A new species of *Kryptosega* Kimsey, 1986 (Insecta, Hymenoptera, Chrysididae, Amiseginae) from Vanuatu

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KEY WORDS
Insecta,
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new species.

ABSTRACT
Kryptosega mweramwera Villemant n. sp. (Insecta, Hymenoptera, Chrysididae, Amiseginae) is the first Chrysididae species recorded from Vanuatu. It was collected with Malaise traps on the Espiritu Santo Island during the SANTO 2006 expedition. The genus *Kryptosega* Kimsey, 1986 known to date by only two species, is recorded here for the first time outside of Papua New Guinea.

MOTS CLÉS
Insecta,
Hymenoptera,
Chrysididae,
Amiseginae,
Vanuatu,
espèce nouvelle.

RÉSUMÉ
Une nouvelle espèce de Kryptosega *Kimsey, 1986 (Insecta, Hymenotera, Chrysididae, Amiseginae) originaire du Vanuatu.*
Kryptosega mweramwera Villemant n. sp. (Insecta, Hymenoptera, Chrysididae, Amiseginae) est le premier Chrysididae signalé du Vanuatu. Il a été collecté au piège Malaise dans l'île d'Espiritu Santo au cours de l'expédition SANTO 2006. Le genre, qui ne comprenait jusqu'ici que deux espèces, est cité ici pour la première fois hors de la Nouvelle-Guinée.

INTRODUCTION

Among Chrysididae Latreille, 1802, Amiseginae Moscáry, 1890 are small antlike wasps that can be recognised by their metasoma with five visible segments in males and four in females, their flat or concave face, slender mandibles and needle-like ovipositor (Kimsey & Bohart 1990). Probably because of their cryptic life habits, these wasps had infrequently been collected, but recent efforts by Kimsey and her collaborators demonstrated that the world fauna is much richer than previously expected (Kimsey & Bohart 1990).

During the SANTO 2006 expedition, the Malaise trap design installed by the theme "Forests, Mountains, Rivers" in the northwest of Espiritu Santo Island, led to the collection of the first Chrysididae species from Vanuatu (Villemant 2011). Among them, we found a new amisegine species, represented by seven male specimens collected at about 900 m a.s.l. in moist mountain forest of the Penaoru region. After our close examination, the species revealed to be a new species of *Kryptosega* Kimsey, 1986, which is known from only two species and restricted to Papua New Guinea until now.

For a narrative and background of the SANTO 2006 expedition, see Bouchet *et al.* (2011a), and for a review of the geography and natural history of Santo, see Bouchet *et al.* (2011b).

MATERIAL AND METHODS

28 Malaise traps were set out by the senior author between 10 and 30 November 2006 in the forest area near the Penaoru village, on the ground or in the canopy, at predetermined altitudes (100, 300, 600, 900 and 1200 m a.s.l.) following the IBISCA (Investigating the Biodiversity of Soil and Canopy Arthropods) protocol (Corbara 2011). Seven specimens of the new *Kryptosega* species were collected in two Malaise traps placed on the ground at about 900 m a.s.l. in montane Kauri-Tamanu (*Agathis, Calophyllum*) forest (Munzinger *et al.* 2011). Sweep netting and yellow pan trapping were also performed to collect Hymenoptera on the undergrowth around the IBISCA sampling plots but none of these sampling methods enabled the collection of other specimens of this new species.

All type specimens of these new species are deposited in the Muséum national d'Histoire Naturelle (MNHN).

We used the morphological terminology of Kimsey & Bohart (1990). The mean and the range of measurements of the six male paratypes are given in brackets after the measurements of the holotype.

A digital camera (Canon Eos 50D) was used for the preparation of images. Several partially focused images were combined using CombineZM software and edited using Adobe Photoshop Elements® 6.0. SEM images were taken by using a fieldemission scanning electron microscope (Tescan VEGA II LSU).

In order to obtain barcode sequence of the new species, we cut right middle leg of the holotype and five paratypes. Total DNA was extracted using QIAmp DNA Micro Kit (Qiagen) according to the manufacturer's specifications. Sequences represent 648-bp fragment of the mitochondrial COI gene (the COI 5' region). This sequence was amplified by using the following primer pair:

LEP-F1, 5'-TTCAACCAATCATAAAGATAT-3'; and LEP-R1, 5'-TAAACTTCTGGATGTCC AAAAA-3' (Hebert *et al.* 2004).

Sequences were edited and aligned using CodonCode Aligner (3.7.1.1, CodonCode Corporation) and the original chromatograms are available on the BoLD web site (http://www.barcodinglife.com/) in a project file entitled HYSAN/Hymenoptera of Santo, CHRSA/Chrysidae of Santo.

SYSTEMATICS

Order HYMENOPTERA Linnaeus, 1758
Family CHRYSIDIDAE Latreille, 1802
Subfamily AMISEGINAE Moscáry, 1890

Genus *Kryptosega* Kimsey, 1986

This genus lacks most of the derived character states found in other Amiseginae genera, except that it has no hind coxal carina and no indication of a lateral propodeal angle. It may be recognised by the following character states (Kimsey 1986; Kimsey & Bohart 1990):

Occipital carina present; eyes not encircled by carinae; frons without median carina; clypeal mar-

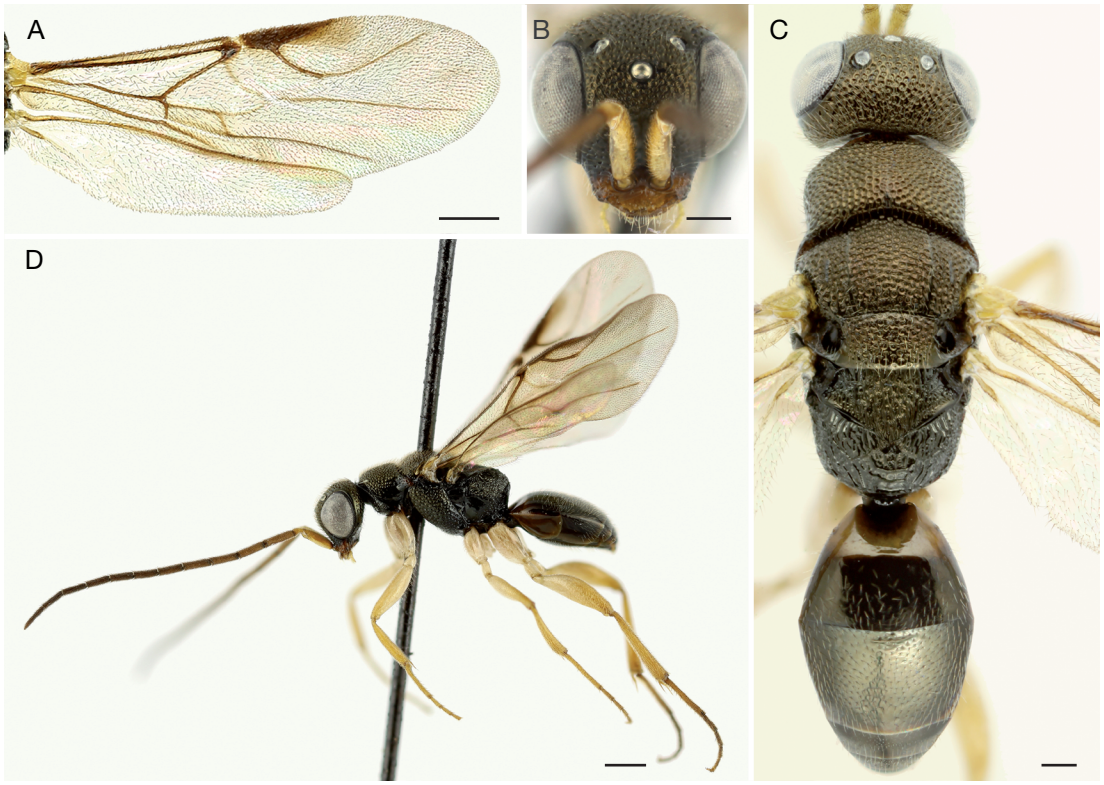

FIG. 1. — *Kryptosega mweramwera* Villemant n. sp. holotype (MNHN EY6350): **A**, forewing; **B**, head in frontal view; **C**, mesosoma and metasoma in dorsal view; **D**, habitus in lateral view. Scale bars: A, D, 0.5 mm; B, C, 0.2 mm.

gin thickened; malar space with vertical sulcus; flagellar segments cylindrical, flagellomeres 2-9 at least twice as long as broad in males; pronotum not thickened apically, or posteriorly declivitous. Mesopleuron without omaulus or scrobal sulcus; metanotum without median enclosure and medially more than half as long as scutellum; propodeum laterally rounded with blunt propodeal tooth. Wing developed, vein *Rs* and pigmented remnant forming an even curve away from costal margin. Hind coxa without dorsobasal carina, tarsal claw bidentate.

Kryptosega mweramwera Villemant n. sp.

TYPE MATERIAL. — **Vanuatu**. SANTO 2006, île de Santo, Penaoru, 900 m, 14°58'0.17"S, 166°39'21.69"E, 6-18.XI.2006, piège Malaise, montane forest, C. Villemant MG09A1, ♂ holotype (MNHN EY6350).

Paratypes: same data as holotype, MG09A1 and MG09B1, 6 ♂♂ (MNHN EY6345-EY6349, EY6351).

ETYMOLOGY. — The specific epithet in apposition refers to traditional Vanuatu's goblins that are evoked by the mask sculpturing recognisable on the propodeum of the species. The anterior transverse carinae of propodeum are widened laterally, and flanked posteriorly by perpendicular striations that give appearance of "eyes", while posterior transverse carina evokes a "mouth" (Figs 1C; 2). According to local beliefs on the west coast of Santo, mweramwera are small creatures with a child-like appearance that live in clearings and move in groups. People can attract them by calling them with a secret language. Mweramwera steal things, confuse people in the forest, but also perform a variety of odd jobs, such as finishing the mat a woman fails to complete it or bringing back lost items (Tzerikiantz 2006).

DIAGNOSIS. — Black coloured species with bronze tints, yellow scape, and orange flagellum and clypeus; propodeum with three transverse carinae; anterior two of propodeal carinae touch each other medially forming depressed X-shape.

DESCRIPTION

Male (Fig. 1A)

Body length 4.1 mm (3.8, 3.2-4.2). Forewing length 4.2 mm (4.1, 3.8-4.5).

Head. Slightly wider than high in frontal view, constricted behind eyes. Ocellar triangle obtuse anteriorly; distance from inner margin of eye to midocellus 2.3× midocellus diameter; distance between lateral ocelli and from lateral ocellus to eye margin respectively 4 and 0.6× great diameter of lateral ocellus. Frons with punctures 0.2× puncture diameter apart; scapal basin with weak oblique striation; subantennal distance 0.3× diameter of mid-ocellus; clypeus about 3× wider than high, apically rounded; malar space 2× mandibular basis. Antenna as long as body, first flagellar segment about 4× as long as broad.

Mesosoma. Pronotum, mesoscutum and scutellum punctate-reticulate. Propleuron almost smooth ventrally. Pronotum 0.8× long as mesoscutum; posterior third of notauli impressed their anterior part faint; parapsidae indistinct. Mesopleuron with scrobal sulcus obsolescent, punctures centrally 0.2× puncture diameter apart. Metapleuron almost impunctate anteriorly. Metanotum triangular, ending in a point and reticulate, medially 1.2× as long as scutellum. Propodeum rounded posteriorly in dorsal view, with three transverse carinae; anterior two carinae touch each other medially forming depressed X-shape; longitudinally striate between these carinae (Figs 1C; 2); posterior face vertical and separated from dorsal face by posterior transverse carina. Front wing with posterior ⅔ of vein *Rs* and apical abscissa of A1, veins RS+M, Cu, Cu1 and m-cu indicated as dark streak, radial cell slightly infuscate along the stigmal margin as well as radial cell below stigma.

Metasoma. Shining. First tergite smooth, with very sparse short hairs in its posterior margin. Second tergite 0.7 as long as broad anteriorly, regularly and shallowly punctate, with fine regular appressed hairs. The following tergites more finely and densely punctuate with a postmedian row of setae.

Colour. Head and thorax black with bronze tints dorsally, scape and pedicel yellow, flagellum orange brown; clypeus orange; mandible yellow with dark brown apex; coxae, trochanters, and femora basally whitish, the rest of the legs yellowish; hind tarsus infuscate; metasoma dark brown to black, anterior half of first tergite paler.

Barcode

Three complete barcode sequences have been obtained, from the holotype (MNHN EY6350: Bold no. CHRSA002-12) and two paratypes (MNHN EY6345: Bold no. CHRSA001-12; MNHN EY6347: Bold no. CHRSA003-12).

The barcode of the holotype is as follows: AATAATTTATTTTATTTTAGCTGTAT GATCAGGAATAATTGGTTTATCAATAAG TATATTAATTCGAAGAGAATTAAGAACAC CCAAATCAATATTAAATAATGACT TAATTTATAATGCTATTATTACTAGT CATGCATTTCTAATAATTTTTTTTATAG TAATACCTTTTATAATTGGAGGATTCG GAAATTGACTAGTTCCATTAATAATTG GAGCTCCCGATATAGCTTATCCAC GAATAAATAATATAAGATTCTGATTACTTC CTCCTTCATTAATTTTATTATTAATAAGAT CAATAATTAATGATGGAGTAGGAACTG GTTGAACAGTTTACCCTCCACTATCAT TATCAAATTATCATACTGGATCTTCATT AGACTTTTCAATTTTTTCTCTCCAT ATAGCAGGAATCTCATCAATTATAGGAG CAATCAATTTTATTTCAACTATTAA TAATATATTTAATAAAAAAATAAAAAT AGAAAATTTATCATTATTTACTTGATC AATTTTTATTACTGCAATTTTATTAATTT TATCATTACCAGTATTAGGAGGAGC TTTAACAATACTACTAACTGACCGAA ATATTAATACATCTTTTTATGATCCTG CTGGAGGAGGAGATCCAATTCTTTATC AACACTTATTT.

DISCUSSION

In addition to the present species, the SANTO 2006 expedition has already discovered six new Hymenoptera species including two Pompilidae Latreille, 1805 (Wahis *et al.* 2009), two Halictidae Thomson, 1869 (Pauly & Villemant 2009), one Dryinidae

Haliday, 1833 (Olmi & Villemant 2009) and one Ichneumonidae Latreille, 1802 (Villemant *et al.* 2012).

Kryptosega mweramwera Villemant n. sp. is the first species of the genus recorded outside of New Guinea.

So far as we know, Amiseginae parasitise eggs of walking stick phasmatids (Phasmatodea Jacobson & Bianchi, 1902) and are found in low vegetation or in leaf litter. The biology of *Kryptosega* species is still unknown, however, it is possible that they also utilise such insects as host. As Kimsey (1990) pointed out, the morphology of the female mandibles, used to open the host egg, and the structure of the ovipositor are remarkably consistent throughout the subfamily; it suggests that all species probably parasitise phasmatids. Amiseginae occur in most geographic regions but have their highest species diversity between latitude 30°N and 30°S (Kimsey & Bohart 1990). Due to their cryptic way of life, these wasps are infrequently collected. Nevertheless, further collecting efforts with different methods (pitfall trap, litter sampling, flight interception trap, etc.) in the different Vanuatu islands as well as in neighbouring archipelagos would probably provide other representatives of this rare genus.

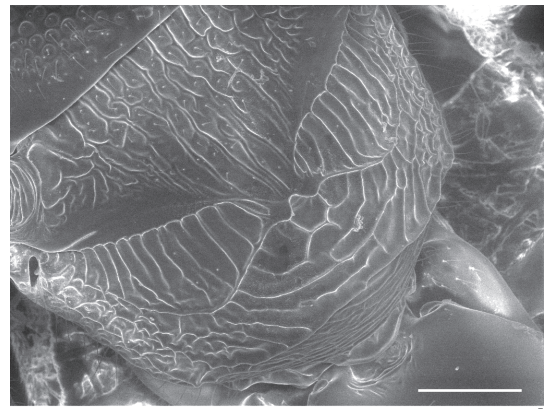

FIG. 2. — *Kryptosega mweramwera* Villemant n. sp. sculpture of metanotum and pronotum in dorsal view. Scale bar: 200 µm.

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