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## *Chryseacampa* gen. n. – a new genus with two new species for Afrotropic Lasiocampinae (Lasiocampidae, Lepidoptera)

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### Abstract

A new genus *Chryseacampa* gen. n. with *Chryseacampa evani* sp. n. (type-species) and *Chryseacampa ralphyi* sp. n. are described. Detailed diagnosis for the new genus is provided and compared with three closely related genera: *Pachymetana* Strand, 1912; *Mallocampa* Aurivillius, 1902; and *Dollmania* Tams, 1930. Male and female genitalia of *Pachymetana custodita* Strand, 1912 are illustrated for the first time.

**Key words:** Afrotropical realm, biodiversity, COI, Kenya, lappet moth, Tanzania.

## Introduction

A peculiar lineage of Afrotropic Lasiocampidae was found during a survey of numerous private and museum collections. Rare adults remind us, externally, of members of *Pachymetana* Strand, 1912; *Mallocampa* Aurivillius, 1902; and *Dollmania* Tams, 1930 but have sufficient morphological differences to be treated as a new genus *Chryseacampa* **gen. n.** described below.

### *Abbreviations of the depositories used:*

**CGM** – collection of Günter Müller (Freising, Germany);  
**CMS** – collection of Manfred Ströhle (Weiden in der Oberpfalz, Germany);  
**DMNH** – Ditsong National Museum of Natural History (Pretoria, RSA);  
**MfNB** – Museum für Naturkunde (Berlin, Germany);  
**MWM** – Museum Witt Munich (Munich, Germany);  
**NHML** – Natural History Museum (London, UK);  
**NHMZ** – Natural History Museum of Zimbabwe (Bulawayo, Zimbabwe);  
**SMNH** – Swedish Museum of Natural History (Stockholm, Sweden);  
**USTTB** – l'Université des Sciences, des Techniques et des Technologies de Bamako (Bamako, Mali);  
**ZSM** – Bavarian State Collection of Zoology (Munich, Germany).

### *Other abbreviations used:*

**BOLD** – Barcode of Life Data System;  
**COI** – cytochrome *c* oxidase subunit I;  
**DRC** – Democratic Republic of the Congo;  
**GS** – genitalia slide;  
**HT** – holotype;  
**ST** – syntype;  
**PT** – paratype;  
**RSA** – Republic of South Africa.

## Material and Methods

Some adults, mentioned below, were collected near the Ekongo camp (2.75613S, 20.31538E; see Prozorov *et al.*, 2021a; Prozorov *et al.*, 2021b), Mai-Ndombe, DRC using a traditional white screen lit with a Sylvania Mini-Lynx Blacklight BL368 and a chain of locally made auto-traps with similar bulbs. A Honda EU 20i generator provided the electricity for the screen and the traps.

Adults were photographed with an Olympus C-750 UZ, a Nikon D3300, a Nikon 40mm f/2.8G and a Nikon R1C1. Genitalia preparations were made generally following Hardwick (1950). Distal one third of the abdomen of each specimen was put into a separate 50 ml Falcon tube with 10 ml of 13% solution of potassium hydroxide (KOH). Several tubes with abdomens and KOH were put together into a small pot with hot water for 20 minutes. The tubes thereafter were taken out from the pot and the abdomens were rinsed with water once or twice to wash off remaining scales and soft tissue. Cleaned abdomens then were transferred into separate cells of the Corning Costar 96 Well Cell Culture Cluster with a little amount of water to keep them moist during preparation. One after another, abdomens were cleaned with soft brush and dissected using Dumont Tweezers Style 5 and “no name” micro scissors in a Petri dish. Aedeagus was extracted and vesica everted with an insulin syringe and a 32G or 33G needle for mesotherapy. Male's vesica and female's bursa were stained with the Evans blue. The dissected genitalia were rinsed in 50, 70 and 96% ethanol and then mounted on a microscope slide in Euparal and covered with a cover slip. Slides then photographed using an Olympus C-750 UZ and a Leica MC170 HD. All images were processed with Photoshop CS6 and InDesign CS6 (Adobe, 2012).

Sequences of 9 specimens from BOLD projects were used for this study (Ratnasingham & Hebert, 2007, 2013). The samples were collected in Cameroon, Equatorial Guinea, DRC, Malawi, Kenya, Tanzania, and RSA. The specimens were stored in three entomological collections: CMS, MWM, and ZSM (Table 1). One leg from each individual was used for analysis. Legs were stored in tubes with 96% ethanol. The

sequences were obtained at the Biodiversity Institute of Ontario, Canada. DNA isolation, PCR amplification, and DNA sequencing followed standard protocols (Hebert *et al.*, 2003; deWaard *et al.*, 2008). The sequences were released publicly in the dataset DS-CHRYSEA (dx.doi.org/10.5883/DS-CHRYSEA) on BOLD.

Sequence alignment and calculation of pairwise distances were conducted using MEGA X (Kumar *et al.*, 2018). Bootstrap analysis (1000 replicates) and the neighbor-joining tree of the COI sequences (the Kimura 2-parameter was used; Kimura, 1980) were also conducted using MEGA X.

Morphological terminology follows Prozorov *et al.* (2023c). Elevation ranges were taken from Google Earth Pro. Distribution map was made with Google My Maps service (<https://www.google.com/maps/>). Ecoregions listed in the Biology section follow Dinerstein *et al.*, 2017.

**Table 1.** Information on COI sequences used in the phylogenetic analysis.

Species, BIN	BOLD Sample ID	Collection data (depository)
<i>Chondrostegoides magna</i> , ABV0037	LBEO1763-11	PT ♂, RSA, Western Cape Province, Swellendam, Bontebok NP, 34S, 20.25E, 150–300 m, 13–23.III.1999, leg. J. de Freina (MWM/ZSM)
<i>Chryseacampa evani</i> , AAV2727	LBEO1154-11	PT ♂, Tanzania, Pwani Region, savanna of Mandera, 6.21422S, 38.37714E, 170 m, 15.I.2005 (MWM/ZSM)
	LBEO1155-11	PT ♀, Kenya, Marenje Forest, 4.52138S, 39.21777E, 100 m, VIII–IX.2002 (MWM/ZSM)
<i>Dollmania cuprea</i> , AAN4302	LBEOA1839-12	♂, Malawi, Central, Kasungu National Park, 13.03 S, 33.1211 E, 1050 m, 4.I.2011, leg. V. Anikin (MWM/ZSM)
	LBEO707-10	♂, RSA, Limpopo, Medike, 23.02S, 29.38E, 900 m, 28.XI–6.XII.2009, leg. J. de Freina (MWM/ZSM)
<i>Mallocampa audea</i> , ABV0037	LBEO1144-11	♀, DRC, Kasai River, on the contrary Ngimbue, extraction of diamonds, 6.129722S, 20.649167E, 450 m, summer 2007, leg. G. Kalnoy & V. Siniaev (MWM/ZSM)
	LBEO1357-11	♀, Equatorial Guinea, Bioko Island, Moka, mountain rainforest, 3.361N, 8.662167E, 1400 m, 18–22.II.2002, leg. Hoppe (CMS)
<i>Pachymetana custodita</i> , AAU0382	GWOSZ702-11	♂, Cameroon, Southwest Region, Mount Kupe, 2 km E Nyasoso, nature trail, cave, 4.82344N, 9.68761W, 976 m, 24.XI.2007, leg. M. Ochse (ZSM)
	LBEO1354-11	♀, Equatorial Guinea, Bioko Island, Playa de Moraca, 1.3 km W Punta Sagres, 3.35044N, 8.42189E, 5 m, 13–16.II.2002, leg. Hoppe (CMS)

## Taxonomical part

### *Chryseacampa* gen. n.

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(Figs 7–12, 19–24)

Type-species: *Chryseacampa evani* sp. n., here designated.

**Description.** **Male** (Figs 7–8, 11–12). *Forewing*. Forewing length: 18–20 mm; wingspan: 38–40 mm. Short, somewhat trapezoid. External margin slightly crenate. Background color creamy or reddish brown. Pattern consists of more or less pronounced dark crenate ante- and postmedial lines, pale c-shaped discal mark, and fragmented external line. Fringe speckled, colored like background and pattern color. *Hindwing*. Ovate with slightly crenate external margin. Background color creamy or reddish brown. Pattern absent, only darker anal field or darker anal angle may be pronounced. Fringe speckled, colored like background and pattern color. *Genitalia* (Figs 20–22). Tegumen dorsolaterally bears a pair of fused basally socii. Socii enlarged, sclerotized, somewhat triangle, ventrally covered with setae. Cucullus long, claw-shaped, sparsely covered with setae. Sacculus tiny, knob-like, densely covered with setae. Vinculum medially thin, fused with ring-

like juxta surrounding aedeagus; vinculum has a pair of laterodistal outgrowths. Aedeagus claw-like, dorsobasally has apodeme, ventroapically bears spur. Vesica narrow, bears cornuti. The eight sternite somewhat trapezoid, lateroproximally has short apodemes, distal margin more sclerotized. **Female** (Fig. 9). Externally similar to male. Forewing length: 31 mm; wingspan: 60 mm. *Genitalia* (Fig. 19) Papillae anales oval, densely covered with setae. Posterior apophyses one fourth longer than the anterior ones. Sterigma highly sclerotized, somewhat trapezoid, medially membranous with semi-round ostium. Ductus bursae short. Corpus bursae ovoid, bears small round signum.

**Diagnosis.** The following three genera are morphologically close to *Chryseacampa* **gen. n.** and, thus, compared with its members: 1) *Pachymetana*, 2) *Mallocampa*, and 3) *Dollmania*.

1) The genus *Pachymetana* contains 10 species (type species *Pachymetana custodita* Strand, 1912; see De Prins & De Prins, 2011–2021). Male adults of *Chryseacampa* **gen. n.** have shorter forewings with c-shaped discal mark (Figs 7–8, 10–12), while the ones of *Pachymetana* have elongated forewings with white discal dot (Fig. 2). Female adult of *Chryseacampa* **gen. n.** has evenly colored hindwing (Fig. 9), while the one of *Pachymetana* has contrasting basal field on hindwings (Fig. 1). In male genitalia of *Chryseacampa* **gen. n.** *socii* expanded and basally grown together; cucullus sharply bent; sacculus very small; vinculum medially narrow and fused with ring-like juxta, laterodistally has outgrowths; aedeagus S- or C-shaped with dorsobasal apodeme and apical dent; vesica narrow with one dorsal cluster of cornuti; the eight sternite elongated distally with more sclerotized distal margin (Figs 20–22); while in *Pachymetana* *socii* small and separate; cucullus around 90 degrees bent; sacculus medium-sized, somewhat triangle; vinculum does not fuse with juxta, laterodistally slightly wider; aedeagus C-shaped without apodeme and apical dent; vesica basally large, has two dorsal ridges covered with cornuti; the eighth sternite somewhat trapezoid with mediodistal concavity, laterobasal narrow apodemes (Fig. 13). In female genitalia of *Chryseacampa* **gen. n.** sterigma membranous medially, bursa has small round signum (Fig. 19), while in *Pachymetana* sterigma has no medial membrane, bursa has no signum (Fig. 16).

2) The genus *Mallocampa* contains 10 species (type species *Mallocampa audea* (Druce, 1888); see Prozorov, Zolotuhin, 2013a, 2013b; De Prins & De Prins, 2011–2021). Adults of *Chryseacampa* **gen. n.** have c-shaped discal mark (Figs 7–12), while adults of *Mallocampa* have discal dot of short stroke (Fig. 3–4). In male genitalia of *Chryseacampa* **gen. n.** *socii* short; cucullus elongated, claw-shaped with one apex; vinculum has laterodistal outgrowths; aedeagus elongated, S- or C-shaped; vesica elongated with dorsal cluster of cornuti; the eight sternite has no distal dents (Figs 20–22); while in *Mallocampa* *socii* very long; cucullus short, with three apices; vinculum has no laterodistal outgrowths; aedeagus short, claw-shaped; vesica tiny, without cornuti; the eighth sternite has pair of distal dents (Fig. 14). In female genitalia of *Chryseacampa* **gen. n.** sterigma somewhat trapezoid, membranous medially (Fig. 19), while in *Mallocampa* sterigma somewhat triangle with pin-like mediodistal extension (Fig. 17).

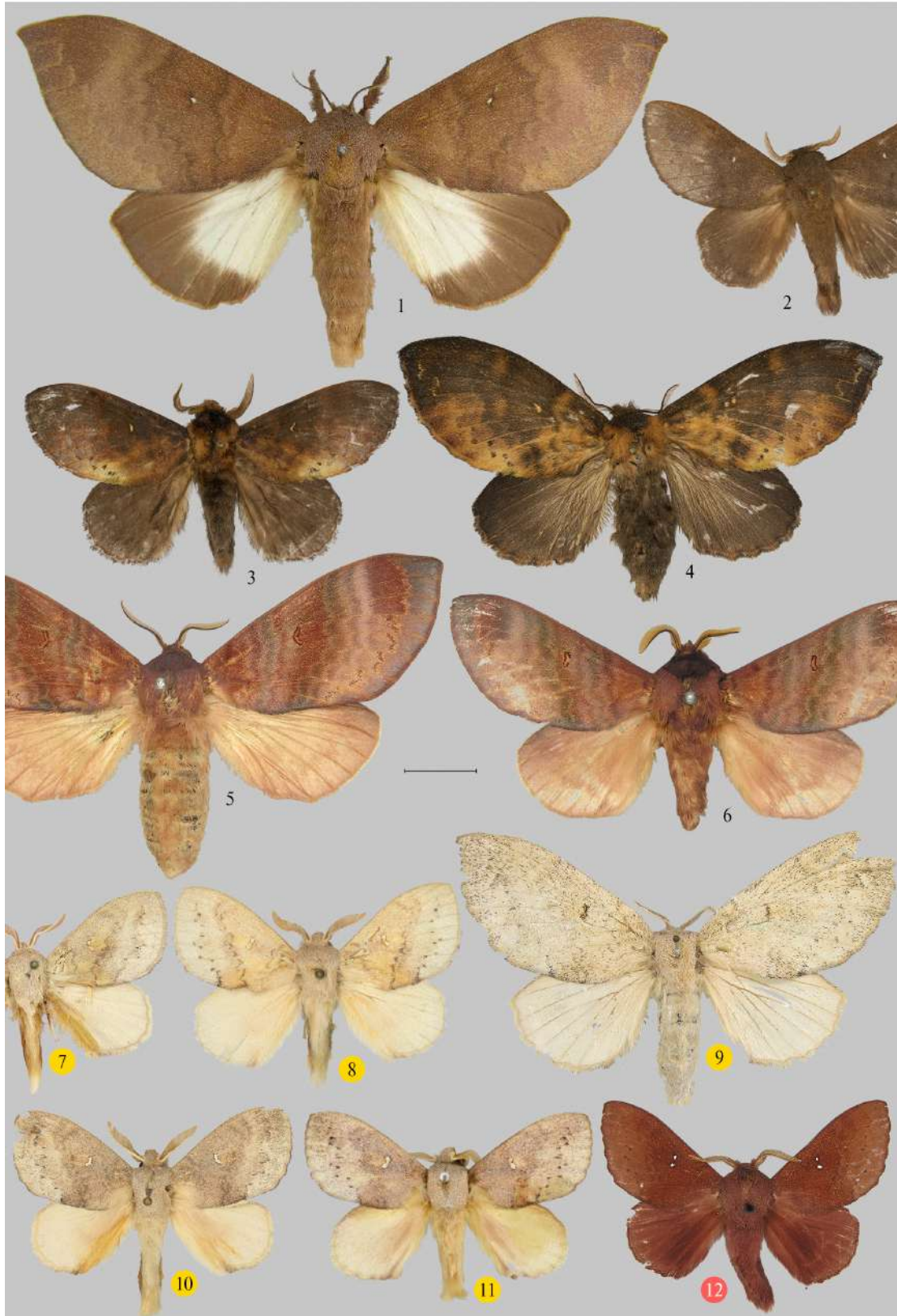
3) The genus *Dollmania* contains 6 species (type species *Dollmania plintochroa* Tams, 1930, junior synonym of *Dollmania cuprea* (Distant, 1897)). We showed that male genitalia of *Dollmania* spp. have weak intraspecific differences (see Prozorov *et al.*, 2023b, 2023c), so here for comparison we take genitalia of *Dollmania ivoriensis* Prozorov *et al.*, 2023. Adults of *Chryseacampa* **gen. n.** have shorter forewings with doubled medial lines and nearly white discal mark (Figs 7–12), while adults of *Dollmania* have elongated wings with multiple medial lines and darker diskal mark (Fig. 3–4). In male genitalia of *Chryseacampa* **gen. n.** *socii* fused basally, have two apices; cucullus C-shaped; sacculus very small; aedeagus S- or C-shaped; juxta surrounds aedeagus; vesica elongated; the eight sternite has no distal dents (Figs 20–22); while in *Dollmania* *socii* not fused basally, have one apex; cucullus slightly C-shaped; sacculus medium-sized; aedeagus C-shaped; juxta stem-like, fused with aedeagus basally; vesica small; the eighth sternite has distal dents (Fig. 14). In female genitalia of *Chryseacampa* **gen. n.** sterigma somewhat trapezoid, membranous medially (Fig. 19), while in *Dollmania* sterigma somewhat oval with a slit-like opening (Fig. 18).

**DNA comparison** (Fig. 23). One species of the genus has been sequenced – *Chryseacampa evani* **sp. n.** The *p*-distance between *Chryseacampa evani* **sp. n.** and *P. custodita* is 6.4–7%; between *Chryseacampa evani* **sp. n.** and *M. audea* is 7.9–8.1%; between *Chryseacampa evani* **sp. n.** and *D. cuprea* is 5.6–6.8%.

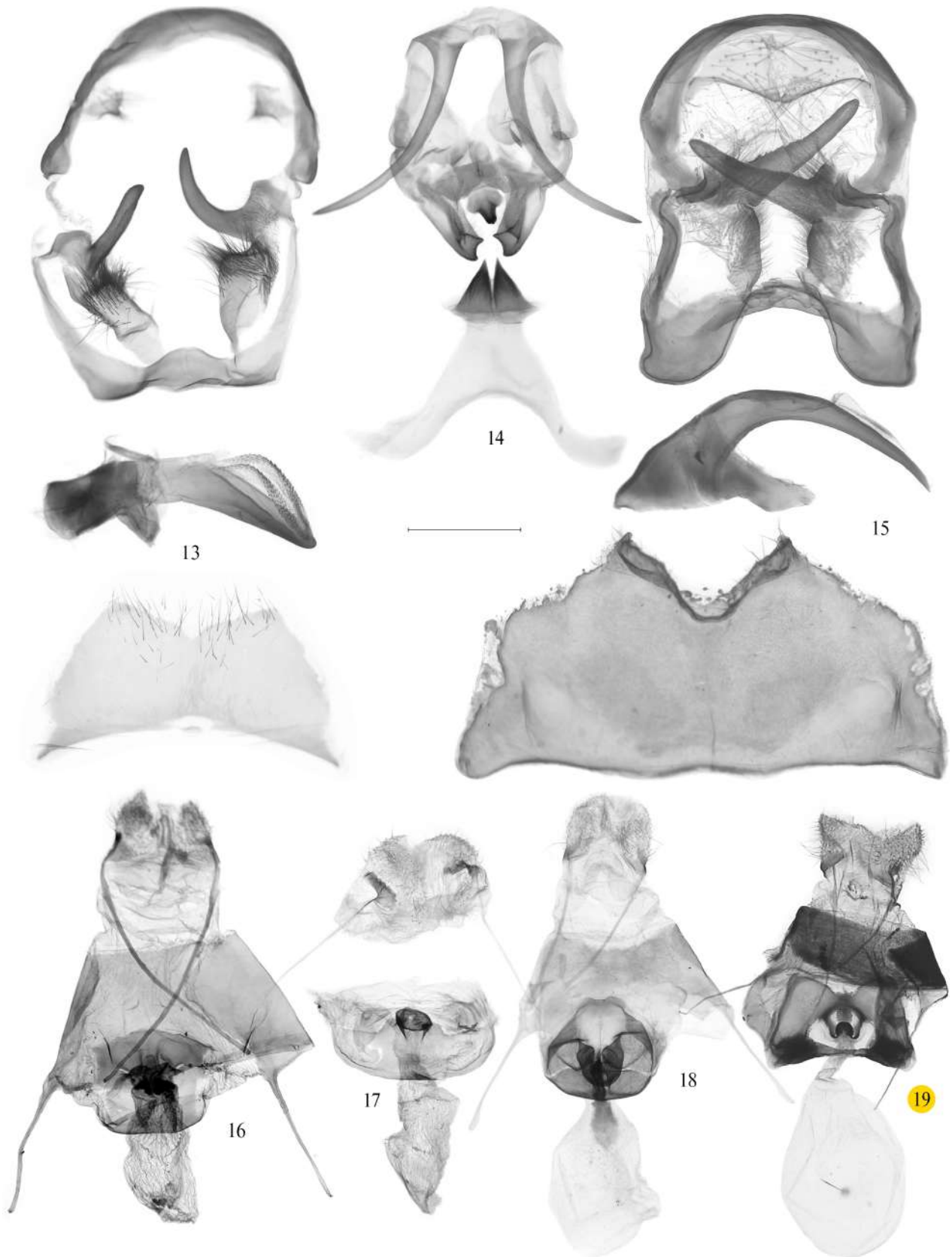
**Included species:** *Chryseacampa evani* **sp. n.** and *Chryseacampa ralphyi* **sp. n.**

**Etymology.** The genus name consists of the Latin “chryseum” for “golden,” and “campa” from *Lasiocampa* Schrank, 1802; *Mallocampa* and others.



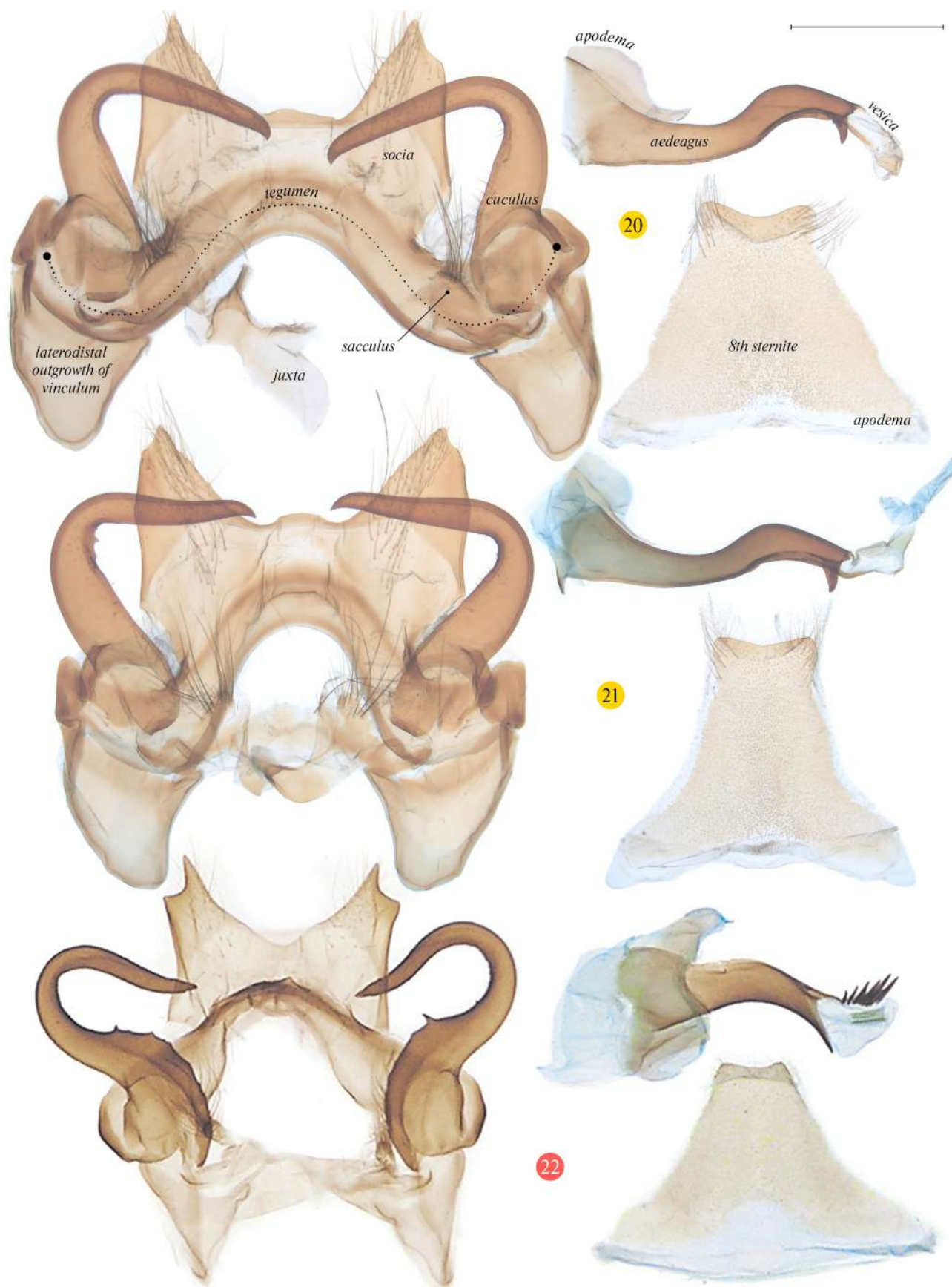


**Figures 1–12.** Adults. 1–2. *Pachymetana custodita*. 1. HT ♀, Equatorial Guinea, Nkolentangan, GS 2008-29 (MfNB). 2. ♂, DRC, Ekongo camp (CGM/USTTB). 3–4. *Mallocampa audea*, ♂ and ♀, DRC, Ekongo camp (CGM/USTTB). 5–6. *Dollmania cuprea*, ST ♀ and ♂ of *D. purpurascens*, Zimbabwe, Mashonaland, GS 9967, 10953 (SMNH). 7–11. *Chryseacampa evani*. 7. PT ♂, Tanzania, Manderu, LBEOU1154-11 (ZSM). 8. HT ♂, Kenya, Kibwezi, GS 0340 (CGM/USTTB). 9. PT ♀, Kenya, Marenje Forest, LBEOU1155-11, GS 20694 (MWM/ZSM). 10. PT ♂, Kenya, Kibwezi, GS 0341 (CGM/USTTB). 11. PT ♂, Kenya, Arabuko Sokoke FR, GS Las-54 (DMNH). 12. *Chryseacampa ralphyi*, HT ♂, Tanzania, Amani, GS 1510 (NHML). Scale bar – 1 cm.



**Figures 13–19.** Genitalia. 13–15. ♂. 13. *Pachymetana custodita*, Cameroon, Nyasoso, GS 2013-016 (ZSM). 14. *Mallocampa audea*, RCA, Mongoumba, GS 2017-042 (MfNB). 15. *Dollmania ivoriensis*, PT, Vavoua, Ivory Coast, GS 0339 (CGM/USTTB). 16–19. ♀. 16. *Pachymetana custodita*, Cameroon, Nyasoso, GS 2013-024 (ZSM). 17. *Mallocampa audea*, Cameroon, Nyasoso, GS 2013-021 (ZSM). 18. *Dollmania purpurascens*, ST, Zimbabwe, Mashonaland (SMNH). 19. *Chryseacampa evani*, PT, Kenya, Marenje Forest (MWM/ZSM). Scale bar for Figs 13–15 – 1 mm.





**Figures 20–22.** ♂ genitalia of *Chryseacampa* spp. 20–21. *Ch. evani*, Kenya, Kibwezi (CGM/USTTB). 20. HT, GS 0340. 21. PT, GS 0341. 22. *Ch. ralphyi*, HT, Tanzania, Amani, GS 1510 (NHML). Scale bar for Figs 20–21 – 1 mm.

***Chryseacampa evani* sp. n.**

<https://zoobank.org/urn:lsid:zoobank.org:act:9CDA40FD-ED09-4067-B83D-9302C0783005>

(Figs 7–11, 19–21, 23–24)

**Holotype:** ♂, Kenya, Kibwezi, 2.41052S, 37.96784E, 900 m, 20–27.VIII.1990, GS 0340 (CGM/USTTB).

**Paratypes** (32♂, ♀). **Kenya:** 21♂, Kenya, Kibwezi, 2.41052S, 37.96784E, 900 m, 20–27.VIII.1990, GS 0341 (CGM/USTTB); ♀, South Coast, Marenje Forest, 4.52138S, 39.21777E, 110 m, VIII–IX.2002, leg. Politzar, LBEO1155-11 (ZSM); 4♂, Coast Province, Malindi District, Arabuko Sokoke Forest Reserve, 3.2S, 39.83E, 100 m, *Cynomethra* red soil forest, 21.VII.2002, leg. H. Staude (DMNH). **Tanzania:** ♂, Pwani Region, Mandera, savanna, 6.21422S, 38.37714E, 250 m, 15.I.2005, LBEO1154-11 (ZSM).

**Description.** **Male** (Figs 7–8, 10–11). Flagellum creamy, rami orangish. Head, thorax and abdomen creamy. *Forewing.* Forewing length: 18–19 mm; wingspan: 38–40 mm. Background color creamy with more or less pronounced brown speckles. Medial lines may be doubled, interspace between the lines, including external one, may have brownish or purplish tint. Fringe speckled creamy and brown. *Hindwing.* Background color creamy with more or less pronounced reddish or brownish anal field and anal angle. Fringe speckled creamy and brown. *Genitalia* (Figs 20–21). One of two apices of socia longer. Inner margin of cucullus may have tiny dents. Aedeagus S-shaped. Vesica dorsally bears minute cornuti. **Female** (Fig. 9). Externally similar to male. *Forewing.* Forewing length: 31 mm; wingspan: 60 mm. *Genitalia* (Fig. 19) with generic characters.

**Variability.** Speckled pattern on male forewings is more (Figs 10–11) or less pronounced (Figs 7–8), anal field on hindwings is more (Figs 10–11) or less pronounced (Figs 7–8).

**Diagnosis.** *Cryseacampa evani* sp. n. has creamy wings with dark speckled pattern (Figs 7–11), vesica bears minute cornuti (Figs 20–21), while *Ch. ralphyi* sp. n. has brownish red wings (Fig. 12), vesica bears several medium-sized cornute (Fig. 22).

**Distribution** (Fig. 24). Northern *Acacia-Commiphora* bushlands and thickets and Northern Swahili coastal forests in Kenya, dry miombo woodlands in Tanzania. This area may be a hot-spot since 8 more lasiocampid species are restricted to it: *Dinometa ethani* Prozorov *et al.*, 2023d; *Dinometa abigailae* Prozorov *et al.*, 2023d; *Eucraera decora* (Fawcett, 1915) (see Prozorov, 2016); *Opisthodontia budamara* Zolotuhin & Prozorov, 2010; *Opisthodontia vensani* Zolotuhin & Prozorov, 2010; *Theophasida kawaii* Zolotuhin & Prozorov, 2010; *Odontopacha dargei* Prozorov *et al.*, 2023b; and *Vavizola hela* Prozorov *et al.*, 2023a.

**Biology.** Adults were collected in January, and from July to September from an altitude of 100 to 900 meters a.s.l. Preimaginal stages are unknown.

**Etymology.** The species is named in honor of Evan Radu (Little Silver, NJ, USA).

***Chryseacampa ralphyi* sp. n.**

<https://zoobank.org/urn:lsid:zoobank.org:act:A65BFCA6-2CEC-4808-9204-D06B9AFE9243>

(Figs 12, 22, 24)

**Holotype:** ♂, Tanzania, Amani, Malaria Institute, 5.09944S, 38.63146E, 915 m, GS 1510 (NHML).

**Description.** **Male** (Fig. 12). Flagellum speckled brown and creamy, rami orangish. Head, thorax and abdomen brownish red. *Forewing.* Forewing length: 20 mm; wingspan: 40 mm. Background color brownish red with creamy speckles. Pattern with generic characters. Fringe speckled red and brown. *Hindwing.* Background color brownish red with dark anal field. Fringe speckled red and brown. *Genitalia* (Fig. 22). Both apices of socia well pronounced. Inner margin of cucullus has tiny dents. Aedeagus C-shaped. Vesica dorsally bears medium-sized cornuti. **Female** remains unknown.

**Diagnosis.** *Cryseacampa ralphyi* sp. n. has brownish red wings (Fig. 12), vesica bears several medium-sized cornute (Fig. 22), while *Ch. evani* sp. n. has creamy wings with dark speckled pattern (Figs 7–11), vesica bears minute cornuti (Figs 20–21).

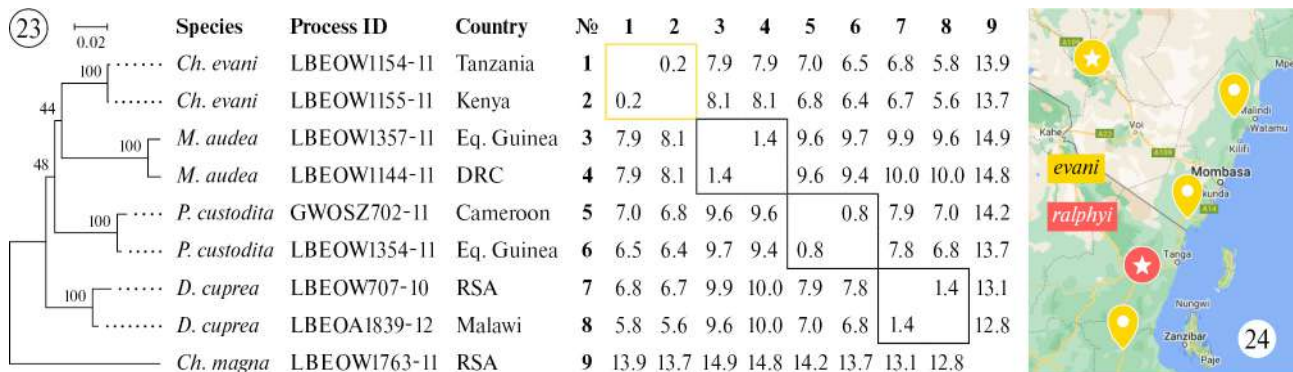
**Distribution** (Fig. 24). Eastern Arc forests in Tanzania. This area may be a hot-spot since 8 more lasiocampid species are restricted to it: *Dinometa ethani* Prozorov *et al.*, 2023d; *Dinometa abigailae* Prozorov *et al.*, 2023d; *Eucraera decora* (Fawcett, 1915) (see Prozorov, 2016); *Opisthodontia budamara* Zolotuhin & Prozorov, 2010; *Opisthodontia vensani* Zolotuhin & Prozorov, 2010; *Theophasida kawaii*



Zolotuhin & Prozorov, 2010; *Odontopacha dargei* Prozorov *et al.*, 2023b; and *Vavizola hela* Prozorov *et al.*, 2023a.

**Biology.** Adult was collected from an altitude of 915 meters a.s.l. Preimaginal stages are unknown.

**Etymology.** The species is named in honor of Ralphy Tomeo (East Meadow, NY, USA).



**Figures 23–24.** NJ tree (23; K2P, bootstrap 1000, built with MEGA X) based on sequence variation at COI and pairwise distances (%), and collecting sites (24) of *Chryseacampa evani* and *Ch. ralphyi* (for details visit [bit.ly/chryseacampa](http://bit.ly/chryseacampa)). Circles with stars are for the type localities, other tags are for additional material.

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