Arthropod collection, in particular beetles, with flight interception traps installed at 3200 m a.s.l.
(Photo by M. Leponce, paraecologist on the picture: C. Dahl)

A new species of *Canalirogas* van Achterberg & Chen, 1996 (Hymenoptera: Braconidae: Rogadinae) from Papua New Guinea

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ABSTRACT

Canalirogas prangchudasringae n. sp., a colorful new species from Papua New Guinea, is described, illustrated and differentiated from all other members of the genus. The type specimen was collected during the course of the "Our Planet Reviewed – IBISCA Niugini 2012-2013" expedition to Wanang.

RÉSUMÉ

Une nouvelle espèce de *Canalirogas* van Achterberg & Chen, 1996 (Hymenoptères: Braconidae: Rogadinae) de Papouasie-Nouvelle-Guinée.
Canalirogas prangchudasringae n. sp, une nouvelle espèce colorée de Papouasie-Nouvelle-Guinée, est décrite, illustrée et différenciée de tous les autres membres du genre. Le spécimen type a été collecté durant l'expédition « La Planète Revisitée - IBISCA Niugini 2012-2013 » à Wanang.

INTRODUCTION

The Rogadinae are a large subfamily of Braconidae dominated by two very large genera, the principally Old World *Aleiodes* Haliday with nearly 600 described species and undoubtedly many more yet to be described (Butcher *et al.* 2012, Quicke 2012), and the largely New World *Triraphis* Ruthe. The remaining 45 or so recognized genera are, with the exception of three genera of Stiropiini, largely Palaeotropical. This tropical diversity has been rather neglected until the papers of van Achterberg (1991) and van Achterberg & Chen (1996) which laid frameworks on which generic placements

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could be based and provided keys to the genera known at that time. Since then a small number of new genera have been described (Quicke & Butcher 2011, Quicke *et al.* 2012, Quicke *et al.* 2014, Butcher & Quicke 2015, Quicke & Butcher 2015) and the boundaries of the subfamily somewhat extended (Butcher & Quicke 2014).

Canalirogas van Achterberg & Chen (1996) is an Indo-Australian genus ranging from India, Nepal and China through to Southeast Asia to Papua New Guinea. The ventrally strongly convex hypopygium, ventrally curved ovipositor, as well as molecular data, place it in the tribe Rogadini. As with all other Rogadinae (biology of Betylobraconini remains unknown), they are koinobiont endoparasitoids of lepidopteran larvae which they mummify before pupating (Zaldivar-Riverón *et al.* 2008). One specimen from Sumatra, tentatively identified as *C. balgooyi* Achterberg & Chen, 1996, has been reared from an unidentified, strongly ornamented, lymantriid larva (Quicke & Shaw 2005). Thus far only 21 species have been described, 11 in the original generic description and then a further 10 from Vietnam (Long & van Achterberg 2015). The genus may be recognized using the key in Chen & He (1997). Unpublished observations and molecular phylogenetic analyses of specimens, mostly from Thailand, suggest it may contain many cryptic species.

MATERIALS & METHODS

The only known specimen was collected in the course of the "Our Planet Reviewed – IBISCA Niugini 2012-2013" expedition. Sampling was conducted from 25 October to 10 November 2012 at eight sites placed every 500 m along an elevational transect set up on the north-eastern face of Mt Wilhelm and at Wanang (Swire) Research Station (175 m asl) a lowland forest distant of 63 km north of Mt Wilhelm. At each sampling site, four Malaise traps were set up every 100 m following the same contour line. The captures were daily collected and placed in a zip-lock bag with 90% ethyl alcohol. The material locally sorted to order, was then exported to the Muséum national d'Histoire naturelle (MNHN). From almost 2000 Braconidae specimens collected, only one specimen caught in Wanang belongs to the new species described here.

Terminology for body regions follow van Achterberg (1988); terminology for wing venation follows Sharkey & Wharton (1997) and Quicke (2015).

Illustrations were made using an Olympus SXZ16 microscope with automated multiple image capture at preset focal levels using an Olympus DP72 camera, and image combination using the Cell^D image processing system.

The type specimen is deposited in the Muséum national d'Histoire naturelle, Paris, France.

SYSTEMATIC PART

Family BRACONIDAE Nees, 1811
Subfamily ROGADINAE Förster, 1862
Tribe ROGADINI Förster, 1862

Genus ***CANALIROGAS*** van Achterberg & Chen, 1996

Type species. *C. balgooyi* Achterberg & Chen, 1996.

REMARKS — The type species is known from West Malaysia (type locality), Brunei, east Malaysia (Sabah, Sarawak), China (Guangxi, Hainan), India, Nepal and Indonesia (Bali, Sumatra).

Canalirogas prangchudasringae n. sp.

Figures 1, 2

DIAGNOSIS — Differs from all other known *Canalirogas* in its colour pattern with white metasomal tergites 1 and 2 sharply contrasting with more posterior black tergites. The only species previously known from the island of New Guinea is *Canalirogas heijningeni* van Achterberg, 1996, known from Irian Jaya (as well as from Halmahera; (van Achterberg & Chen 1996)). It differs from *C. prangchudasringae* n. sp. in having the first metasomal tergite 1.9-2.1× longer than apically wide, the head dark brown, contrasting with yellowish-orange mesosoma, hind femur and tibia infuscate and the wing membrane sub-hyaline.

TYPE MATERIAL — Holotype, female. **Papua New Guinea**. Province Madang, Wanang 3 station, 5.22767° S, 145.0797° E, 175 m, 22-23.xi.2012, leg. Basset, plot 1, understory; Malaise-MAL-WAN01-D05 P4904. (DNA voucher DQ-BKK00024, GenBank accession numbers: CO1 barcoding region KU745532, 28S rDNA D2-3 expansion region KU745531).

DISTRIBUTION — So far known only from Papua New Guinea.

DESCRIPTION — Length of body 9.5 mm, of fore wing 7.5 mm and of antenna 12 mm. Antenna with 63 flagellomeres. Terminal flagellomere acuminate. Median flagellomeres more than twice longer than wide. First flagellomere 1.1x longer than both the 2nd and 3rd separately, 2x longer than wide. Face smooth and shiny with punctures at the bases of setae (Figure 1B). Width of head: width of face: height of eye = 2.1: 1.0: 1.15. Inter tentorial distance: height of clypeus: shortest distance between tentorial pit and eye = 2.6: 1.15: 1.0. Malar suture deep. Frons flat, smooth, without midlongitudinal sulcus (Figure 1C). Shortest distance between posterior ocellus and eye equal to transverse diameter of posterior ocellus. Occipital carina strong (lamelliform) dorsally, obliterated ventrally. Mesosoma 1.5x longer than high, largely with rather dense, fine short, pale setosity and with conspicuous punctures at bases of setae (Figures 1D, 2A). Sides of pronotum with some vertical rugae anteriorly, largely smooth posteriorly (Figure 2A). Notauli finely crenulate along whole length, meeting at short midlongitudinal groove postero-medially. Scutellar sulcus wide with strong medial and submedial carinae. Scutellum with narrow crenulate groove subposteriorly. Precoxal sulcus hardly impressed, short, indicated by a few weak rugae. Propodeum with deep mid-longitudinal groove and several strong transverse carinae on posterior half that extend across medial groove (Figure 2B). Legs. Tarsal claws simple, with rounded basal lobe and only two or three small pectinate spines near extreme base of lobe. Fore tarsus 1.23x fore tibia. Lengths of hind femur [excluding trochantellus]: tibia: basitarsus= 1.5: 1.86: 1.0. Hind femur 6.4x longer than maximally wide. Hind basitarsus 15x longer than maximally wide. Wings. Fore wing: Lengths of veins r-rs: 3RSa: 3RSb = 1.0: 3.0: 5.1. 1CUa: 1CUb = 1.0: 4.5. Hind wing: 1Ma 1.1x M+CU. Vein m-cu absent. Metasomal tergites largely coarsely longitudinally striate-rugose with finely sculptured interspaces. First tergite 1.3x longer than posteriorly wide; sides sub-parallel (Figure 2C). Second metasomal tergite with small mid-basal triangular area, midlongitudinal carina hardly differentiated from other longitudinal striation. Second metasomal suture rather shallow and broad. Tergites 3-6 with only weak medial depressions, and longitudinal striation only weakly diverging posteriorly. Posterior margin of 5th tergite rather raised forming an anteriorly directed medial point (Figure 2D). Color. Antennae black becoming slightly browner at apex; palps not infuscate; scapus, head, mesosoma, fore legs, mid coxae [remainder of middle legs missing] and hind coxae orange-red; first metasomal tergite white; hind legs beyond coxae, metasomal tergites 2-6 black; hypopygium whitish with dark brown blotch on either side; wings grey-brown with dark brown venation and pterostigma.

ETYMOLOGY — Named after Ms Prang Chudasring, daughter of the senior author's friend Piya Chudasring.

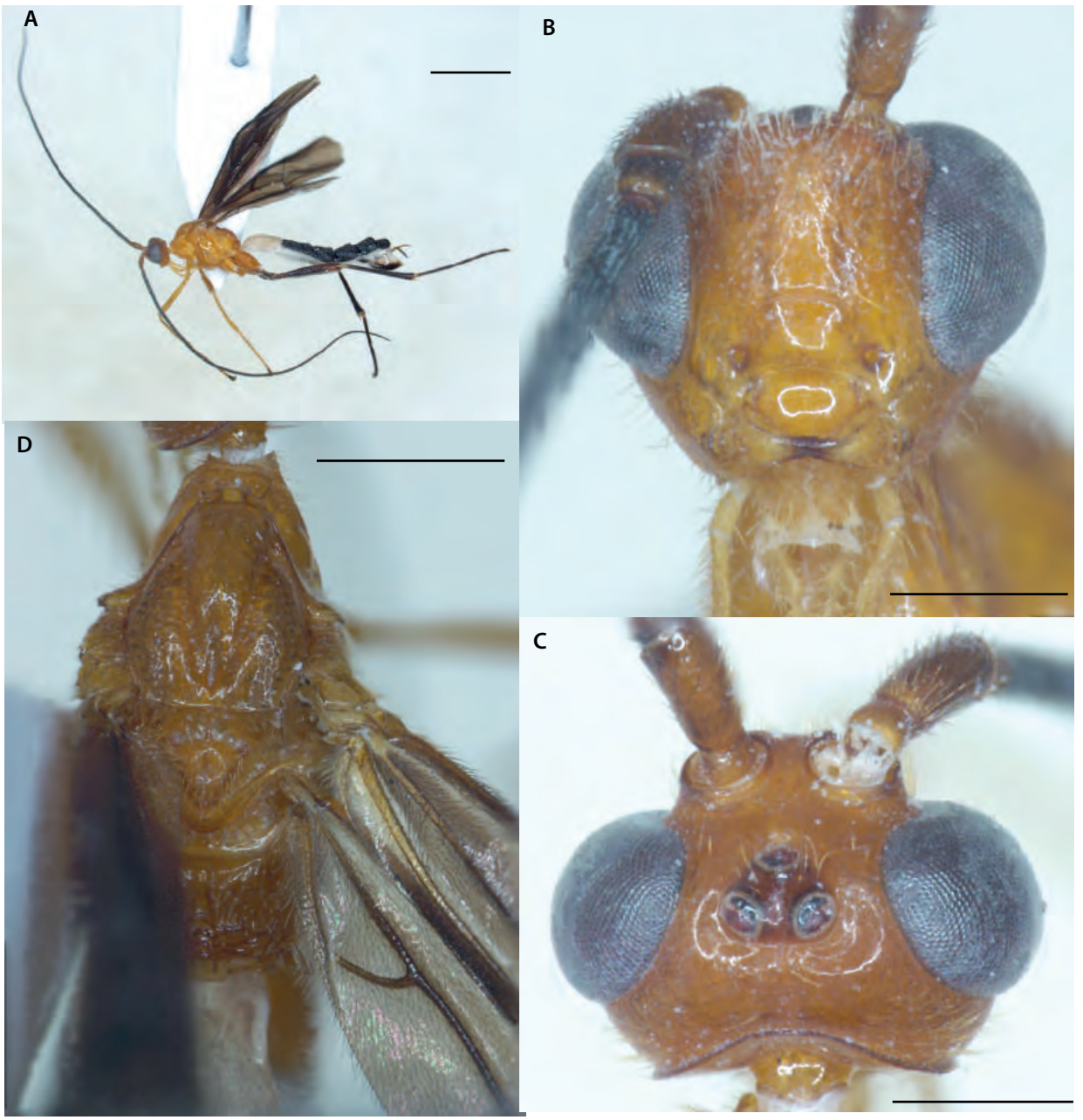

FIGURE 1

Canalirogas prangchudasringae n. sp. holotype female, 9.5 mm. **A**, habitus, lateral view. **B**, head, frontal view. **C**, head, dorsal view. **D**, mesosoma, dorsal view. Scale bars, A = 3 mm, B-D = 1 mm.

FIGURE 2

Canalirogas prangchudasringae n. sp. holotype female. **A**, mesosoma, lateral view. **B**, propodeum, dorsal view. **C**, metasoma, dorsal view. **D**, metasomal tergites 5 and 6, detail. Scale bars, A = 1 mm, B-D = 0.5 mm.

DISCUSSION

Most species of *Canalirogas* described so far are rather monotonous in their coloration, being predominantly yellow-brown with somewhat of an ophionoid facies and most specimens have been collected at light. The bright, presumably aposematic, colour pattern of the new species is typical of many parasitic wasp species, especially medium-sized Braconidae, from the Australasian region (Quicke *et al.* 1992, 2014; Austin *et al.* 1994; Butcher & Quicke 2014). It seems probable that the new species is predominantly diurnal like many of the more conspicuously colored Rogadinae.

A BLAST search (http://blast.ncbi.nlm.nih.gov/Blast.cgi?PROGRAM=blastn) of the barcoding gene sequence carried out on 17/2/2016 gave the best matches with only 87% similarity to various *Canalirogas* species and an 87% match to a sequence lodged as '*Triraphis*' (also Rogadinae) (voucher QL-2013, GenBank accession number KF385877), from an unpublished study by Q. Li, S.J. Wei, and X.X. Chen of braconid mitochondrial genomes. BLAST searching on the corresponding part of the '*Triraphis*' sequence similarly yields closest matches between 90 and 97% similarity to *Canalirogas* sequences, suggesting that perhaps the identity of the Chinese '*Triraphis*' needs confirmation.

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