

Cossidae (Lepidoptera) of Zambia

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ABSTRACT: The annotated list of Cossidae of Zambia includes 11 species in 7 genera from two subfamilies.

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INTRODUCTION

Cossidae (Insecta, Lepidoptera) are wide spread. About 1000 cossid species are currently known, 800 of them recorded from the Old World (Yakovlev 2011; Nieukerken *et al.* 2011). Cossidae from Africa are poorly studied, despite the number of new genera and species described from various countries of Africa during last years (Yakovlev 2006; 2009; 2011; Yakovlev *et al.* 2013). A checklist of the Cossidae known from Zambia is given in this article.

Zambia (before 1964, North Rhodesia) is a landlocked country in Eastern Africa bordering the Democratic Republic of Congo in the north, Tanzania in the northeast, Malawi in the east, Mozambique, Zimbabwe, Botswana and Namibia in the south, Angola in the west. Zambia is located on a plateau with no outlet to the sea and characterized by a tropical climate. The total area of the country is 752,614 km². The Zambezi River basin stretches along western and southern borders of the country occupying ¾ of the country's territory. The rest of the territory generally belongs to the basin of the Congo River except for the small area in the northeast, which belongs to the internal drainage basin of Lake Rukwa, located in Tanzania.

Members of the family Cossidae from North Rhodesia were first mentioned in the publication by Hampson (1910), in which the new species *Azygophleps atrifasciata* Hampson, 1910 was described. A century later two new species, *Gumilevia minetti* Yakovlev, 2011 and *Zeuzeropecten zambica* Yakovlev, 2011, were described from Zambia by the author of this article (Yakovlev 2011). Seven species was published (Yakovlev 2011). Author report new data on distribution and fauna Cossidae of Zambia.

MATERIALS AND METHODS

Moths were collected at night using ultraviolet lights by the German entomologist J. Lenz (2009–2010) and Russian entomologists Vasiliy Kovtunovich and Petr Ustjuzhanin (2010–2011). Male and female genitalia dissections were mounted in euparal on slides. The abdominal integuments were cut lengthwise, descaled, and also mounted on slides. A Zeiss Stemi 2000 C microscope, Olympus XC 50 and Olympus Camedia C-740 camera were used to prepare images. Taxonomic nomenclature and checklists used in this study were developed from the research of the author and relevant literature (Hampson 1910; Yakovlev 2011).

List of collecting localities (Figure 1)

1. 10 km S Isoka, NE Zambia, 10°11' S, 32°37' E;
2. Zambia, Kandala, 14°49' S, 22°27' E;
3. W. Kaoma, Zambia, Western Prov., 14°47' S, 24°48' E;
4. Kapishya Hot Springs Lodge, N Zambia, 11°10' S, 31°36' E;
5. Kundalila, N. Zambia, 12°23' S, 31°19' E;
6. Mfwanta loc., Zambia;
7. Miombe, Mutinodro, N. Zambia, 12°23' S, 31°19' E;
8. Mutinondo Wilderness, Zambia, Northern Zambia Prov., 12°27' S, 31°17' E;
9. Ndola, Fatim School, Zambia, 12°58' S, 28°38' E;
10. Senanga, W. Zambia, 13.01.2010, 16°06' S, 23°15' E;
11. W of Solwezi, NW Zambia, E of Chisasa, 12°11' S, 26°24' E;
12. Zambia, Samphia, Mukushi, reg. Liubwe, 13°00' S, 28°45' E;
13. NW Zambia, Hillwood Farm, 11°16' S; 24°18' E.

Abbreviation list: BMNH – The Natural History Museum (London, UK); MNHN – Muséum National d'Histoire Naturelle (Paris, France); MWM – Museum of Thomas Witt (Munich, Germany); RYB – collection of Roman Yakovlev (Barnaul, Russia); ZSM – Zoologische Staatssammlung Muenchen (Munich, Germany); LT – locus typicus.

RESULTS

Annotated list of species

Family Cossidae Leach, [1815]

Subfamily Cossinae Leach, [1815]

Genus *Gumilevia* Yakovlev, 2011

Neue Entomol. Nachr. 66: 12. Type species — *Gumilevia zhiraph* Yakovlev, 2011

Gumilevia minettii Yakovlev, 2011 (Figures, 2, 3)

Neue Entomol. Nachr. 66: 12.

LT: Zambia, Western Prov., W. Kaoma.

Type material (holotype by monotypy) in MWM.

Material examined: holotype (MWM); 1 male, Zambia, Northern Zambia Prov., Mutinondo Wilderness, 12°23'30" S 31°19'22" E, h 1406 m, 02.01.2011, leg. Kovtunovich V. & Ustjuzhanin P. (RYB); 1 female, Zambia, Northern Zambia Prov., Mutinondo Wilderness, 12°27'10" S 31°17'29" E, h 1450 m, 01.01.2011, leg. Kovtunovich V. & Ustjuzhanin P. (RYB)

Subfamily Zeuzerinae Boisduval [1828]

Genus *Phragmataecia* Newman, 1850

Zoologist 8: 2931. Type species — *Noctua arundinis* Hübner, [1808]

Phragmataecia irrorata Hampson, 1910 (Figures, 4, 5)

Ann. Mag. Nat. Hist. 8(6): 128.

LT: Mashonaland [Zimbabwe].

Type material (cotypes) in BMNH.

Distribution: Zimbabwe, South Africa, Namibia, Botswana, Mozambique, Zambia, Malawi (Pinhey 1979; Vári et al. 2002; Yakovlev 2011).

Material examined: 1 male, Zambia, Northern Zambia Prov., Mutinondo Wilderness, 12°27'10" S, 31°17'29" E, h 1450 m, 01.01.2011, leg. Kovtunovich V. & Ustjuzhanin P. (RYB); 2 males, 1 female, Zambia, Northern Zambia Prov., Mutinondo Wilderness, 12°23'30" S, 31°19'22" E, h 1406 m, 02.01.2011, leg. Kovtunovich V. & Ustjuzhanin P. (RYB); 1 male, N. Zambia, Mutinodro, 1390 m, Miombe, 26.12.2010, 12°23.30' S; 31°19.23' E, leg. J. Lenz (RYB).

Phragmataecia fuscifusa Hampson, 1910 (Figure 6)

Ann. Mag. Nat. Hist. 8(6): 128.

LT: Sierra Leone.

Type material (cotypes) in BMNH.

Distribution: Sierra Leone, Nigeria, Zambia, Malawi.

Material examined: 2 females, NW Zambia, E of Chisasa, W of Solwezi, 24.10.2008, leg. Snizhek (MWM).

Genus *Eulophonotus* Felder, 1874

Reise Freg. Novara: pl. 82: fig. 9. Type species — *Eulophonotus myrmeleon* Felder, 1874.

Eulophonotus stephanius (Druce, 1887) (Figure 7)

Zeuzera stephania Druce, 1887, Proc. Zool. Soc. London: 685, pl. 55: fig. 3

LT: Nyassa [Malawi].

Type material (holotype by monotypy) in BMNH.

Distribution: South Africa, Malawi, Zambia, Mozambique (Hampson 1910b; Pinhey 1979).

Material examined: 1 male, Zambia, Northern Zambia Prov., Mutinondo Wilderness, 12°27'10" S, 31°17'29" E, h 1450 m, 01.01.2011, leg. Kovtunovich V. & Ustjuzhanin P. (RYB), 1 male, Zambia, Mfwanta loc., 3.02.2008. (MWM).

Genus *Alophonotus* Schoorl, 1990

Zool. Verhand. 263: 135–136. Type species — *Chalcidica (Duomitus) rauana* Strand, 1909.

Alophonotus rauana (Strand, 1909) (Figure 8)

Chalcidica (Duomitus) rauana 1909, Int. Ent. Ztschr. 3: 130.

LT: DO Afrika, Kilimanjaro.

Type material (holotype by monotypy) in CMNH.

Distribution: Senegal, S. Sudan, Uganda, Congo, Tanzania, S. Africa (Yakovlev 2011).

Material examined: 1 male, N. Zambia, Mutinodro, 1390 m, Miombe, 26.12.2010, 12°23.30' S, 31°19.23' E, leg. J. Lenz (RYB).

Genus *Zeuzeropecten* Gaede, 1930

Gross-Schmett. Erde 14: 547. Type species — *Zeuzeropecten lactescens* Gaede, 1930.

Zeuzeropecten zambica Yakovlev, 2011 (Figure 9)

Neue Ent. Nachr. 66: 55

LT: Zambia, Ndola, Fatim School.

Type material (holotype by original designation) in ZSSM.

Distribution: Zambia and Malawi.

Material examined: holotype and paratype (ZSSM); 1 male, paratype, Zambia, Kandala, 18.01.2009, H – 1150 m, leg. Minetti (MWM).

Genus *Strigocossus* Houlbert, 1916

Et. Lep. Comp. 11: 85. Type species — *Strigocossus leucopterus* Houlbert, 1916.

Strigocossus capensis (Walker, 1856) (Figure 10)

Zeuzera capensis Walker, 1856, List Spec. Lep. Ins. Brit. Mus. 7: 1533.

LT: Port Natal [S. Africa, Natal prov.].

Type material (holotype by monotypy) in BMNH.

Distribution: From Central (Tanzania) to Southern Africa (Yakovlev 2011).

Hosts: *Cassia bicapsularis* L., *C. siamea* Lam., *C. laevigata* Willd., *C. didymobotrya* Fresen., *Ricinus communis*, *Pavonia columella* (Pinhey 1979; Schoorl 1990; Kroon 1999).

Material examined: 2 males, N. Zambia, Mutinodro, 1390 m, Miombe, 26.12.2010, 12°23.30' S, 31°19.23' E, leg. J. Lenz (RYB); 1 male, N Zambia, Kapishya Hotsprings Lodge, 11°10'16" S, 31°36'03" E, h 1410 m, 10.10.2009, leg. J. Lenz (RYB); 1 male, N. Zambia, Kundalila, 12°23.53' S, 31°19.40' E, 24.09.2009, 1450 m, leg. J. Lenz (RYB).

Strigocossus crassus (Drury, 1782) (Figure 11)

Phalaena (Noctua) crassa Drury, 1782, Ill. Nat. Hist. 3: Pl. 2: fig. 1

LT: Sierra Leon [Sierra Leone].

Type material is lost.

Distribution: Africa (from Central to Southern Africa) (Yakovlev 2011).

Material examined: 1 male, NW Zambia, Hillwood Farm, 11°16.01' S, 24°18.99' E, 17.09.2009, 1420 m, leg. J. Lenz (RYB).

Genus *Azygophleps* Hampson, 1892

Fauna Brit. India 1: 309. Type species — *Hepialis scalaris* Fabricius, 1775.

Azygophleps inclusa (Walker, 1856) (Figure 12)

Zeuzera inclusa Walker, 1856, List. Spec. Lepid. Ins. Brit. Mus. 7: 1534

LT: Port Natal [Durban, South Africa].

Type material (holotype by monotypy) in BMNH.

Distribution: Sudan, Ethiopia, Kenya, Tanzania, Zambia, Angola, Malawi, Mozambique, Botswana, South Africa, Lesotho, Uganda, Congo, Ghana, Sierra Leone, Guinea, Côte d'Ivoire (Pinhey 1979; Vári et al. 2002; Yakovlev 2011).

Host: *Indigofera* L. (Le Pelley 1959).

Material examined: 1 male, NE Zambia, 10 km S Isoka, 10°11'50" S, 32°37'41" E, h 1444 m, 30.12.2010, leg. Kovtunovich V. & Ustjuzhanin P. (RYB); 1 male, N Zambia,

Kapishya Hotsprings Lodge, 11°10'16" S, 31°36'03" E, h 1410 m, 31.12.2010, leg. Kovtunovich V. & Ustjuzhanin P. (RYB); 2 males, Zambia, Northern Zambia Prov. Mutinondo Wilderness, 12°23'30" S, 31°19'22" E, h 1406 m, 02.01.2011, leg. Kovtunovich V. & Ustjuzhanin P. (RYB); 2 males, W. Zambia, 13.01.2010, Senanga, leg. R. Beck & R. Wannenger (MWM); 1 male, NW Zambia, Hillwood Farm, 11°16.01' S, 24°18.99' E, 17.09.2009, 1420 m, leg. J. Lenz (RYB).

Azygophleps boisduvalii (Herrich-Schäffer, 1854) (Figure 13).

Zeuzera boisduvalii Herrich-Schäffer, 1854, Samml. ausser-europ. Schmett. 1(1): 58, Taf. 35: 167.

LT: Gata (Sierra Leone)

Type material (holotype by monotypy) in MNHN.

Distribution: Africa (Guinea, Sierra Leone, Ghana, Camerun, Nigeria, Sudan, Ethiopia, Kenya, Uganda, Congo, Zambia, Zimbabwe, Senegal, Malawi, Cot de Ivoire) (Fletcher 1968; Schoorl 1990; Yakovlev 2011).

Material examined: 2 males, Zambia, Samphia, Mukushi, reg. Liubwe, 7.07.2009 (MWM).

Azygophleps atrifasciata Hampson, 1910 (Figure 14)

Proc. Zool. Soc. London 1910: 481.

LT: N.E. Rhodesia, Kalungwisi distr., High Plateau [Zambia].

Type material (holotype by monotypy) in BMNH.

Distribution: Zimbabwe, Zambia, Uganda, Kenya, Angola, Malawi, S. Africa (Yakovlev 2011)

Material examined: 7 males, N. Zambia, Kapishya Hot Springs, 11°10.29' S, 31°36.00' E, 10.10.2009, 1430 m, leg. J. Lenz (RYB).

DISCUSSION

Altogether 11 Cossidae species in 7 genera from two subfamilies have been recorded in the Zambia. The Cossidae fauna of the Zambia comprises the following elements: Transafrican and South African, as well as endemic species (1 species, or 9% of the total).

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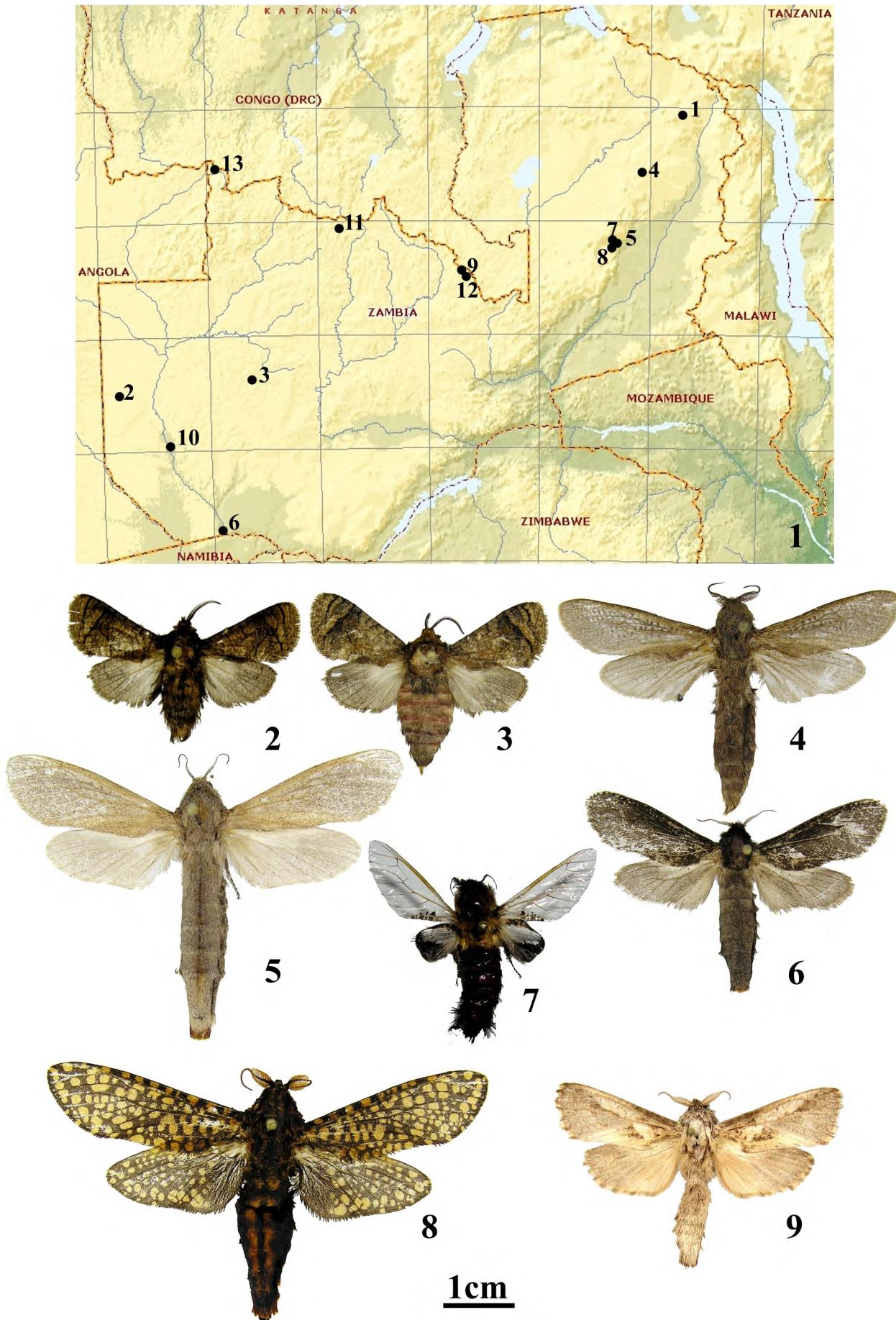
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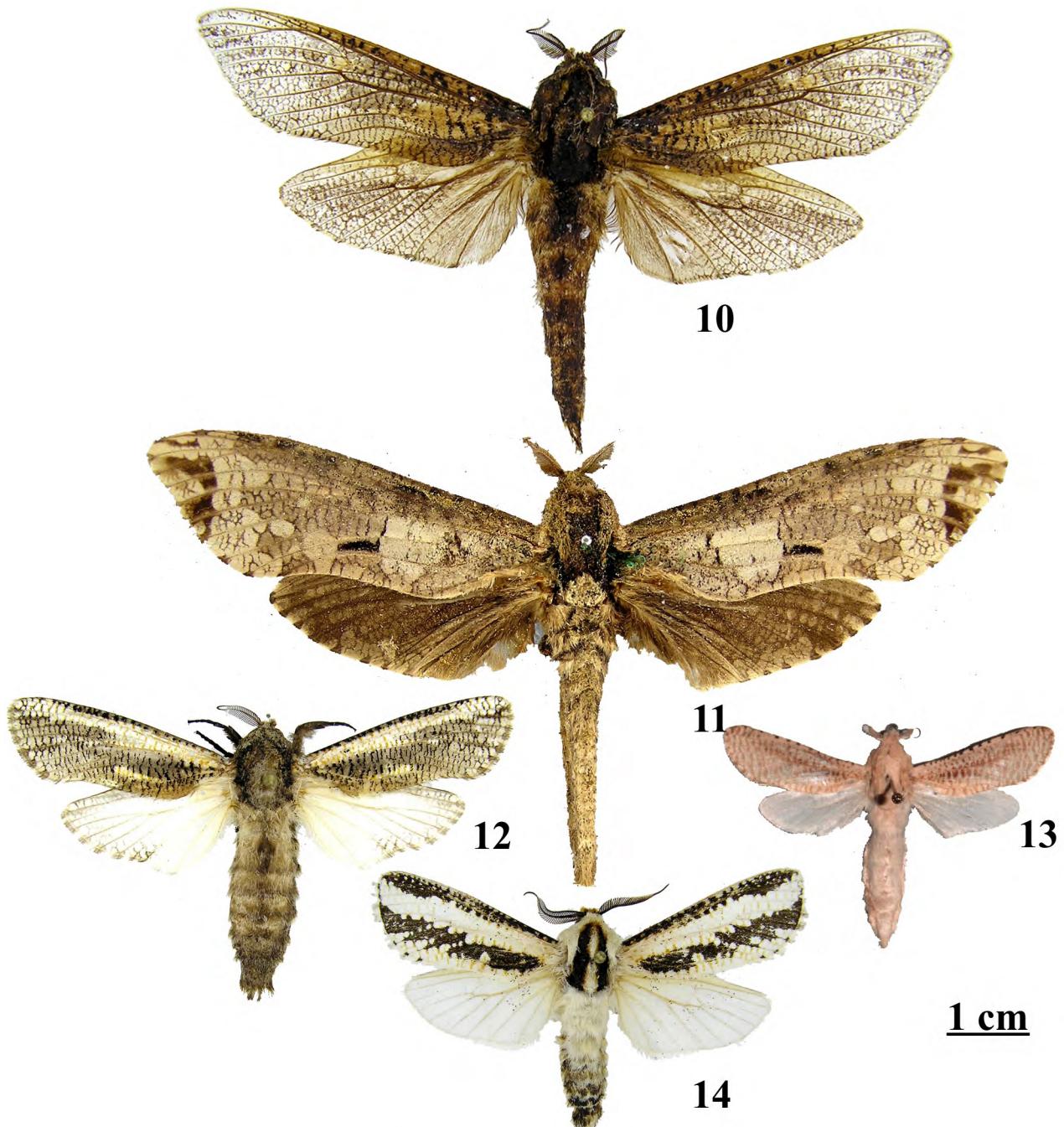
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FIGURES 1–9: 1, map of Zambia with collecting localities. 2–3, *Gumilevia minettii* Yakovlev, 2011, adults: 2) male, Zambia (RYB); 3) female, Zambia (RYB). 4–5, *Phragmataecia irrorata* Hampson, 1910, adults: 4) male, Zambia (RYB); 5) female, Zambia (RYB). 6, *Phragmataecia fuscifusa* Hampson, 1910, adult, female, Zambia (MWM). 7, *Eulophonotus stephanius* (Druce, 1887), adult, male, Zambia (RYB). 8, *Alophonotus rauana* (Strand, 1909), adult, male, Zambia (RYB). 9. *Zeueropecten zambica* Yakovlev, 2011, holotype (ZSSM).



FIGURES 10–14: 10, *Strigocossus capensis* (Walker, 1856), adult, male, Zambia (RYB). 11, *Strigocossus crassus* (Drury, 1782), adult, male, Zambia (RYB). 12, *Azygophleps inclusa* (Walker, 1856), adult, male, Zambia (RYB). 13, *Azygophleps boisduvalii* (Herrich-Schäffer, 1854), adult, male, Zambia (MWM). 14, *Azygophleps atrifasciata* Hampson, 1910, adult, male, Zambia (RYB).