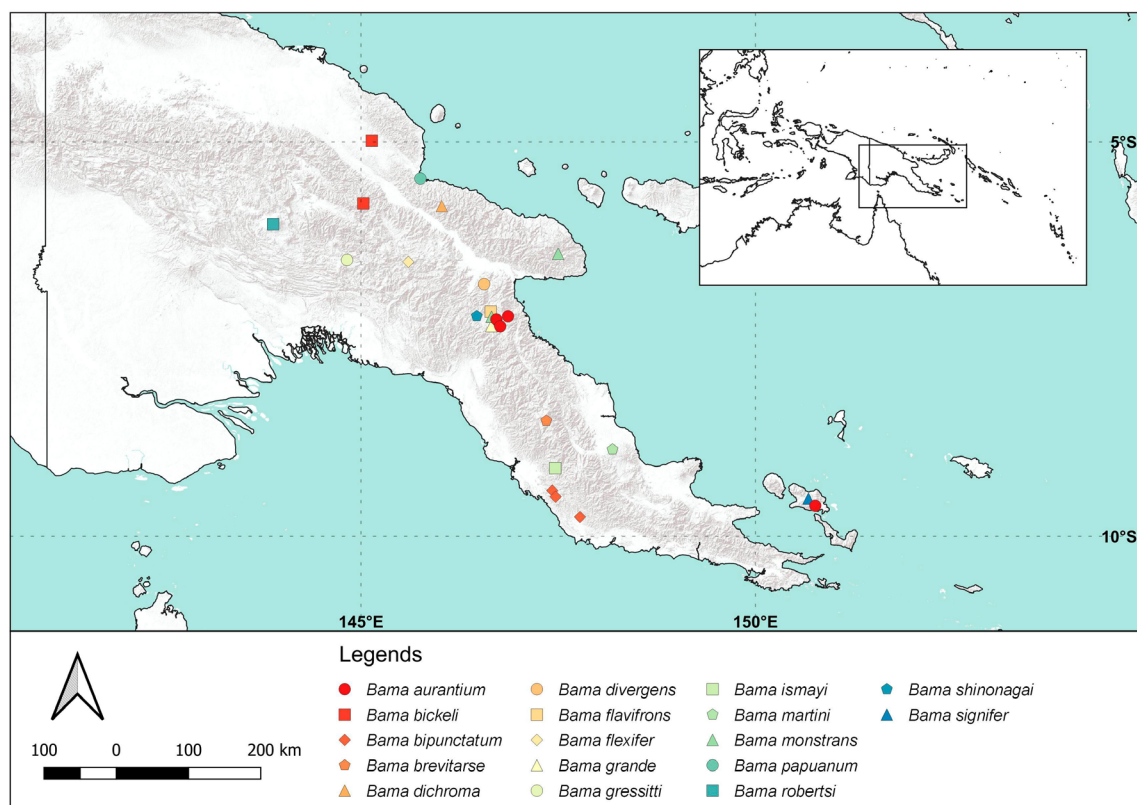


Figure 3. Distributional map of the species of *Bama*.

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Conflicts of interest

The authors declare no conflicts of interest.

Author contribution statement

All the authors conceived equally this study; JPVR write the original draft; RLM and CJBC reviewed and contributed to the original draft; CJBC is the lead supervisor, RLM is the support supervisor; and JPVR and CJBC provided funding for this work.

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