

# Redescription of the genus *Alophonotus* Schoorl, 1990 based on the morphology of male and female genitalia (Lepidoptera: Cossidae)

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## Abstract

Based on the study of male and female genitalia and the external habitus of *Chalcidica (Duomitus) rauana* Strand, 1909, the type species of the genus *Alophonotus* Schoorl, 1990, the genus *Alophonotus* is redescribed. Images of the type female, male genitalia, a new generic diagnosis, and a distribution map are given. *Alophonotus rauana* is indicated for the moth fauna of Cameroon, Ethiopia, Nigeria, and Uganda for the first time.  
KEY WORDS: Lepidoptera, Cossidae, *Alophonotus*, fauna, Africa.

## Redescripción del género *Alophonotus* Schoorl, 1990 basado sobre la morfología de la genitalia del macho y de la hembra (Lepidoptera: Cossidae)

## Resumen

Se redescrive el género *Alophonotus* basado en el estudio de la genitalia del macho y de la hembra y en la morfología externa de *Chalcidica (Duomitus) rauana* Strand, 1909, la especie tipo del género *Alophonotus* Schoorl, 1990. Se da el imago del tipo de la hembra, de la genitalia del macho, una nueva diagnosis genérica y un mapa de distribución. Se indica, por primera vez, *Alophonotus rauana* para la fauna de Camerún, Etiopía, Nigeria y Uganda.  
PALABRAS CLAVE: Lepidoptera, Cossidae, *Alophonotus*, fauna, África.

## Introduction

Carpenter moths (Lepidoptera, Cossidae) of Africa are relatively poorly studied. In particular, there are no morphological descriptions for a several genera, such as *Alophonotus* Schoorl, 1990, which was established for *Chalcidica (Duomitus) rauana* Strand, 1909. Unfortunately, SCHOORL (1990: 135-136, 140-142) did not provide descriptions of the genitalia for the genus described by him. He identified the following apomorphies of the thorax and wing venation: "Fringes short, R1 proximal to areole". Having examined the holotype female and additional material from various African localities t, we give a detailed morphological description of male and female of the genus *Alophonotus* and summarize its distribution.

## Material and methods

Material from the following collections were studied:

AMNH - American Museum of Natural History (New York, USA)  
CMNH - Carnegie Museum of Natural History (Pittsburg, USA)

- MNKB - Museum für Naturkunde, Leibniz Institut für Evolution und Biodiversitätsforschung, (Berlin, Germany)  
MRAC - Museum Royal of Central Africa (Tervuren, Belgium)  
MSW - collection of Manfred Ströhle (Weiden, Germany)  
MWM - Museum of Thomas Witt (Munich, Germany)  
RMM - collection of Raymond Murphy (Mzuzu, Malawi)  
RYB - collection of Roman Yakovlev (Barnaul, Russia)

Genitalia slides were examined with a Zeiss Stemi 2000 C microscope and images were taken with the Olympus XC 50 camera.

## Results

### Genus *Alophonotus* Schoorl, 1990

Schoorl, 1990: 135-136.

Type species: *Chalcidica (Duomitus) rauana* Strand, 1909 (by monotypy)

Male redescription (figs. 1-8): Medium size, wingspan 40-56 mm. Antennae bipectinate in proximal half, simple in distal half, orange. Thorax covered with orange scales with three grey longitudinal lines from above, tegula orange, with two big round grey spots. Abdomen orange, with longitudinal dashed grey band dorsally and segments with round grey spots laterally. Fore wing narrow, grey, with pattern of small round orange spots uniformly distributed over the entire wing surface, apex sharp. Hind wing short, of the same pattern (but orange spots smaller than those on the fore wing).

Male genitalia (fig. 6): Uncus thick at base, sharply narrowing in medium third, distal third thin with sharp, beak like apex; gnathos arms ribbon-like, short, not fused; valves narrow, lanceolate, smoothly narrowing to apices, edges even; juxta robust, saddle-like, with wide leaf-like lateral processes directed dorsally; saccus poorly expressed, semi-circular; phallus robust, equal to valve in length, sharply bent in basal third; big spindle-like cornutus (1/2 of phallus) in vesica.

Female (figs. 1, 2, 5): Slightly bigger than male, wingspan 45-68 mm. Antennae simple, wings slightly wider than those of male, pattern on body and wings the same as in male.

Female genitalia: Papillae analis tapered, apophyses posterior 2,8 longer than apophyses anterior, ostium poorly submerged, bursa bag-like, without signa, small bag-like bulla stretching from bursa on long membranous ductus.

Diagnosis: *Alophonotus* clearly differs from the other genera of African Zeuzerinae Boisduval [1828] by the specific spotty pattern on the wings, poorly expressed sexual dimorphism, the uncus of the male genitalia sharply narrowing in the medium third, the poorly expressed saccus and the juxta with relatively short leaf-like lateral processes. SCHOORL (1990: 141) included the genus *Alophonotus* in "Section 2A - part 1" together with several Palearctic and Neotropical genera: *Morpheis* Hübner, [1820] (type species - *Phalaena pyracmon* Cramer, 1782), *Xyleutes* Hübner, [1820] (type species - *Phalaena (Noctua) strix* Linnaeus, 1758), *Chalcidica* Hübner, [1820] (type species - *Phalaena (Bombyx) minea* Cramer, 1779), *Bergaris* Schoorl, 1990 (type species - *Xyleutes malayica* Roepke, 1957), *Rapdalis* Schoorl, 1990 (type species - *Zeuzera pardicolor* Moore, 1879); *Rugigegat* Schoorl, 1990 (type species - *Zeuzera nigra* Moore, 1877). The legitimacy of this association will be confirmed or refuted after a complete morphological and molecular genetic study of all Zeuzerinae genera.

Taxonomical notes: In the entomological collection of CMNH, we have found one male from Congo, marked as "holotype". There is no species determination on the labels. Probably, this specimen is one of non-described taxa, marked for the subsequent description by H. Clench. This specimen is not considered a type and was incorrectly accepted as the holotype of *A. rauana* (YAKOVLEV, 2011).

The genus currently is considered monotypic including only, *A. rauanus*, described from Tanzania (STRAND, 1909) based on the unique female. Later, Holland (1920) described from Congo (also based on a female) *Callocossus langi* Holland, 1920, which was synonymized by GAEDE (1930).

*Alophonotus rauanus* (Strand, 1909)

*Chalcidica* (*Duomitus*) *rauana* Strand, 1909: 130.

Type locality: DO Afrika [Tanzania], Kilimanjaro.

Type material (holotype female) in MNKB, examined.

= *Callocossus langi* Holland, 1920: 318–319.

Type locality: Faradje [Congo].

Type material (holotype female) in AMNH, examined.

Distribution: Angola, Ethiopia (new record), Cameroon (new record), Congo, Kenya, Malawi, Nigeria (new record), S. Africa, Ruanda (new record), Senegal, Sierra Leone, Southern Sudan, Tanzania, Uganda, Zambia, Zimbabwe (SCHOORL 1990; VÁRI ET AL., 2002; YAKOVLEV, 2011; 2014; YAKOVLEV, LENZ, 2013; YAKOVLEV, MURPHY, 2013; GOFF, 2018) (fig. 8).

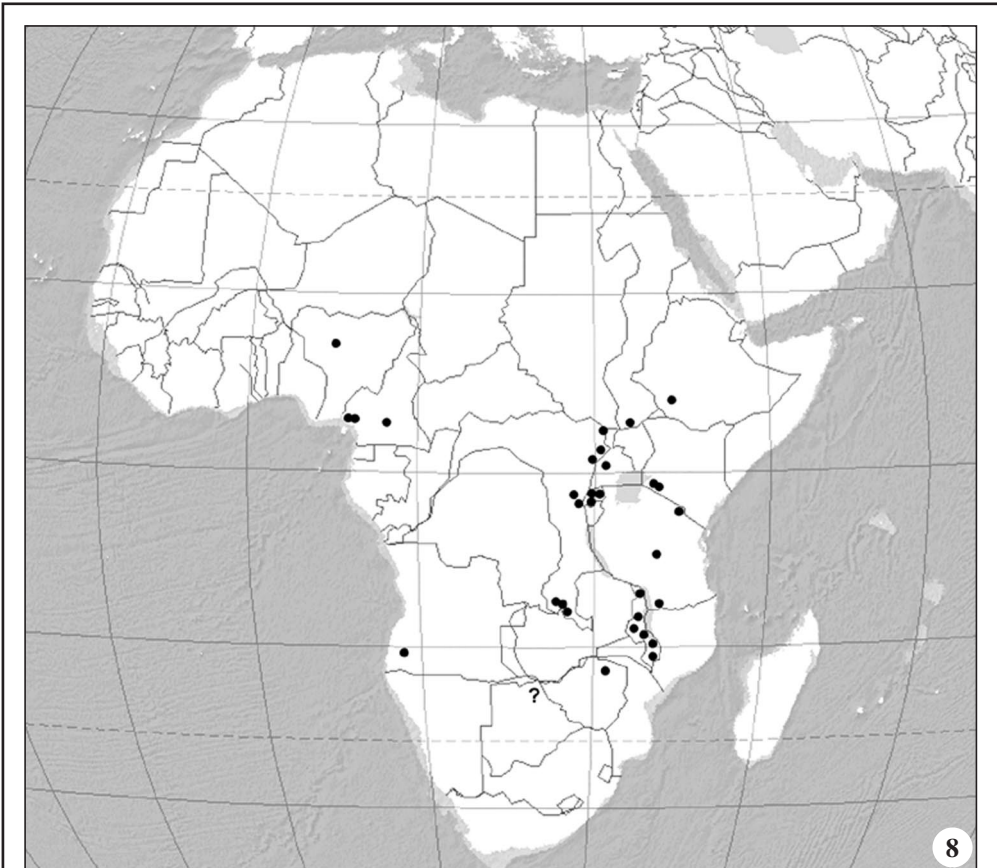


Fig. 8.– 8. Map of distribution of *Alophonotus rauanus*.

Material examined: 1 ♀ (holotype of *Chalcidica (Duomitus) rauana*), D. O. Africa, Rau Fl., Kilimandjaro, Mitte XI-1904, C. Uhlig S. G. (MNKB); 1 ♀ (holotype of *Callocoessus langi*), Faradje, Congo, 29° 40' E; 3° 40' N, 3-IX-1912, coll. Lang & Chapin (AMNH); 1 ♂ (“holotype”), Congo Belge, Elisabethville, 17-III-1949, Ch. Seydel (CMNH); 1 ♂, Nkhorongo Mzuzu, Mzimba distr., 1375 m, N. Malawi, 8-III-2000, R. J. Murphy leg. (RMM); 1 ♂, lake Kazuni, Vwaza marsh game reserve, Rumphii distr., N. Malawi, 11-III-2010, leg. R. J. Murphy (RMM); 1 ♂, same locality, 5-IV-1997 (RMM); 1 ♂, same locality, 7-IV-1999 (RMM); 1 ♂, Mughese FR, Chitipa distr., N. Malawi, 8-18-VI-2002, leg. R. Murphy (RMM); 1 ♂, Dzalanyama forest, Lilongwe distr., C. Malawi, 21-27-III-2003, leg. R. Murphy (RMM); 7 ♂♂, S. Malawi, Mangochi District, 25 km E Mangochi, Manizimu Forest Reserve, Uzuzu Hill, 14° 24' 46" S 35° 22' 42" E, h 1010 m, 17-18-IV-2011, leg. R. Yakovlev (RYB); 1 ♂, Angola, Huila Prov., 10 km SW Cacula, 04-06-XI-2011, leg. P. Schüle (MSW); 3 ♂♂, Uganda, Itwara fst., Kyenjojo, I-2003 (MSW); 1 ♂, Kivu, Mwera, 3-IV-1957, R. P. de Caters (MRAC); 1 ♂, Elisabethville, III-1912, Miss Agric (MRAC); 1 ♂, Ruanda, Kisenyi, 21-IV-1957, Dr. M. Fontaine (MRAC); 1 ♂, Elisabethville, 17-II-1959, Ch. Seydel (MRAC); 1 ♂, Kivu, Rwankwi, 11-XI-1947, J. V. Leroy (MRAC); 1 ♂, Kibale, Iture, Nioka, 25-IV-1954, J. Hecq (MRAC); 1 ♂, Ruanda, Astrida, 10-X-1961, Allaerts (MRAC); 1 ♂, Kivu, Kagna, 3-V-1958, J. Hecq (MRAC); 2 ♂♂, Cameroun, Eloumden, 27-28-10-1992, Th. Bouyer (MRAC); 1 ♂, Cameroun, Mt. Kanu, 22-IV-1992, Th. Bouyer (MRAC); 1 ♂, Cameroon, Buea, 12-VI-1992, Rec. K. Maes (MRAC); 1 ♂, Katanga, Zilo, II-1969, Rec. V. Allard (MRAC); 2 ♂♂, Congo Belge, P. N. A., Secteur Nord, Ihumbia, affl.dr. Semliki, 920 m, 6-XI-1956, P. Vanschybroeck (MRAC); 1 ♂, Lubumbashi, XII-1975, J. Thiry (MRAC); 2 ♂♂, Tanzania, Iringa Prov., Udzungava NP, campsite, 2400 m, 29-I-2005 (MWM); 1 ♂, Tanzania, Nord Mitomoni, South Tanz, 11° 28' S / 35° 18' E, 25-V-2010, leg. T. N. Chance & J. Cave (MWM); 1 ♂, N. Nigeria, Kadena, 4-X-1970, leg. Dr. Politzar (MWM); 14 ♂♂, 3 ♀♀, South Sudan, East Equatorial State, Akotos province, Lolibai Mts., 1300 m, 15-VIII-10-IX-2010, leg. Vladimir Gurko (MWM); 1 ♂, Kenya, Transmara, Lolgorien, 2000 m, IV-2000 (MWM); 4 ♂♂, Kenya, Transmara, Kilgoris, 1-15-XII-1996, leg. Dr. Politzar (MWM); 1 ♂, N. Zambia, Mutinodro, 1390 m, Miombe, 26-XII-2010, 12° 23.30' S, 31° 19.23' E, leg. J. Lenz (RYB); 1 ♂, Ethiopia, Godiam Prov., Mangushi vill., H - 900 m, 4-6-VIII-2017, O. Legezin leg. (RYB).

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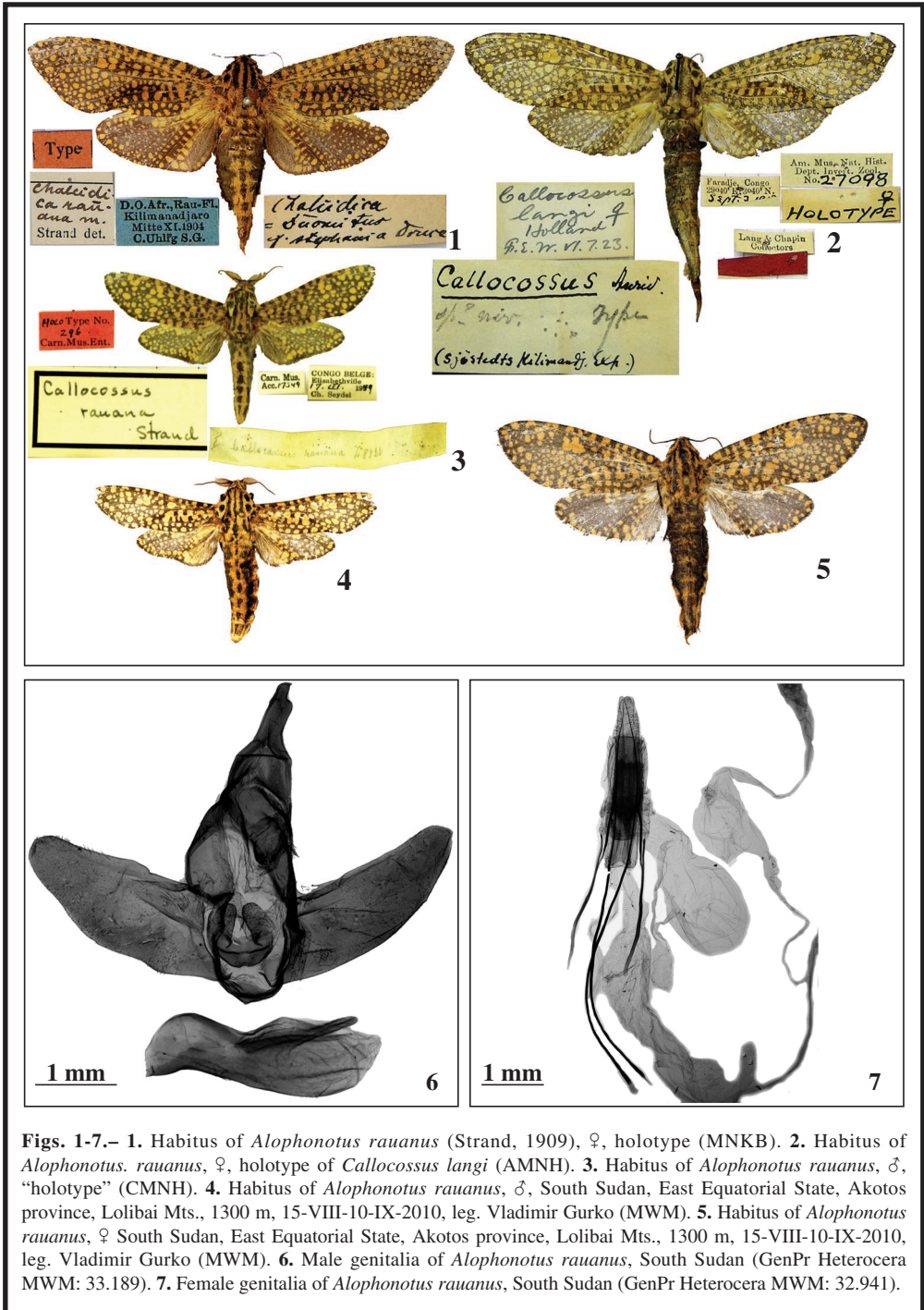
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**Figs. 1-7.**— 1. Habitus of *Alophonotus rauanus* (Strand, 1909), ♀, holotype (MNKB). 2. Habitus of *Alophonotus rauanus*, ♀, holotype of *Callocossus langi* (AMNH). 3. Habitus of *Alophonotus rauanus*, ♂, "holotype" (CMNH). 4. Habitus of *Alophonotus rauanus*, ♂, South Sudan, East Equatorial State, Akotos province, Lolibai Mts., 1300 m, 15-VIII-10-IX-2010, leg. Vladimir Gurko (MWM). 5. Habitus of *Alophonotus rauanus*, ♀ South Sudan, East Equatorial State, Akotos province, Lolibai Mts., 1300 m, 15-VIII-10-IX-2010, leg. Vladimir Gurko (MWM). 6. Male genitalia of *Alophonotus rauanus*, South Sudan (GenPr Heterocera MWM: 33.189). 7. Female genitalia of *Alophonotus rauanus*, South Sudan (GenPr Heterocera MWM: 32.941).