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The *gonypetes*-group of the genus *Cyana* Walker, 1854 of South-East Asia (Erebidae: Arctiinae, Lithosiini)

Johannes H. Lourens

Dr. Johannes (Jan) H. Lourens, Diamant 97, NL-3643 AK Mijdrecht, The Netherlands; janhlourens@yahoo.com

Abstract: Eight large-sized species of the genus *Cyana* Walker, 1854 from the Philippines were grouped together based on common morphological external and structural features of known males and several newly discovered female partners. They were placed in the *gonypetes*-group. The type locality of *Cyana gonypetes* Prout, 1919 was reassessed as Luzon and adjacent islands instead of Mindanao where the closely related *C. gabriellae* Černý, 1993 occurs including the islands Leyte and Samar. The new subspecies *Cyana gonypetes* ***visayana*** **ssp. n.** is designated for specimens from Negros and Panay islands (type locality on Negros). The male holotype will eventually be deposited at CMWM/ZSM. Differentiation within the taxa of the *gonypetes*-group suggests the development of two sections: one, the *gonypetes* (*sensu stricto*) section, characterized by males carrying a triangular outward dent along the front wing marginal border, and the *rosabra*-section in which both genders have rounded wings. Based on habitus as well as some illustrated structural genitalia features of at least 10 similar sized insular and mainland SE Asian Sundanian taxa show a considerable degree of affiliation to the *gonypetes*-group, although several female partners still have to be discovered.

Die *gonypetes*-Gruppe des Genus *Cyana* Walker, 1854 in Südostasien (Erebidae: Arctiinae, Lithosiini)

Zusammenfassung: Acht große Arten der Gattung *Cyana* Walker, 1854 von den Philippinen werden aufgrund von gemeinsamen habituellen und strukturellen Merkmalen der bekannten Männchen und einiger neu erkannter Weibchen zusammengefaßt zur *gonypetes*-Gruppe. Die Typuslokalität von *Cyana gonypetes* Prout, 1919 wird korrigiert zu Luzon und benachbarte kleinere Inseln anstelle von Mindanao, wo die nah verwandte *C. gabriellae* Černý, 1993 lebt, einschließlich der Inseln Leyte und Samar. Die neue Unterart *Cyana gonypetes* ***visayana*** **ssp. n.** von den Inseln Panay und Negros wird beschrieben (Typenlokalität auf Negros); der männliche Holotypus wird schließlich in CMWM/ZSM in München deponiert werden. Innerhalb der *gonypetes*-Gruppe lassen sich 2 Sektionen abgrenzen: Die Sektion *gonypetes* (*sensu stricto*), bei der die Männchen einen dreieckförmigen, nach außen weisenden Zahn am Außenrand der Vorderflügel tragen, sowie die *rosabra*-Sektion, in der beide Geschlechter gerundete Flügel haben. Nach Habitusmerkmalen und einer Reihe von abgebildeten Merkmalen im weiblichen Genitalapparat zeigen mindestens 10 ähnlich große Taxa von den Inseln und dem kontinentalen Teil Sundalands (Südostasien) Affinitäten mit der *gonypetes*-Gruppe, obwohl noch eine Reihe von deren weiblichen Partnern bisher unbekannt sind.

Introduction

The often spectacularly beautiful large *Cyana* species have drawn broad attention of past and present taxonomists. They are externally detailed described and even structurally fairly well documented. The genitalia of a good number of species have been illustrated by Roepke (1947), Roesler & Küppers (1976) and Kishida (1991) as well as Černý (1993) with colour or black and white genitalia illustrations, whereas recent authors like Holloway (2001), Černý (2009) and Bucsek (2012) illustrated numerous males and females of new and rare species in brillant colours. The 37.7 mm (average) sized SE Asian species of this section of the large genus offers virtually no taxonomical discrepancies, although various females still remain to be discovered. Intensive sampling by me revealed that most females responded poorly to light, and it required a 500 W ML light source to attract them. Obviously they were strongly biotope bound to virgin forest-environments. The missing species of the Philippines could thereafter be collected in double-digit numbers and a complete set of structural information be elaborated for both genders. Based here on the features of eight fully described and illustrated Philippine species were compared with earlier published SE Asian species and their potential relationship established or discussed.

Materal and methods

By traditional habitus criteria the large Philippine species of *Cyana* are grouped by the following features.

- They involve eight taxa of robust moths with wingspans of 29–40 mm in males and 32–54 mm in ♀♀, having the usual *Cyana* tiger moth red transverse fasciae on a predominantly white background. The narrow banded species usually have fasciae up to < 2 mm wide and ♂♂ sometimes possess small triangular protrusions on the front wing margin, just before the apex.
- ♀♀ have rounded front wings and are usually broader banded (i.e. > 2 mm) or very broad (i.e. > 5 mm) in species with rounded front wings in both genders, the latter with progressively orange to fully orange coloured species with only few remnant white spots.
- ♀♀ have usually a single prominent cell-spot and have stronger pigmented hind wings.
- ♂♂ have mostly two outer cell spots, the central one closer to the postmedian. The usual inner cell-spot of ♂♂ is sometimes absent or replaced by an orange wedge.
- All taxa have ♂♂ with two prominent pheromone pads on the underside of the front wings between the discoidal cell and the costa, a round outer one and a connected oblong inwardly elongated one in orange pigmented front wing zones. In both genders the antemedians stand acutely on the outer borders.
- Black margins are common in most species, in ♀♀ inwardly dented, in ♂♂ partially reduced or restricted to the outer half of the postmedian.

The technical procedures for the preparation of genitalia structures as described by Lourens (2007) were minitu-

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ously followed and detailed, partially dyed 3D male vesica and female bursa structural components elaborated for both genders of all Philippine taxa. It was experienced that in a number of species the vesica membranes were very thin and only noticeable as light reflections. They probably lacked supporting ribs or other structural incorporated material which commonly lightly dyed the membranes and enabled them to be photographed. In those cases, the vesicas were injected with a few drops of yellow or blue printer ink through the phallus hull, which after dissipation inside the vesicas, enabled these to be pictured.

Adult external features were complementary to the often lengthy original descriptions by the first authors, when these involved diagnostic parameters, necessary for further differentiation, whereas the structural details were described in greater detail as to provide supplementary information for partial information provided by the original authors.

Abbreviations

BMNH	British Museum Natural History, London, U.K.
CMWM	Collection Museum Witt München/Munich, Germany.
GP	genital preparation [no.].
HT	holotype.
JHL	Johannes H. Lourens.
PT	paratype.
TL	type locality.
ZSM	Zoologische Staatssammlung München/Munich, Germany.

General clarification of scale bars:

Red bar 1 cm,

black bar 1 mm.

Quoted measurements in millimeter (mm) always taken at the centre of the object.

Plate reference numbers of the eight revised species are numbered from **1 to 8,** further explained by a letter for a character and sometimes by a further number for a replicate photo:

a = male imago,

b = female imago.

Genitalia parts are indicated by the same running numbers for the species plus a further letter:

c = armature (♂),

d = phallus (♂),

e = valve in proxylateral view (♂),

f = everted vesica (♂),

g = bursa (♀),

h = bursa opposite view (♀).

In some cases the features are also illustrated by photographic images taken under different angles or complemented with images from duplicates. In those cases the picture reference is extended by a further number.

Collector references: always collected by J. H. Lourens, unless otherwise quoted.

All material, including the holotype of the new subspecies, will be deposited in CMWM, predestinated for ZSM.

Descriptive section

Cyana gonypetes (Prout, 1919) comb. n.

(Figs. 1a–1h.)

Note: A photo of the HT of *C. gonypetes* in the BMNH, sent by M. Honey, exactly matches the illustrated ♂ Fig. 1a from Nueva Ecija, Prov. N. Luzon. Prout's (1919) type carries a locality label "Mindanao". Two further specimens of the type series of four are labelled "Palali" on Luzon. This location lies within the Palali-Mamparang Mtn. Range, with Mt. Palali (4052 ft.) and extrapolated coordinates 16°23′ N, 121°13′ E. At the below quoted collection locations, as well as at five further collection sites of Černý and Schintlmeister, *C. gonypetes* was never found on Mindanao. As later will be shown, all collectors exclusively caught substantial numbers of the abundant sisterspecies *C. gabriellae* on Mindanao, Leyte and Samar. This indicates that the HT TL is almost certainly incorrect, especially because the adjacent islands NW of Mindanao, Negros and Panay, and the NE Islands Leyte and Samar form a geographical barrier with different species and subspecies occupying the same ecological niche.

Cyana gonypetes gonypetes (Prout, 1919) comb. n.

Chionaema gonypetes: Prout (1919: 12).

Doliche gonypetes: Černý (1993: 46).

New distribution records for the nominotypical subspecies on the Philippines:

Luzon: North: 1 ♂, 1 ♀, SE Pagudpud, Adams, Masasabug, Brgy. Bucarat, 400 m, 18°25.769' N, 120°55.259' E, 20. iv. 2007. 1 ♂, 2 ♀♀, 0.5 km NE Adams, Managa river, 140 m, 18°3.359' N, 120°54.678' E, 15. ii. 2008. — East: 13 ♂♂, 2 ♀♀, Sierra Madre range: Aurora Province, NE Casiguran, 13 km W Dibulo, 585 m, primary forest 16°32.856' N, 122° 14.134' E, 24.–25. ix. 2006 and 14.–15. vi. 2007. 12 ♂♂, 4 ♀♀, Nueva Ecija Province, Bongabon, Brgy. Laby, Mingan Mts, 950 m, 15°38' N, 121°15' E, 6.–7. ix. 2006. — Southeast: 20 ♂♂, Quezon Province, Infanta, Pisa River, Brgy. Magsaysay, iv., v., vi. and viii. 2004. 3 ♂♂, Lucban, East slope Mt. Banahaw, 741 m, 14°6.030′ N, 121°31.478′ E, 2.–3. v. 2013. — South: 6 ♂♂, Sorsogon, Bulusan Volcano, 12 km E Irosan, 280 m, 12°45' N, 124°04' E, 27. iii. 2005.

Marinduque: 9 ♂♂, 1 ♀, Sibuyao, Mt. Masimot 500 m, 13° 20.830' N, 122°0.219' E, 21.–23. v. 2009.

Mindoro: 2 ♂♂, Maja Bic, ft. Mt. Halcon, riverine forest, 200 m, 13°17' N, 121°3' E, 10. xii. 2004.

External diagnostics (Figs. 1a ♂, 1b ♀): The front wing of ♂♂ carries an aileron-like small triangular extension at its outer margin, just below the apex. All male specimens have almost fully depleted black edges along the medians. The antemedian is widened at the costa to almost double its width and has at the inner side a seam of black scales. The subbasal has at its centre a distinct black spot and on the outer wing half a predominantly black diagonal wedge. The postmedian is at an agle of ca. 130° broken at Cu and runs diagonal to the costa where it meets obtusely. The remnant outer section of the postmedian is never black edged.

The ♀ front wings are rounded. The subbasal and antemedian similar as the males but the broken section of the postmedian is inwardly convex lens shaped, approaching the single cell spot.

The **♂ genitalia** (Figs. 1c–1f) are relatively large in relation to their wide wingspan. They measure 4 mm × 4 mm, the

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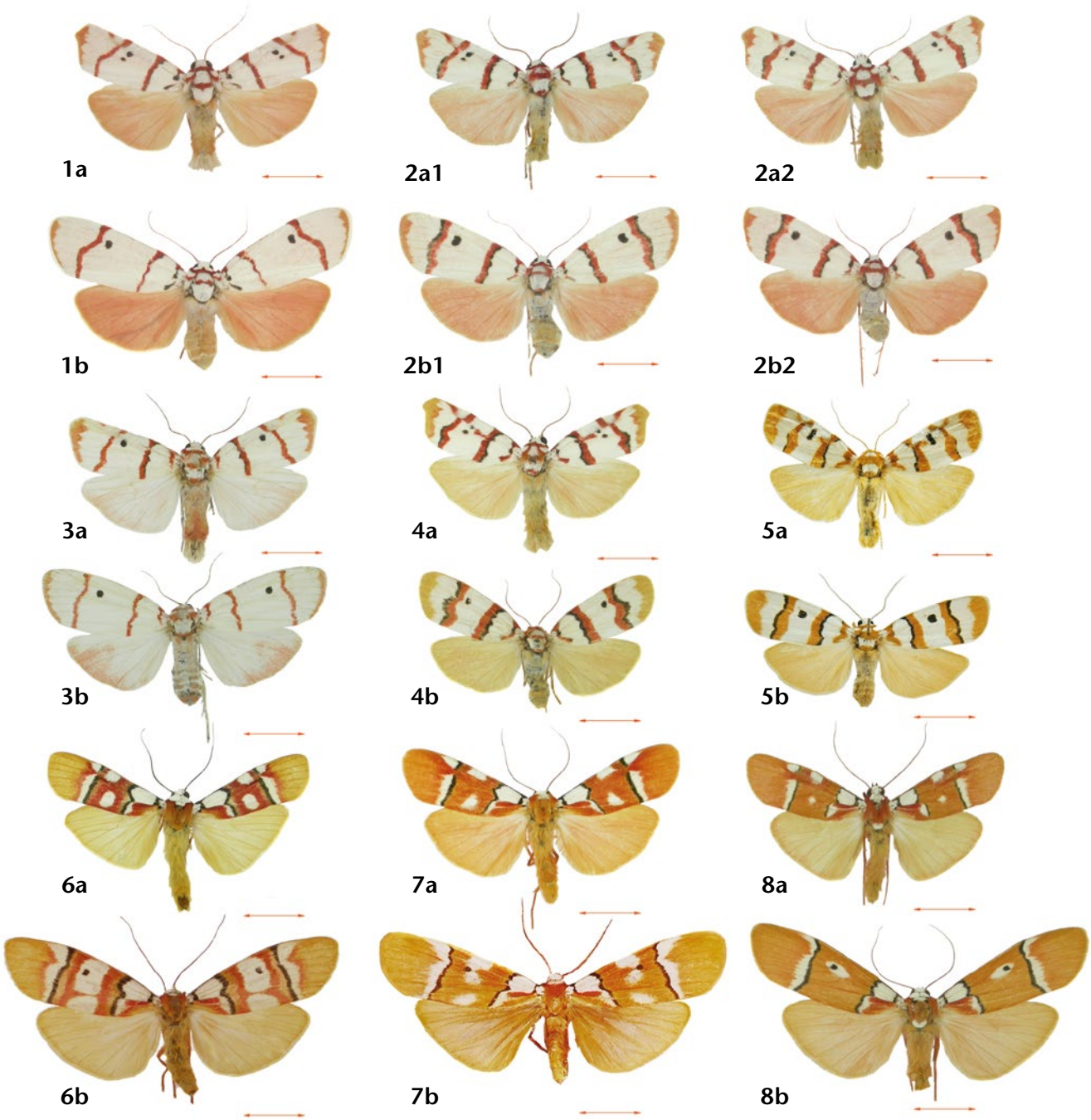

Plate 1: Imagines of the large Philippine *Cyana* species of the *gonypetes*-group. — **Figs. 1a–1b:** *C. gonypetes gonypetes*; **1a:** ♂, **1b:** ♀, C Luzon. — **Figs. 2a1, 2a2–2b1, 2b2:** *Cyana gonypetes visayana* ssp. n.; **2a1:** ♂ HT, **2b1:** ♀ PT, Negros, **2a2:** ♂ PT, Panay, **2b2:** ♀ PT, Panay. — **Figs. 3a–3b:** *Cyana owadai;* **3a:** ♂, **3b:** ♀ Palawan. — **Figs. 4a–4b:** *Cyana gabriellae*, Mindanao; **4a:** ♂, **4b:** ♀. — **Figs. 5a–5b:** *Cyana malayensis palawanensis;* **5a:** ♂, **5b:** ♀. — **Figs. 6a–6b:** *Cyana cara,* Mindanao; **6a:** ♂, **6b:** ♀. — **Figs. 7a–7b:** *Cyana andromeda,* Mindanao; **7a:** ♂, **7b:** ♀. — **Figs. 8a–8b:** *Cyana rosabra,* Mindanao; **8a:** ♂, **8b:** ♀.

harpe sides are 2.2 mm and valves measure 3.7 mm × 1.2 mm. The dorsal lobe is just larger than the heavily inward curved, hook-shaped, ventral lobe. The dorsal lobe is apically rounded and ends on the inner side with a small inward tongue shaped protrusion. The dorsal lobe's inner layer forms an independently movable structural inner lining of the lobe. It is pointedly extending to the hinging point of the valve with the harp, and has, at its centre a proximal dent, bridging over to the ventral lobe. The ventral lobe is partly rolled up outwardly and has at its centre a longitudinal fold. The phallus is 2.6 mm × 0.6 mm, at the apex lightly curved and partly circularly chitinized. This guides, on eversion, the vesica's main body of 1.5 mm × 1.5 mm into a predestinated position and brings the single large, about 2 mm long, somewhat (pastry) croissant-shaped lobe with a terminal bladdery narrowing ending, into its approximately 120° position versus the phallus hull. There are no cornuti. The ductus ejaculatorius is only rarely fully everted, and originates from the proximal small lobe off the vesica base.

The ♀ **genitalia** (Figs. 1f-1g) are bulky and large. Not only does this organ measure approx. 8 mm in length, it is composed of a 5 mm wide atrium copulatrix and

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5 mm × 5 mm tuber-shaped bursa. In this taxon the bursa is asymmetrically attached. There is a light transverse apical signum and a very small apical macula. The broad atrium copulatrix has a proximal lightly structured undulating sclerotised border with a 0.8 mm wide yoke-shaped distal incurvation at its centre, opposite of it showing a symmetrical half egg shaped structure that could be the base of a sclerotized section of a bursa plate.

*Cyana gonypetes **visayana*** n. ssp.

(Figs. 2a1 and 2a2, 2b1 and 2b2)

Holotype ♂ (Fig. 2a1, with photo label 288 and GP number 1081): Philippines, Negros Or., NE of Don Salvador Benedicto, Brgy. Bagong Silang, ft. Mt. Mandalagan, 770 m, 10°36.017' N, 123°16.127' E, 19.–20. VI. 2009.

Paratypes (in total 33 ♂♂, 2 ♀♀):

Negros: 20 ♂♂, 1 ♀, same locality as HT, 900 m, 9°21.660' N, 123° 10.795' E, swampy hill forest edge, 19.–20. VI. 2009. 7 ♂♂, Negros Occ., 14 km W San Jose Dumaguete, Twin Lakes, ft. Mt. Guinsayawan, 23.–24. VI. 2009.

Panay: 4 ♂♂, 1 ♀, Aklan, Logtugan 105 m, 12 km W Libacao, sec. forest, 11°24.691′ N, 122°18.528′ E, 2. IX. 2008 (3 ♂♂) and 27. VI. 2009 (1 ♂, 1 ♀). 2 ♂♂, Iloilo, E. of Mt. Baloy, Brgy. Supanga, 11°9.460' N, 122°21.279' E, 30.–31. VIII. 2008.

External diagnostics: The fasciae are in both genders similar in shape and dimorph as in *C. g. gonypetes* but slightly wider, especially in the females. Black margins prevail in both genders, but are more prominent in females and on the antemedian, at the centre inwardly indented. The central subbasal spot is clear but the diagonal wedge is predominantly orange. The remnant section of the outer wing half is outwardly always black edged but does not extend over the broken section on the costal wing half. In females the broken section is undulating to the costa and lesser obtuse positioned.

♂ and ♀ genitalia (Figs. ♂ 2c–2f and ♀ 2g–2h): The ♂ genitalia have close similarity with those of *C. g. gonypetes* but the main dorsal vesica lobe is significantly reduced, and the 120° downward angled lobe is significantly wider. The ♀ atrium copulatrix is wider and asymmetrical. The cup shaped (assumed) ductus bursa base is on one side elongated, and the bursa copulatrix attaches precisely at the centre of the structure.

Cyana owadai Kishida, 1991 stat. rev.

(Figs. 3a ♂ and 3b ♀.)

Cyana owadai: Kishida (1991: 65).

Doliche owadai: Černý (1993: 44).

Distribution: This taxon *owadai* is confined to Palawan and has a close relative on Borneo in *C. perornata* Walker, 1854. The latter species is widely distributed on mainland SE Asia and prefers most commonly lowland forests extending rarely to low montane forest.

Recent records, all **Palawan:** SE: 13 ♂♂, 2 ♀♀, Pinagar, Brgy. Culasian, primary forest, 37 m, 8°48.460' N, 117° 28.530' E, 2. III. 2006 (4 ♂♂), 8.–10. XII. 2007 (9 ♂♂, 2 ♀♀). – Central: 2 ♂♂, W. Victoria Mtn. range, E Napsan, 300 m, 9°50' N, 118°35' E, 16. III. 2006. 2 ♂♂, same area, 9° 42.256' N, 118°31' E, 1.–2. XII. 2007. 8 ♂♂, Takawayan, 15 km W Baaugan, 9°54' N, 119°33' E. 3 ♂♂, NE, 2 km W Bagong Silang, foothills of Mt. Ilian 300 m, 10°26' N, 119°33' E, 8. III. 2006. 1 ♂, W, 3 km N Nagtabon, dry coastal forest, 220 m, 9°57.015' N, 118°39.275' E, 12. XII. 2007. – E: 2 ♂♂, Nara Prov., E Victoria Range, Estrella Falls, 7 km W Malalgar, 9°27' N, 118°27' E, 28. II. 2006.

External diagnostics: The species closely resembles *C. gonypetes gonypetes* from Luzon but has no front wing aileron in ♂♂. The transverse fasciae are more straightened. The subbasal is not expressed on the outer wing half and has no trace of black. Both genders have one single cellspot. Only males have a thin but full black margin along the inner antemedian. The orange postmedian is undulated, but not clear obtusely broken like in *gonypetes*. Hindwings white with denser orange suffusion at the outer wing half in ♀♀.

♂ genitalia (Figs. 3c–3f): the armature is similar as in *C. g. gonypetes* and *C. plateni* (Elwes, 1890) from Sulawesi, see Kishida (1991) and Roepke (1946). Tip of the saccus longer pointed than in *C. malayensis* Hampson, 1914. Valve lobes equal in length. The dorsal lobe almost 1 mm wide, with a terminal inner lateral protrusion like *C. gonypetes* and a "fist"-shaped centre with protrusions, like Roepke (1946) described for *C. javanica* (Butler, 1877). The phallus is 4.3 mm long, 0.5 mm at the centre, at its base 0.8 mm, club-shaped and lightly curved at the outer half. The apex has irregular ring-shaped structural chitinizations with a small protruding outward cornuti aggregate. The vesica's main body is 1 × 1 mm with a small upper insulcation. The 2 × 1 mm lobe folds backwards under the phallus hull, and is shoe-shaped like *C. gabriellae*. There are several inner lateral tissue aggregations indicative for non-everted tubuli at the vesica surface similar as in *C. malayensis palawanensis* Kishida, 1991.

♀ genitalia (Figs. 3g–3h): The structure measures 7.1 mm, of which half is formed by the main longitudinally attached bursa, 1.7 mm by a relatively long ductus bursae and 2.7 mm by the atrium copulatrix with a 2 mm wide stirrup-shaped arc. The ductus bursae is proximally funnel shaped with a 1.7 mm rim, narrowing down to 0.9 mm. There is a 2.2 mm lateral attached pseudobursa without macula or signae, wheres the main bursa carries a single 0.7 mm long semicircular insulcation ornamented with stiff hairs (visible under magnification).

Cyana gabriellae (Černý, 1993) comb. n.

(Figs. 4a ♂, 4b ♀.)

Doliche gabriellae: Černý (1993: 46).

The following recent distribution records can be added:

Mindanao: N: 1 ♂, Misamis Or., 22 km E Claveria, Brgy. Mat-I, 1050 m, 8°39.988′ N, 124°59.686′ E, 20.–21. III. 2009, prim. forest, leg. JHL & Černý. – SE: 17 ♂♂, 1 ♀, Surigao del Sur, Lianga, 9 km W Diatagon, 200 m 8°42' N, 126°5' E, 3.–7. VII. 2005 (6 ♂♂, 1 ♀) and 29. XI.–1. XII. 2009 (11 ♂♂). 4 ♂♂, Brgy. Gata, 140 m, 8°43.308' N, 126°5.691' E, 17.–18. III. 2009, leg. JHL & Černý. 11 ♂♂, 1 ♀, 8°43.237' N, 126°9.846' E, leg. JHL & S. Naumann. 1 ♂, San Francisco, Mt. Magdiwata, 400 m 8°29' N, 125°59' E, 2. VII. 2005. 1 ♂, Agusan Sur, 10 km SE Trento, Sta. Maria, 185 m 8°1.615' N, 126°12.322' E, 27. IV. 2008. 1 ♂, Davao Or. Aliwagwag, prim.

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forest, 100 m, 7°43.667' N, 126°17.304' E, 30. IV. 2008, JHL. – Central: 13 ♂♂, 3 ♀♀, Cagayan, 3 km NW Dominorog, S Talakag, W slope Mt. Kalianlian, primary forest edge, 1270–1300 m, closed canopy forest, 7°54.719' N, 124° 38.159' E, 28.–30. IX. 2011, leg. JHL & S. NAUMANN.

Leyte: SW: 1 ♂, 20 km N Maasin Hinacu Dapu, 600 m, 10°16' N, 124°35' E. – SE: 1 ♂, Libertad near Tibo, prim. forest, 50 m, 10°40' N, 125°6' E, 25. X. 2005. – Central: 18 ♂♂, 2 ♀♀, Hilusig, W Mahaplag, Mt. Balocaue, 600 m, 10°40.742' N, 124°55.270' E, 15.–19. V. 2007 (2 ♂♂, 1 ♀); 27.–28. VI. 2006 (6 ♂♂ 1 ♀); 3. XII. 2005 (2 ♂♂); 29.–30. II. 2005 (8 ♂♂). – NW: 2 ♂♂, 12 km N Ormoc, Lake Danao, 700 m, 11°4' N, 124°42' E, 29.–30. VI. 2006.

Samar: Central: 14 ♂♂, 2 ♀♀, 4 km SE Bagacay, prim. forest, 140 m, 11°48' N, 125°15' E, 25. VI. 2006 (1 ♂); 13. III. 2009, leg. JHL & ČERNÝ (5 ♂♂, 2 ♀♀); 21.–22. X. 2006 (7 ♂♂); 26. II. 2009 (1 ♂).

External diagnostics: This species had been abundantly collected by ČERNÝ and SCHINTLMEISTER in Mindanao, Leyte and Samar and was known by 41 ♂♂ specimens, closely resembling *C. gonypetes visayana,* but possessing an orange discocellular wedge from the antemedian to the upper discocellular black spot and fully diagnostic differentiable by its ochre, instead of pink hindwings. The front wings of ♂♂ have the aileron-shaped extension.

The ♀♀ have slightly broader fasciae, the postmedian is stronger undulated and has more prominent black margins. Their front wings are rounded and the ocher marginal band is wide.

♂ **genitalia** (Figs. 4c–4f): The genitalia of *C. gabriellae* were described in detail by ČERNÝ (1993: 46). They closely resemble those of the *gonypetes* relatives, in particular by the joint possession of a small intrusion of the ventral lobe just before the hook, which is likely caused by an slight inward torsion of the terminal section of the structure. In lateral view the phalluses differ by an apical outward protrusion. The main vesica lobes are similar, but the downward lobe is differentiated into two sections, forming the shape of a foot, with the toes section running backwards to the phallus base.

The ♀ **genitalia** (Figs. 4g–4h): Similar in size and outline as *C. g. visayana,* also with an asymmetrical proximal border of the transverse yoke structure and the asymmetrical egg cup shaped structure opposite the incurvation. The bursa is slightly asymetrical attached to the centre of the atrium copulatrix.

Cyana malayensis (HAMPSON, 1914)

(Figs. 5a ♂, 5b ♀.)

Chionaema malayensis: HAMPSON (1914: 622, pl. XXXIII, fig. 9).
Cyana malayensis palawanensis: KISHIDA (1991: 64).
Cyana malayensis: HOLLOWAY (2001: 335, pl. 1).
Cyana malayensis: ČERNÝ & PINRATANA (2009: 49, pl. 9: 100).

Note: This Sundanian species is somewhat variable in size, fasciae colour intensity and width of the black median edges. The fasciae colours are more crimson on Borneo, the Malay Peninsula and in SE Thailand. The species is common on Palawan in lowland forest areas, from the coast to elevations up to 300 m. It is represented by 47 ♂♂ and 10 ♀♀. The collecting locations are identical with those given for *C. owadai* above. The species is confined to Palawan. The subspecific status for this taxon on Palawan (= ssp. *palawanensis* KISHIDA, 1991) is not cited by most authors.

External diagnostics: ♂♂ 35–39 mm and with rounded front wings, fasciae orangy-red. A well developed full subbasal. Medians 2 mm wide at the outer wing border, reducing in width towards the costa. Marginal band 2.5 mm. An orange cellular wedge from the antemedian points to the almost merged outer discal spots. The inner black margin is basad convex, standing with a 0.1 mm outward curved section acute on the outer margin. The black border is thinning towards the costa, on the postmedian outwardly only prominent on the outer wing half.

♀♀ 4–5 mm larger than ♂♂, similar but fascia over its full width 2 mm wide and the margin up to 3 mm at the tip. Black borders are heavy and not reduced. Those outside the postmedian lightly undulated. A single cellspot and ochre hindwings.

♂ **genitalia** (Figs. 5c–5f): armature and harpe like *C. gabriella*. The saccus distally widened. The phallus is 2.1 mm long. The valves are 3.3 mm long, The valve base is widened at its base and is inwardly dented. The dorsal lobe is 0.2 mm wide and 0.3 mm longer than the ventral lobe. It is relatively long, flat and ends rounded, is slightly inward curved and without projections. At its centre there are longitudinal reinforcements. The ventral lobe is almost 1 mm at its base. It ends with a short but heavy perpendicular hook, pointing outwardly. In its inner curve this lobe carries an oval field of very short and study hairs, identical to *C. barisana* ROESLER & KÜPPERS, 1976(: 167) with which the species also shares an identical phallus.

♀ **genitalia** (Figs. 5g–5h) are almost 11 mm in length, with a 2.5 mm wide atrium copulatrix covered by a straight 0.3 mm wide semicircular arc. The bursa copulatrix of 8.3 mm is exceptional large. It resembles an egg-plant fruit. At its base there is a denser structured section of 2 mm which is slightly contracted. It is laterally attached to the atrium by a very short ductus bursae from a flattened basal section of the bursa. See also ČERNÝ (1993: 94, fig. 96). The bursa has a single macula of 0.1 mm before the apex and shows vague shades of internal tubular structures.

Taxonomic note

The following three very large endemic Philippine species, with ♂ wing-spans >4 cm and ♀ wing-spans >5 cm, with extreme wide marginal bands exceeding 7 mm, are tentatively subgrouped in the *rosabra*-section. The taxa are undisputedly differentiable by habitus in their the degree of being predominantly orange coloured arising from widening of the subbasal and median fasciae, most advanced in *C. rosabra* from Luzon and Negros. In the

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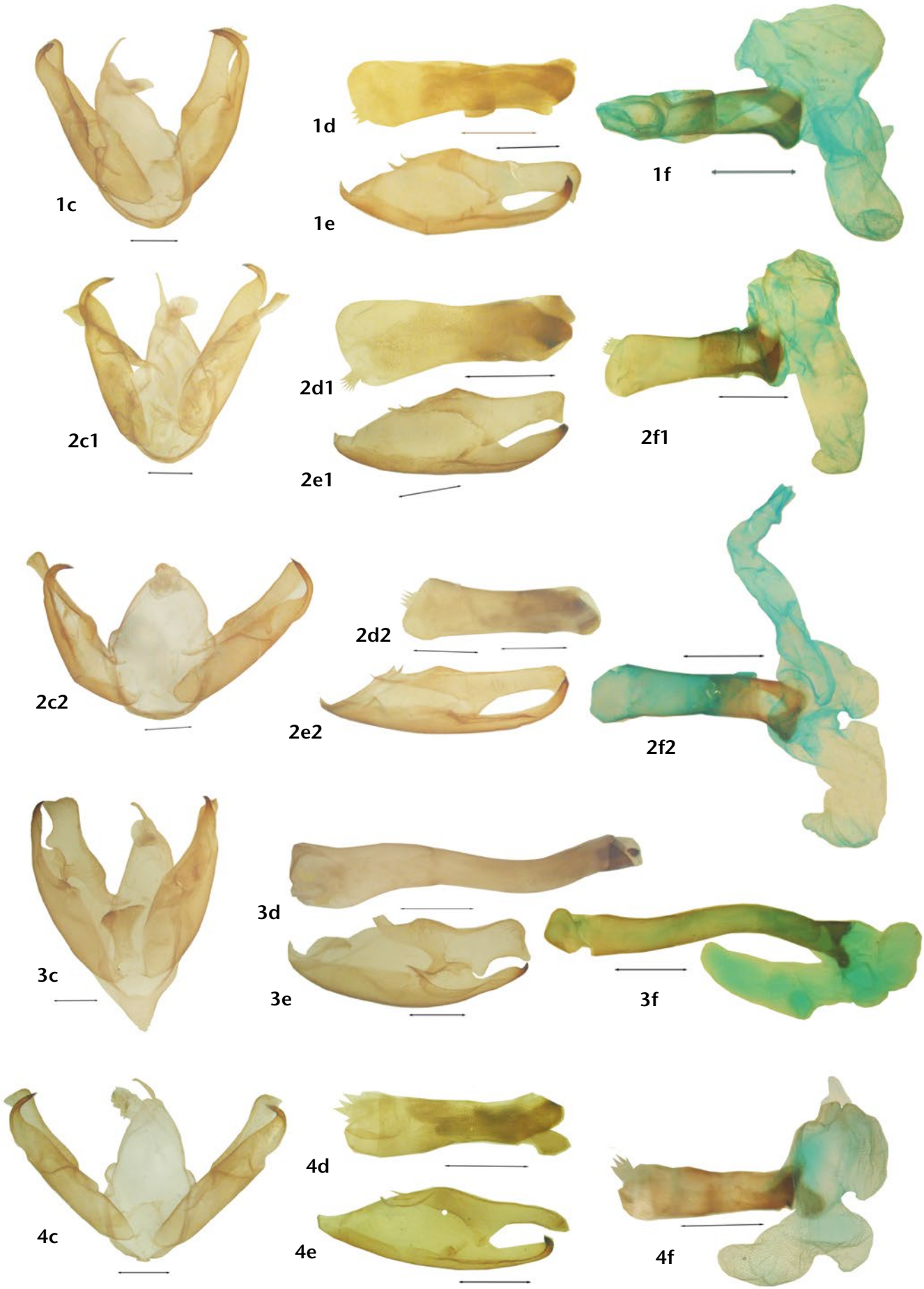

Plate 2: Male genitalia of *Cyana*. — **Figs. 1c–1f:** *C. gonypetes gonypetes,* Bongabon (GP 1081). — **Figs. 2c1–2f1:** HT *C. gonypeytes visayana* ssp. n., Negros (GP 1086); **Figs. 2c2–2f2:** PT *C. g. visayensis,* Panay (GP 1085). — **Figs. 3c–3f:** *C. owadai,* Palawan (GP 5). — **Figs. 4c–4f:** *C. gabriellae,* Mindanao (GP 1089).

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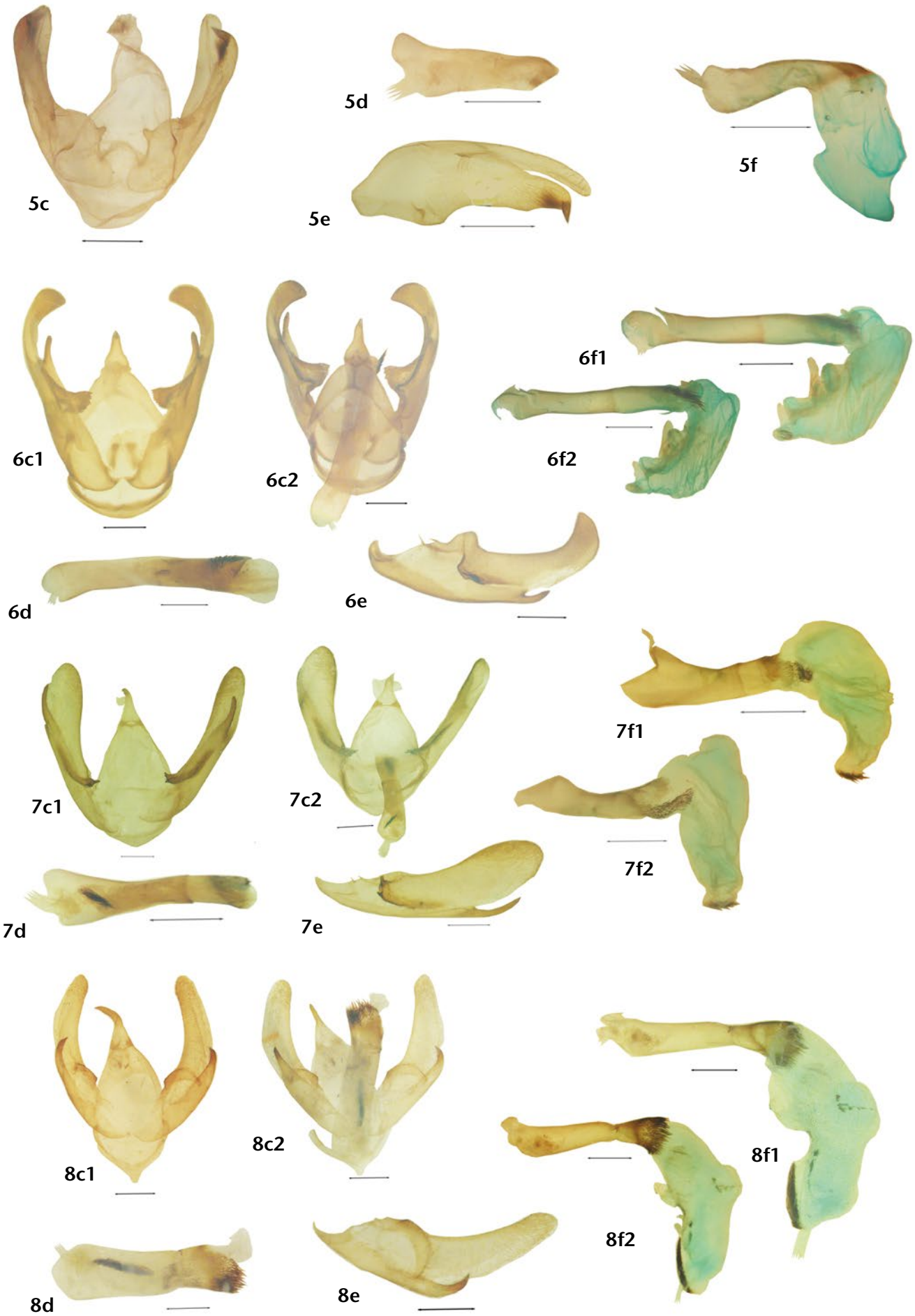

Plate 3: Male genitalia of *Cyana*. — **Figs. 5c–5f:** *C. malayensis palawanensis,* Palawan (GP 1088). — **Figs. 6c1–6f2:** *C. cara,* Mindanao (GP 1090). — **Figs. 7c1–7f2:** *C. andromeda,* Mindanao (GP 1091). — **Figs. 8c1–8f2:** *C. rosabra,* Mindanao (GP 375).

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forthcoming detailed analyses of genitalia components of both genders an effort is made to investigate whether and how these giants might be related to the five above described similarly large Philippine species.

Cyana cara Kishida, 1991 comb. rev.

(Figs. 6a ♂, 6b ♀.)

Cyana cara: Kishida (1991: 64, figs. 17a, b).

Doliche cara: Černý (1993: 53).

Distributed on Mindanao, Leyte and Samar with the following new references:

Mindanao: N: 16 ♂♂, 1 ♀, Misamis Or., 22 km E Claveria, Brgy. Mat-I, 1050 m, 8°39.988' N, 124°59.686' E, 20. iii. 2009, prim. forest, leg. JHL & Černý. — Central: 16 ♂♂, 3 ♀♀, Cagayan, 3 km NW Diminorog, S Talakag, W slope Mt. Kalianlian, primary forest edge, 1270–1300 m, closed canopy forest, 7°54.719' N, 124°38.159' E, 28.–30. ix. 2011, leg. JHL & S. Naumann. — SE: 21 ♂♂, East flank Mt. Apo, Baracatan, 1060 m, 7°0.541' N, 125°22.436' E, 29. ix. 2011.

Leyte: SW: 1 ♂, 12 km N Ormoc, Lake Danao, 700 m, 11° 4' N, 124°42' E, 29.–30. vi. 2006.

Samar: Central: 3 ♂♂, 4 km SE Bagacay, prim. forest, 140 m, 11°48' N, 125°15' E, 20. vi. 2006 (1 ♂), 21.–22. x. 2006 (2 ♂♂).

External diagnostics: Rounded front wings and uniform fascia colours of both genders crimson except the outer margin which is light ochre with a crimson inner border. The ♂ has a 4 mm wide basal white field, which on the outer half is filled with a broad crimson triangular wedge, just not connected to the antemedian. The subbasal is 2 mm wide, straight with a 0.5 mm inner black margin which is inwardly dented. The intermedian white band is reduced to 2 white spots, a square one on the costa 2 mm wide and a larger oblong spot on the outer wing half, separated by a transverse bar over the discal field. The male has no cell spot. The postmedian has a heavy outer black margin and borders a narrow white zone to the marginal band, which is at the cell interrupted by a pointed tongue, overlaying the black edge.

In the ♀, the antemedian is 3 mm wide, similar to the width of the intermedian white zone. The single cell spot is black. On the Cu vein an outward thorn bridges over to an opposite protrusion from the postmedian. The black margins carry inwardly a narrow zone of ochre. The subbasal is on the costal half black, with a distinct central dot.

♂ genitalia (Figs. 6c1/6c2, 6d–6e, 6f1/6f2): See also the description by Černý (1993: 53). Armature in situ 5 mm long with a 4.5 mm long inward curved spatula shaped dorsal valve, terminally asymmetrical rounded with an inward protrusion. The valve lobe with a central inward sclerotized fist-shaped structure, edged with small dents, pointing to the harp. The ventral lobe is reduced to 0.5 mm and carries no hook. The phallus is 4.3 mm long and 0.6 mm wide. At the apex ornamented with a 0.7 mm elongated cornuti field. At the phallus centre lies a small circular cornuti field that eventually will reappear at the very end of the vesica. The vesica is croissant-shaped 3 mm long × 1.5 mm wide, approx 45° acutely positioned with the phallus hull. Its inner border carries circular and tubular lightly chitinized appendices.

♀ genitalia (Figs. 6g–6h): An extreme large, > 8 mm long structure, with a 2.5 mm × 1.5 mm atrium copulatrix, a 3.5 × 0.6 mm heavily chitinized flat ductus bursae and an almost 4 mm egg shaped bursa copulatrix. The atrium arc is 0.5 mm wide. The proximal part of the ductus carries on either side curved hooks with a central proximal undulation. The duct is just above the centre sinusoid bulged, and attaches laterally to the bursa. At the bursal surface there are two almost similar 2 × 1 mm spiny signae.

Cyana andromeda (Černý, 1993) comb. n.

(Figs. 8a ♂ and 8b ♀.)

Doliche andromeda: Černý (1993: 52).

The species is only known from locations in North and Central Mindanao.

Mindanao: 3 ♂♂, Misamis Or., 22 km E Claveria, Brgy. Mat-I, 1050 m 8°39.988' N, 124°59.686' E, prim. forest, 2. iii. 2006, leg. JHL & K. Knoblich (1 ♂); 21. iii. 2009, leg. JHL & Černý (2 ♂♂). 6 ♂♂, C,14 km NE Maramag, Brgy. Bagong Silang, 1480 m, 7°55.049' N, 124°54.049' E, 27.–28. ii. 2009, leg. JHL & K. Knoblich. 13 ♂♂, 3 ♀♀, Cagayan, 3 km NW Diminorog, S Talakag, W slope Mt. Kalianlian, primary forest edge, 1270–1300 m, closed canopy forest, 7° 54.719' N, 124°38.159' E, 28.–30. ix. 2011, leg. JHL & S. Naumann.

External diagnostics: The rounded front wings of ♂♂ are uniformly brick reddish orange , those of females light orange similar as the hind-wings of both partners. In the male, the centre white spot on the costa is oblong 3 mm wide (those of *C. cara* and *C. rosabra* ♂♂ 2 mm or less).

The white zone between the medians of the ♀♀ is patchy in three sections, the one on the costa oblong and 4 mm wide. The single cell spot touches the postmedian with an orange wedge to the antemedian.

♂ genitalia (Figs. 7c1/7c2, 7d–7e and 7f1/7f2): The armature is 5 mm long with the saccus rim slightly protruding. The dorsal valve of 4 × 1.1 mm at the centre, is eggplant shaped, rounded and wider at the apex and with a double lateral dented heavy base, hinging on the harp legs. This lobe is light inward curved. The ventral lobe is short, just over 1 mm. The phallus is 2.8 × 0.5 mm at the centre, but has a 0.8 mm wide base with one 0.5 mm long proximal diagonal cornuti field and a terminal field with long spines at the apex. The 2.5 mm long croissant shaped vesica stands perpendicular to hr phallus hull and is proximally bulgier than the downward lobe. This is distally narrowing and carries at the end a rounded cornuti ornamented plate.

♀ genitalia (Figs. 7g–7h): An extreme long (8 mm) structure, with a trapezoid widening atrium copulatrix covered by a 0.5 mm wide band. The ductus bursae is 2 mm long, heavily chitinized sausace shaped tube, lightly narrowing ar the almost central entry point of the 3.5 mm long oval shaped shaped bursa copulatrix. The bursa is somewhat pear-shaped and carries two 1.2 mm long spiny signae opposite to each other.

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Cyana rosabra Wileman, 1925, comb. rev.

(Figs. 8a ♂ and 8b ♀.)

Cyana (Chionaema) rosabra: Wileman (1925 [October]: 241).
= *Chionaema benguetana:* Schultze (1925 [December]: 573).
Doliche rosabra: Černý (1993: 50).

This species is confined to Luzon and Negros Island as per the following recent specifications:

Luzon: N: 1 ♂, Quirino Prov., S. Madre, 35 km E Naptipunan, S. Pul. Lupa, 15°58' N, 121°29' E, 11.–12. iii. 2005. — W: 4 ♂♂, Abra Prov., E Malibcong Basiwag, 17°30.200' N, 120°58.881' E, 1690 m, 17.–18. iv. 2007. — E: 37 ♂♂, 1 ♀, Aurora/Isabella Prov. border, Dinapique, 22 km NW Dibulo, 16°33' N, 122°13' E, logged prim. forest, 7.–9. ix. 2005 (1 ♂); 3.–4. ix. 2006 (3 ♂♂); 21.–27. ix. 2006 (2 ♂♂); 14.–15. vi. 2007 (24 ♂♂, 1 ♀): 21.–23. ii. 2007 (3 ♂♂); 5.–6. ix. 2006 (3 ♂♂); 24.–25. ix. 2008 (1 ♂). 11 ♂♂, 3 ♀♀, Nueva Ecija Prov., Bongabon Brgy. Laby, Sierra Madre, Mingan Mts., 950 m, 15°38' N, 121°15' E, 15. viii. 2005 (1 ♂); 7.–9. ix. 2005 (18 ♂♂,1 ♀); 7. vi. 2005 (1 ♀); 16.–17. viii. 2005 (7 ♂♂, 1 ♀); 6.–7. ix. 2006 (2 ♂♂); 26.–27. ix. 2008 (1 ♂).

Negros: Or.: 26 ♂♂, 1 ♀, NE Don Salv. Benedicto, Barangay Bagong Silang, ft. Mt. Mandalagan, 770 m. 10°36.017' N, 123°16.127' E, prim. hill forest edge, 19.–20. vi. 2009. —Occ.: 18 ♂♂, 14 km W San Jose, Dumaguete Twin Lakes, ft. Mt. Guinsayawan, 900 m, 9°21.660' N, 123°10.795' E, edge swampy hill forest, 23.–24, vi. 2009.

External diagnostics: Both genders have rounded front wings and are a grade lighter, slightly duller orange than the closely resembling *C. andromeda*. *C. rosabra* is diagnostic distinguishable by the white colour of the metathoracal hump. In ♂♂ the triangular (crimson) subbasal outer section connects to the antemedian, interrupting the black margin. The intermedian white zone is reduced to two small white spots, the one on the costa 2 mm, the inner one often missing. ♂♂ have no black cellspot but instead a longitudinal red zone over the discal cell connecting to the upper part of the marginal band.

In ♀♀ the subbasal crimson triangle touches the inward black dent of the antemedian. The intermedian band has vanished, except for a 3 mm oval white spotlet surrounding the black discal spot.

The hind wings of both genders are light ochre.

♂ genitalia (Figs. 8c1/8c2, 8d–8e, 8f1/8f2): The armature is 5.1 mm long and the uncus at the tip lightly tongued. The valves are 4 mm long, at the base just over a mm wide. The dorsal lobe is 2.2 mm long, inwardly slightly banana-like curved, at the centre 0.7 mm and gradually thinning towards its rounded apex. It meets the lobe base with a structural heaver serrated base and has a transverse arc to the ventral lobe. The ventral lobe is reduced to a 1 mm slightly inward curved thorn. The phallus is 4.4 mm long and 1 mm wide. It has at its base a 1.2 mm elongated cornuti field and a terminal thick aggregate of larger cornuti. The vesica of 4 mm is at its base rounded and extends as a light inwardly curved cucumber and stands 90° with the phallus hull. It displays the large cornuti field terminally at the inward border. Inside the curve there are several small fingerlike protrusions. The phallus has inside regular patterns of small sclerotized plates.

The **♀ genitalia** (Figs. 8g–8i) measure 5.4 mm, with a 1.8 mm wide atrium copulatrix, a 3 mm long heavily chitinized ductus bursa with an 1 mm diameter circular lateral outgrowing structure at its base, and a proximal as well as distal flattened bursa copularix with two gigantic signae on either side. The apical signum plate is 2 × 0.7 mm and has at its circumference approx 40 cornuti like thorns and approx. twice this number at its inner and outer flanks. The proximal plate is about double the size and on one side S-shaped. The heavy ductus bursae attaches laterally in between them. The ductus bursae is 1.3 mm wide, inwardly hollow and laterally compressed.

Discussion

Trends in external features of imagines

The orange front wing fasciae of the eight Philippine taxa preliminarily assembled in the *gonypetes*-group are uniform with respect to their acute positioning of both medians on the outer wing border, but vary considerably in width and the degree of parallelism of the bands. The subbasal is sometimes only partially expressed on the costal wing half and in almost all taxa fully reaching the outer border by means of a distinct wedge. This wedge is in three taxa of the almost fully orange coloured Philippine species assembled in the *rosabra*-section so excessively wide that it almost entirely fills up the outer section of the white band between the subbasal and the antemedian. The species placed into the *rosabra*-subgroup have rounded front wings in both genders, whereas those of the designated section *gonypetes s. str.* are only rounded in ♀♀. The ♂♂ of the group of *gonypetes s. str.* possess an aileron-like wing tip, a dented protrusion on the front wing at the outer margin, just below the apex. The majority of species assembled in the *gonypetes*-section have their postmedian on the costal wing half inwardly diagonal broken or undulated up to an angle of 130°, and in ♂♂, the inner cellspot sometimes replaced by an orange (seldom black) wedge. Of the Philippine species united in the *gonypetes*-section, *C. g. gonypetes* (Prout, 1919), *C. g. visayana* ssp. n. and *C. gabriellae* (Černý, 1993), only *C. gabriellae* has an orange ♂ discocellular wedge.

At least 10 similar taxa, distributed on the main Sundanian Islands, the Malay Peninsula and in continental SE Asia, fit within this wing feature variation range of the Philippine species: *C. j. javanica* (Butler, 1877), *C. j. sumatrensis* (Druce, 1899), *C. plateni* (Elwes, 1891), *C. barisana, C. bebas* Roesler & Küppers, 1976, *C. garuda* (Roesler & Küppers, 1976) and *C. cruentata* (Talbot, 1926); *C. conclusa* Walker, 1862, *C. paeninsulana* Černý & Pinratana, 2009, and *C. perornata* are very similar in habitus. They occupy distinct zoogeographical zones within the very large distribution area of this presumed clade, ranging from Bangladesh, Nepal, southern China,

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Myanmar, Thailand and in the east 1 species (*C. plateni*) on Celebes, beyond the Wallace line. This large species had earlier been considered a subspecies of *C. javanica* until Roepke (1946) illustrated its genitalia. Territories of some of the above species sometimes overlap, but they are highly likely taxonomically properly defined despite only being sparsely supported by evidence derived from genitalia structures.

C. malayensis closely resembles *C. gabriellae,* but is diagnostical differentiable by the round ♂ front wing shape, similar to the ♀, and the slight, but distinctive, broader fasciae than the Philippine *gonypetes*-group taxa, especially the marginal band. The *C. malayensis* ♂ displays a short orange outward wedge arising from the antemedian and pointing towards the almost merged outer discal cellspots. This wedge is larger in *C. javanica, C. bebas, C. conclusa* and is displayed as an orange classical rounded inner cellspot in *C. paeninsulana*. The ♂♂ of these four taxa carry the distinctive aileron wing extension of the *gonypetes*-group and look very similar, apart from the orange discoidal wedge.

The postmedian usually meets the costa obtusely, running from the wing center to the inner branch of the (commonly) dichotome split ending meeting point with the costa. The outer branch is in *gonypete*s visable as a spot on the costa. In *C. cruentata* (from Borneo, Sarawak) the triangle between the dichotome branches is almost fully orange filled. The postmedian is (exceptionally) straight in this species. There is a prominent orange wedge from the marginal band connecting to the discal cell. This unique feature forms a basic common component of three endemic Philippine species in the designated subgroup of *C. rosabra,* most noticeable in *C. cara.*

Another broad-banded species with the *gonypetes* ♂ aileron front wing feature, *C. conclusa,* is only known from a few specimens like the ♂ illustrated by Černý (2009) from Krabi (SE Thailand) which displays on the outer wing half of the postmedian a wedged inward protrusion, similar as in both genders of *C. cara* and *C. andromeda* from Mindanao of the Philippines. This ♂ basal white field tends to form a semicircle and has consequently lost its acute positioning. The ♀ still has the acute positioning, an exceptional wide subbasal and a very broad marginal band almost as wide and shaped as in *C. cara.* Two round-winged species with almost straight transverse fasciae (*C. barisana* from SW and N Sumatra and *C. paeninsulana* Černý & Pinratana 2009 from the SW Thai Peninsula) have similar habitus features as *C. malayensis,* especially the ochre outer margins which are distinctly separated from the outer cilia.

♀♀ of the *gonypetes*-group always have sinusoid or distinctly broken postmedians. In most species, the imaginary straight projection of the unbroken section of the postmedian points to the outer leg of the dichotome branch (often only visible in males as a dot on the costa), and the curved section connects or runs towards the inner leg. In the taxa of the *rosabra*-section, the postmedian is not split. In *C. owadai* and the continental *C. perornata* the fasciae width is very narrow and both species have at the centre an inward dent. They do resemble *C. gonypetes*.

The black margin plays an independent role with regard to the degree by which this feature is expressed on the medians. It usually fully follows the inner antemedian and outer postmedian edges although it varies in width and intensity. It is effectively a valuable parameter for differentiation. The new subspecies *C. gonypetes visayana* recorded for Negros and Panay Islands displays a thin black margin on the straight section of the postmedian (in $n = 45$ specimens) without a single exception, whereas this feature is absent on specimens ($n = 94$) from Luzon, Mindoro and Marinduque Islands. The nominotypical species can have black bordering at the inside of the antemedian at the costa and the subbasal diagonal wedge to the outer wing border. Both taxa have black dots at the centre of the subbasal.

Trends in structural features of males

The ♂ armatures are homogeneous in layout and carry formidable, 4–5 mm large, valves with uniform harps and sometimes slightly lobed saccae. The valve bases are broad and robust and usually carry a rigid ventral lobe with a strong inwardly curved hook. The length of this ventral valve lobe varies: is almost equal to the dorsal lobe in *C. gonypetes* and *C. owadai,* shorter in *C. gabriellae* and more contracted in *C. malayensis*. This ventral lobe is reduced to half in *C. andromedae,* only 1 mm in *C. rosabra* and 0.5 mm in *C. cara.*

The dorsal lobe has undergone significant extension modifications, in comparison to those of the taxa in the *insularis*-group of species (Lourens 2017) which in this group have shrunk to insignificant appendices. In *C. gonypetes* the dorsal lobe has widened to 0.4 mm and ends bluntly with an inward pointed axially torded apical section of the lobe, inflicting a small round incurvation. The lobe's base is inwardly pointed to the hinging point with the harpe. At the lobe's inner centre, an inward ridge bridges over to the ventral lobe. This structure is held in position by ligaments. In some preparations it turned perpendicular and could easily be returned to its original position. The dorsal lobe structure is broader in *C. owadai* and further differentiated to shapes, which Roepke (1946) describes as "digitiform appendices" in his illustrations of the genitalia of *C. j. javanica*. The wonderfully detailed black and white ink sketches of the valves and the phallus views by Roepke confirm the close relationship of *C. javanica* and *C plateni* to the *gonypetes*-group as well as its diagnostic differential details in support of full species level designation attributed to these taxa.

The elongated triangular heavier chitinized shape over the valve base and the dorsal lobe with digitiform protrusions at the centre, seen in the Philippine and Sundanian species, can be considered characteristic for the

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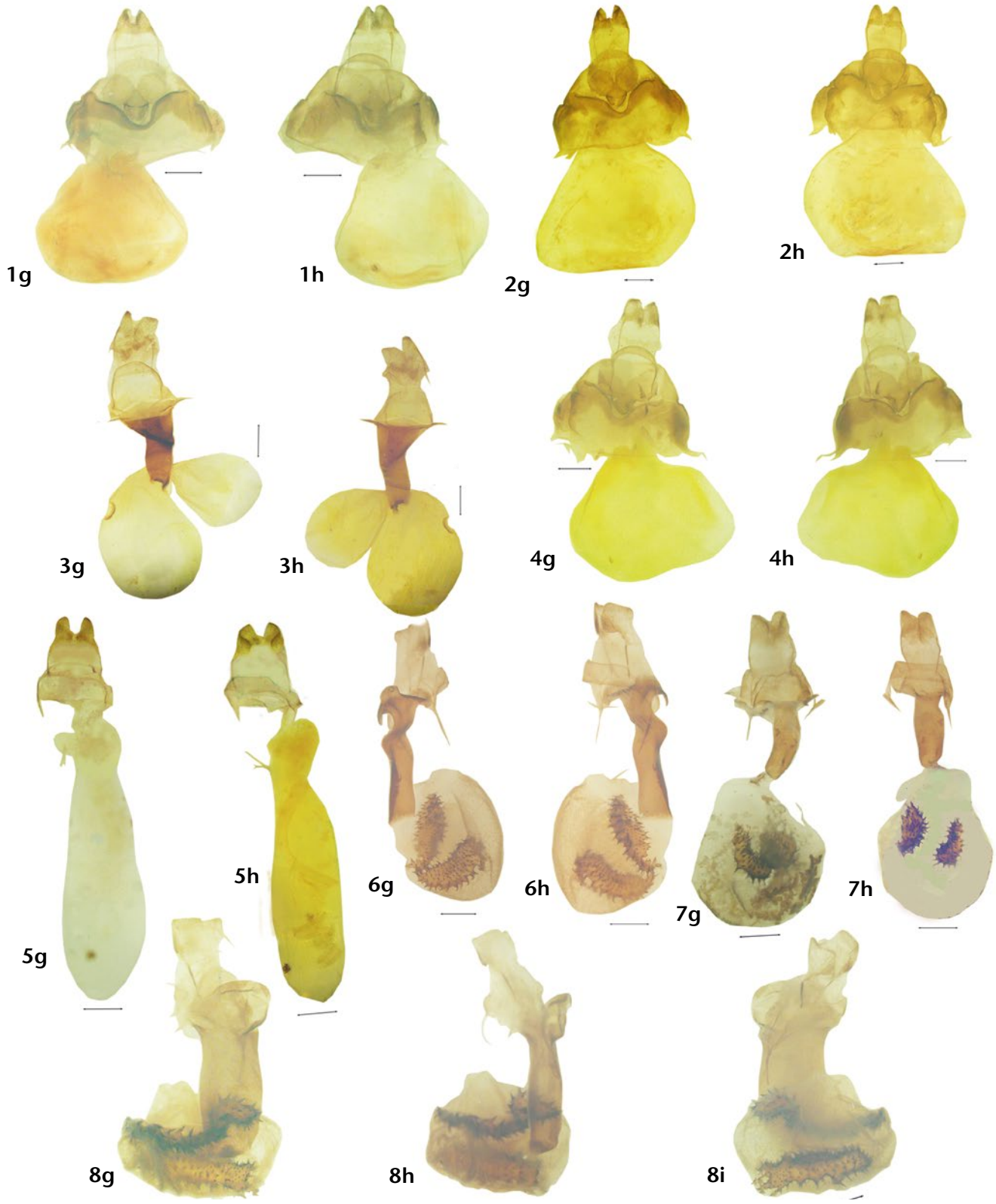

Plate 4: Female genitalia of Philippine *Cyana*. — **Figs. 1g + 1h:** *C. gonypetes gonypetes* (GP 1092). — **Figs. 2g + 2h:** PT *C. gonypetes visayana* (GP 287). — **Figs. 3g + 3h:** *C. owadai,* Palawan (GP 1098). — **Figs. 4g + 4h:** *C. gabriellae* (GP 1093). — **Figs. 5g + 5h:** *C. malayensis palawanensis,* Palawan (GP 1094). — **Figs. 6g + 6h:** *C. cara,* Mindanao (GP 1097). — **Figs. 7g + 7h:** *C. andromeda,* Mindanao (GP 1096). — **Figs. 8g + 8h** (90° rotated) + **8i:** *C. rosabra,* Luzon (GP 1095).

gonypetes-group. In *C. malayensis, C. rosabra, C. andromeda* and *C. cara* the dorsal lobes end without terminal lateral projections, but are instead species-specific elongated, broadened and curved. The triangular shape has shortened but the lobes base has formed a dent in *C. malayensis,* a saddle in *C. rosabra,* and has increased to heavy structural clamps in *C. andromeda* and *C. clara*.

The phallus shapes of 13 so far illustrated taxa have in lateral view an apical heavier chitinized darkened section, sometimes shaped as two partial circular sections or as a full circle. The phallus hull is hyaline, but sometimes wrapped in a rigid circular ligament which is hard to remove and can shift to various positions. *C. malayensis* has a short 1.5 mm phallus, those of *C. gonypetes* and

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the very similar *C. gabriellae* measuring 2.5 mm. The phallus of *C. andromeda* is 2.5 mm, similar in shape as *C. malayensis* but thinner (0.4 mm) and double its size. *C. owadai* has a 4.5 mm long and a narrow, only 0.3 mm wide phallus. Those of *C. rosabra* and *C. cara* are 5 mm long and 0.6 mm at the centre. In *C. owadai* there is a minuscule spot-like cornuti aggregate at the apex. This feature has also been illustrated in Roepke's (1946: 47, fig. 4) illustration of *C. perornata*. Two species of the *rosabra*-section (*C. rosabra* and *C. andromedae*) have 0.5–1 mm elongated cornuti fields inside the proximal part of the phallus, whereas this feature sticks out of the phallus apex and maintains this position in *C. cara*.

The vesica shapes of the so far dissected 8 Philippine species of the *gonypetes*- and *rosabra*-sections have a good degree of similarity in shape, resembling somewhat of a (pastry) croissant, which shapes are difficult to define and characterize. The vesicas of the *gonypetes*-section taxa attach just under the internal denser structured section of the vesica opposite the diagonal border of the triangular shaped chitinized plate at the apex. In $n = 4$ replicates, the upper section of the vesica showed some variation in short lobes, from which on one occasion a long ductus ejaculatorius arose. A large, 1.8–2 by 0.8–1 mm lighter structured lobe, with a half-croissant terminal curve, positions obtusely with the phallus shaft. This lobe is backwardly positioned in *C. gabriellae,* similar as in *C. owadai*. The vesica shape of *C. malayensis* has similarity with the shapes of the species of the *rosabra*-section, standing either close to 90° on the phallus hull or are acutely angled as in *C. cara*.

Trends in structural features of females

The ♀ genitalia structures of the recently discovered ♀♀ of *C. gonypetes gonypetes* and *C. gabriellae* disclose convincing diagnostic differences between them, as well as signs of a considerable degree of relationship. Their atria copulatrices are very similar in shape and extremely (4.5 and 3.5 mm, respectively) wide, laterally extended. The genitalia of one dissected specimen of the new subspecies *C. g. visayana* more closely resembles *C. gabriellae* in the similar bursal attachment position and the light asymmetry of the atrium copulatrix yoke. These species have in the narrow conic section connecting to the valvae, a stirrup-shaped arc, standing on a shoulder-yoke shaped second transverse band. This well chitinized transverse structure is heavier in *C. g. gonypetes*. The very large pear-shaped bursae are in *C. gonypetes* laterally connected and in *C. gabriellae* attached at the centre. Both taxa have terminally minimally thin signae and a just detectable very small macula. *C. owadai* also has the distinct heavily chitinized and flattened ductus bursae, a central connected lemon-shaped bursa (with a smaller laterally attached pseudobursa) and a single 0.5 mm insulcated and dented macula at one lateral side of the main bursa.

C. malayensis has over the atrium copulatrix a regular, narrow transverse band, similar in shape as the three *rosabra*-section taxa. The cucumber-shaped bursa of *C. malayensis* is 8.4 mm long. Its base is flattened and is laterally attached to the atrium copulatrix. Inside the bursa there are tubular structures and square, slightly darker sections. It has a single lateral macula of 0.2 mm just before the apex.

The three taxa of the *rosabra*-section have the transverse atrium copulatrix bands, very similar as in *C. malayensis,* but are fully distinguished from this taxon by heavily chitinized, laterally flattened bursal ducts, probably functionally homologue with those of the *gonypetes* ♀♀.

The large tuber-shaped bursae contain two heavily plated signae with numerous solid thorns in *C. andromeda,* which are almost tripled in size in *C. cara,* and in *C. rosabra* fill up almost the entire bursa with a proximal sinusoid 4 mm transverse placed signum, each proportionally ornamentated with an increasing number of sturdy thorns. The signae structures composed of aggregates of spiny cup-shaped insulcations has never before been noticed in other *Cyana* taxa. A single unit hereof was seen under magnification at the upper lateral side of the bursae of *C. owadai* and *C. barisana.*

Conclusions

The large Philippine *Cyana* species, with remarkable diverse habitus features, can structurally be clustered into two different sections or subgroups, which are likely related. This whole entity is defined as the *C. gonypetes* group. Habitus features in combination with structural criteria derived from the previously unknown ♀ partners of *C. gonypetes* from Luzon, Mindoro and Marinduque, as well as *C. gabriellae* from Mindanao, Leyte and Samar, and the new subspecies *C. gonypetes visayana* from Negros and Panay Islands, provided clarification about the variability of an orange discocellular wedge, sometimes replacing the inner cellspot in ♂♂, which, in combination with a small triangular protrusion on the outer margin of the front wing of ♂♂, creates a specific wing shape. The taxa with ♂♂ carrying such "aileron" wing tips are united in the subgroup of *gonypetes sensu stricto*. Most of the species in this section have narrow fasciae. The group could be confirmed by structural differences in genitalia of both genders. The genitalia components of ♂♂ with such similar shaped front wings from Java, Sumatra, Borneo and Celebes, previously partly described and illustrated by Roepke (1946) and Roesler & Küppers (1976), support the incorporation of 8 Indonesian, 1 S. Thai Peninsular and 1 continental SE Asian taxa (see discussion) in the defined *gonypetes*-group.

The very similar looking species *C. owadai* from Palawan and *C. perornata* (Walker, 1854) from Borneo resemble *C. gonypetes* morphs, however lack the ♂ wing border extension and the discocellular wedge and have a

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single outer discal cellspot as well as incomplete subbasal fasciae position. This places these taxa out of the subgroup of *gonypetes s. str.*

The ♀ ductus bursa is very similar to 4 Philippine species with rounded wings in both genders. The roundwinged Sumatran *Cyana barisana* Roesler & Küppers, 1976, with cellular wedges in both genders, has an intermediate chitinized ductus bursae, an identical ventral valve lobe, and an intermediate funnel shaped sclerotized bursa copulatrix as *C. malayensis* with a single dented bursal signum as *C. owadai*. Although *C. owadai* appears seemingly closely related to the group of *gonypetes s. str.,* especially the ♀, several genitalia components such as vesica positioning, cornuti appearance and bursal signum, suggest that this species is transient to or might be descending from the *rosabra*-section. The characteristical lateral structure of the atrium copulatrix of the 3 species assembled in the *rosabra*-section, is assumedly homologue with the yoke-shaped lateral extension of the atrium copulatrix seen in the Philippine taxa of *C. gonypetes s. str.*

Further detailed analyses of the genitalia of the enumerated related taxa of the Sundanian islands is desirable for wider understanding of the intermediate evolutionary development position of these species by means of trend sequences, such as the possible stepwise modification of a relative simple structured dorsal valve lobe of ♂ *C. malayensis* noticeable in the assigned taxa of the *rosabra*-section. The ♂♂ of C. *malayensis, C. barisana* and *C. owadai* have almost identical phallus bases. So far, early development stages of the yoke-shaped atrium copulatrix as seen in ♀♀ of *gonypetes* and *gabriellae,* have not (yet) been found in any of the rare ♀♀ of the Indonesian taxa of the section *gonypetes s. str.,* and consequently there remain wide gaps in understanding of a potential stepwise development sequence of this feature. Four species (*C. cruentata, C. conclusa, C. perornata* and *C. paeninsulana*) have tentatively been included in this group. They lack structural genitalia confirmation, but their wing features very closely fit those of structurally confirmed members of the *gonypetes*-group, that their designation is likely.

The ailerated ♂ of *C. bebas* is thereby morphologically assigned to the section *gonypetes s. str.,* although it shows a small (perhaps remnant) apical cornuti aggregate outwardly of the phallus ornamentation rim, very similar as in *C. owadai. C. garuda* from Nias Island, 130 km off the south coast of Sumatra, harbours a rare ailerated species (known by two ♂♂ only) with a habitus closely matching *gonypetes,* also devoid of a discocellular wedge.

These unsolved discrepancies indicate that our knowledge and interpretation of zoogeographical distribution of the taxa in this obvious clade is still in an early stage. The demonstrated trends and similarities however justify to cluster these larger fascinating species in this unifying *gonypetes*-group, with likely two closely related lineages.

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