Description of two new genera and ten new species of Metarbelidae (Lepidoptera: Cossoidea) from western, north-central and eastern Africa with notes on habitats and biogeography

Ingo Lehmann

Published by the author

Author:
Ingo Lehmann

Produced by:
S&K NEUE Hamburger Digitaldruck
+ Medien GmbH
Hamburg – Germany

This publication may be ordered from the author.

Date of publication:
25th March 2013

An original hard copy of this publication has been sent to the following:
the *Zoological Record*, Thomson Reuters, Heslington, York, UK
The Natural History Museum, London, UK (BMNH),
the Natural History Museum, Paris, France (MNHN),
the National Museums of Kenya, Nairobi (NMK),
the Royal Museum for Central Africa, Tervuren, Belgium (RMCA),
the Swedish Natural History Museum, Stockholm (NRM),
the Ditsong (Transvaal) National Museum of Natural History, Pretoria, South Africa (TMP),
the Zoological Research Museum Alexander Koenig, Bonn (ZFMK),
the Zoological Museum Amsterdam, Leiden, The Netherlands (ZMA),
the Natural History Museum, Humboldt-University, Berlin (ZMHB),
the Natural History Museum of Denmark, University of Copenhagen (ZMUC),
the Zoological State Collection Munich (ZSM).

I dedicate my two new genera
Mountelgonia *and* Moyencharia
to six game rangers who were killed and
to those many people who were injured in an attack
on the Institute in the Congo for Conservation of Nature (ICCN)
headquarters in Epulu, Democratic Republic of the Congo,
on 24th June 2012.

The attack was in retaliation against the ICCN rangers
and staff members because of their interfering
with illegal poaching and illegal mining
in the Okapi Wildlife Reserve.

Date of Publication: 25th March 2013 (pp.1– 82)

Description of two new genera and ten new species of Metarbelidae (Lepidoptera: Cossoidea) from western, north-central and eastern Africa with notes on habitats and biogeography

INGO LEHMANN

University of Bonn, Zoological Research Museum Alexander Koenig,
Adenauerallee 160, 53113 Bonn, Germany

Friedrich-Ebert-Damm 59, 22047 Hamburg; e-mail: ingo5.lehmann@googlemail.com

Abstract

Mountelgonia **g. nov.** and *Moyencharia* **g. nov.** are described. The former currently comprising seven species, five of which are described as new: *Mountelgonia percivali* **sp. nov.**, *M. lumbuaensis* **sp. nov.,** *M. thikaensis* **sp. nov.**, *M. urundiensis* **sp. nov.** and *M. abercornensis* **sp. nov..** *Mountelgonia arcifera* (Hampson, 1909) and *M. pagana* (Strand, 1909) have been transferred into the new genus from *Metarbela* Holland, 1893. The type species of the new genus is *M. percivali* **sp. nov..** *Mountelgonia* **g. nov.** is described from Burundi, Rwanda, Kenya, Tanzania and northeast Zambia (eastern Africa) occurring in four distinct phytochoria, namely: i) the Afromontane archipelago-like regional centre of endemism, ii) Somalia-Masai regional centre of endemism, iii) Lake Victoria regional mosaic and iv) Zambezian regional centre of endemism (Afrotropical Region). A butterfly-like appearance of the wings among the males of *Mountelgonia* **g. nov.** is a character that was not published previously for the family Metarbelidae but for the related family Ratardidae.

The second genus, *Moyencharia* **g. nov.,** currently comprising six species, five of which are described as new: *M. mineti* **sp. nov.**, *M. winteri* **sp. nov.,** *M. joeli* **sp. nov.**, *M. herhausi* **sp. nov.** and *M. sommerlattei* **sp. nov..** The sixth species, *M. ochreicosta* (Gaede, 1929), has been transferred into the new genus from *Teragra* Walker, 1855. *Teragra basiplaga* Gaede, 1929 is treated here as a synonym of *Moyencharia ochreicosta* (Gaede, 1929). Therefore the subspecific rank of *Teragra basiplaga* f. *fuscoradiata* Gaede, 1929 is not adopted here. The species' name "*ochreicosta*" is given precedence and will be fixed according to the "Principle of the First Reviser." The type species of *Moyencharia* **g. nov.** is *M. mineti* **sp. nov..** The new genus is described from the Republic of Guinea, Burkina Faso, Ghana, Nigeria (western Africa); southeastern Chad, northeastern Democratic Republic of the Congo and Republic of South Sudan (north-central Africa) occurring in three phytochoria, namely: i) the Sudanian regional centre of endemism, ii) the Guinea-Congolia/Sudania regional transition zone and iii) Guineo-Congolian regional centre of endemism.

This paper represents the first published records of the family Metarbelidae for the country Burkina Faso. The species of *Moyencharia* **g. nov.** from Burkina Faso and Chad represent – together with *Kroonia carteri* Lehmann, 2010a from Sénégal – the most northern records of the family Metarbelidae on the African mainland (Afrotropical Region).

In addition to the descriptions and illustrations of adult morphology notes on ecology and biogeography are presented.

Keywords: Afrotropical Region, Burkina Faso (formerly Upper Volta), butterfly-like appearance, chad, *Mountelgonia*, *Moyencharia*, new genera, new species, revision, taxonomy.

Introduction

The diversity of the family Metarbelidae came only recently into focus again (Lehmann 1997, 2007, 2008a, b, 2010a, b, 2011, 2012). The Metarbelidae comprise 16 genera and 211 published species (De Prins & De Prins 2012). However, the number of genera and species are not yet definitive. Ongoing studies by the author suggest that the Metarbelidae comprise at least 25 genera and more than 400 species in the Afrotropical Region. Among the 16 described genera is, for example, the genus *Melisomimas* Jordan, 1907 based on a misidentified type-species which was in fact a re-description of *Melisa grandis* Holland, 1893 by Jordan (Fletcher & Nye 1995). The latter species is a synonym of *Melisa diptera* (Walker, 1854) that belongs to the family Erebidae. Hence, the genus' name *Melisomimas* should be replaced since it still includes a second (Metarbelidae?) species recorded from Uganda which is *Melisomimas metallica* Hampson, 1914.

Recent works using molecular methods placed Metarbelidae as one of the seven families of Cossoidea (Regier *et al*. 2009; Mutanen *et al.* 2010; van Nieukerken *et al*. 2011). Cossoidea was found to be a heterogeneous group not forming a monophylum. It seems that Metarbelidae could be closely related to the Ratardidae which occur in Southeast-Asia and in the northeastern Himalaya. Both families share several morphological features, *e.g.* having only one strong anal vein on the forewing as well as the deep, 8-shaped ovipositor lobes (Holloway 1986). The butterfly-like appearance of the Ratardidae is also noteworthy. This character is described for the first time for the Metarbelidae in regard to the males of *Mountelgonia* **g. nov..**

The present studies of the author suggest that the family Metarbelidae ranges from mainland Africa and Madagascar across the southern Arabian Peninsula (Afrotropical Region) via Nepal and India to Southeast Asia (Lehmann 2008b; De Prins & De Prins 2012) whilst some alleged New World *Indarbela* Fletcher, 1922 species belong to the Hypoptinae (Edwards *et al*. 1998).

Taking into consideration the ongoing deforestation, destruction of natural habitats, rapidly changing anthropogenic environment, and the impossibility of field research in some regions of West Africa and north-central Africa, the historical collections serve as the major source for defining and revising the genera of Metarbelidae. Additionally, they offer a chance to present data on habitats. Lepidoptera species are often associated with certain vegetation types or biotopes (Van Dyck 2011). A particular association of Metarbelidae to legume-dominated forests and woodlands has been emphasized by Lehmann (2008a) based on 14 years of field research in southeast coastal Kenya (Lehmann & Kioko 2000, 2005). As knowledge about the habitat of new species is often separated from taxonomic papers I will present such information here in regard to the holotype including results based on own field studies in south-central Kenya.

In the frame work of the revision of the family Metarbelidae I will describe two new genera and ten new species in this paper which are based on morphological characters.

Material and methods

The 13 species presented here are from the following collections: The Natural History Museum, London (BMNH); Natural History Museum, Paris (MNHN); the private collection Witt, Munich, Germany (MWM); the National Museums of Kenya, Nairobi (NMK); the Swedish Natural History Museum, Stockholm (NRM); Royal Museum for Central Africa, Tervuren, Belgium (RMCA); Zoological Research Museum Alexander Koenig, Bonn (ZFMK); Zoological Museum, University of Copenhagen, Denmark (ZMUC); Natural History Museum, Humboldt-University, Berlin (ZMHB) and Zoological State Collection Munich (ZSM). The specimens were photographed and then compared with all described Metarbelidae.

The maceration of the abdomen was done as follows: It was detached and macerated between one to three days in a glass tube containing a cold 10% solution of potassium hydroxide. After the maceration of the abdomen the genitalia were removed from the abdomen and drawn on a piece of paper in a lateral view, then transferred to distilled water for cleaning and spreading. The preparation of the genitalia was flooded with isopropyl alcohol and remained for two hours before being mounted in Euparal. The genitalia slides were photographed using a digital stereo-microscope (ZEISS-SteREO: Discovery.V20) at ZFMK. The shape of the genitalia, in particular of the valva, might be different in comparison of the lateral view (*cf.* drawings) with the ventral view (*cf.* photographs). The reason for this difference is because the drawings were done while the genitalia are not pushed. In contrast, the photographs were taken while the genitalia are below a coverslip that is gently pushed onto them. Specimens of several taxa examined here were studied with Scanning Electron Microscope (SEM, Hitachi S-2460N) at ZFMK.

The terminology for external characters follows Ridgway (1912), Janse (1925), Scoble (1995), Edwards *et al.* (1998), and for internal features, mainly the genitalia, Sibatani *et al.* (1954) and Klots (1970). The biogeographical names follow White (1983), Sayer *et al.* (1992) and Burgess *et al.* (2004).

Taxonomic review

I. *Mountelgonia* g. nov.

Type species: *Mountelgonia percivali* **sp. nov.**

Diagnosis. The new genus comprises species that are of medium size in comparison to species of other genera in the family Metarbelidae. *Mountelgonia* possesses typical metarbelid characters (Edwards *et al*. 1998; Lehmann 2008a, 2012) which are repeated here with some additions in regard to the frontoclypeus, the butterfly-like appearance and the geometric design/wing pattern: Head rugulose, not retracted under the prothorax. The lower frontoclypeus has a pair of pits in a few genera (*cf.* Lehmann 2011); but in the majority of genera a pair of projections, rather conical in shape (Figures

11–12), are present or neither pits nor projections occur. Antennae bipectinate in males; bipectinate, unipectinate or filiform in females. Wings broad, very rarely fore- and hindwings are of equal surface (= butterfly-like) as in the males of *Mountelgonia* **g. nov.**; a geometric design as defined by Lehmann (2011) is often absent; wing pattern usually present, but often simple, sometimes reticulate or transversely striate on a pale ground-colour. Retinaculum and frenulum very rarely present; chaetosemata and tympanum absent; epiphysis often absent, if present, the epiphysis occurs roughly at middle of foretibia extending to first tarsomere; hindlegs with one or two pairs of tibial spurs; tibia and first tarsomere of hindleg not dilated as in the Cossidae. Accessory cell absent; anterior branch of R_4+R_5 (in forewing) and of M_1 (in hindwing) in discal cell usually absent (in Cossidae the M_1 vein stem is present and branches within the discal cells of both wings resulting in an anterior M and posterior M vein); CuP in forewing usually obsolete, very rarely present; one strong anal vein occurs always on the forewing.

Male genitalia: uncus beak-like or wide, tip bifid or bilobed; usually with separate or connected drumstick-like or hand-like or kidney-like or lever-like appendages from uncus (possibly gnathi); socii very small or absent; valvae small, rarely long and elongated, usually rounded or rectangular, sometimes with thorn-like processes, rarely the valvae consist of two lobes, some modification to the sacculus; aedeagus tube-like.

Female genitalia: short, telescopic ovipositor with broad, more or less 8-shaped ovipositor lobes as well as reduced ductus and corpus bursae *sensu* Holloway (1986); an often expanded membrane between tergite 7 and 8.

Mountelgonia is defined as a new genus based on **i)** the naming of the sister taxon and **ii)** putative morphological apomorphies:

i) It is assumed that the genera *Metarbelodes* Strand, 1909 and *Mountelgonia* **g. nov.** are two monophyletic groups and sister taxa sharing an common ancestor. The genera share male genitalia valvae comprising only one thorn-like process towards the ventral-posterior margin of the valva which is a unique character (apomorphy). The occurrence of this thorn-like process in *Metarbelodes* and *Mountelgonia* **g. nov.** is plesiomorphic within the genera. In *Mountelgonia* **g. nov.** the process is only slightly bent and looks like a flat thorn that is shorter than the length of the weakly-sclerotized projection and hence, never extends beyond of the latter. In *Metarbelodes* the thorn-like process is more developed, that means it resembles a bent thorn that is usually hollow inside and that extends beyond the weakly-sclerotized projection. The occurrence of these two apomorphies suggests the existence of two separated lineages. Two other shared derived characters of the sister taxa are the weakly-sclerotized projection above the thorn-like process as well as an oval shaped emargination in between the process and the projection.

ii) The fore- and hindwing is almost of equal surface, that means butterfly-like, in the males of *Mountelgonia* **g. nov..** The males have a broad forewing that is almost of the same length and width as

the hindwing. This is a very interesting character since it is similar among the species of the Ratardidae. The butterfly-like appearance of the males of *Mountelgonia* **g. nov.** is treated here as an apomorphy for the Metarbelidae (Figures 1A, 3A, 4A, 6A–10A). The females are larger than the males and their forewing is longer than the hindwing, more narrow and elongated (Figures 2A, 5A)**.** The different shape of the wings in both sexes (female not butterfly-like; male butterfly-like) is treated here as a second apomorphy of *Mountelgonia* **g. nov..** In *Metarbelodes*, the females are 1.5 to 2.5× larger in wing size than the females of *Mountelgonia* **g. nov.** and have elongated and broad forewings with a rounded apex instead of an elongated and narrow forewing. The males of *Metarbelodes* are smaller than the females and have a broad forewing that is larger than the hindwing. The wings are not of equal surface in both sexes (not butterfly-like).

The combination of characters presented above demand the erection of a new genus. Seven Afrotropical species are currently recognized: *Mountelgonia percivali* **sp. nov.**, *M. lumbuaensis* **sp. nov.,** *M. thikaensis* **sp. nov.**, *M. urundiensis* **sp. nov.** and *M. abercornensis* **sp. nov..** *Mountelgonia arcifera* (Hampson, 1909) and *M. pagana* (Strand, 1909) have been transferred into the new genus from *Metarbela* Holland, 1893.

Description. *Head:* Rough-scaled; long hair-like scales on frontoclypeus; a pair of pits absent, a pair of conical projections present on lower frontoclypeus in both sexes, the two projections are widely separated (Figure 11) and occur close to the upper end of two large pits behind the labial palpi (Figure 12); the labial palpi are almost as long as eye diameter and consist of three segments, the second segment is very long, at least 3× longer than the basal segment in both sexes; male antennae bipectinate; female antennae rather unipectinate; flagellum and dorsal side of branches scaled (branches appear to be less scaled in females). *Thorax:* Densely covered with hair-like scales (very fine scales in females) and without a collar ring; with a short crest on metathorax. Epiphyses are absent in both sexes. Hindlegs with one pair of narrow tibial spurs (at least 0.7mm long) in both sexes. Forewing upperside without a geometric design; with a simple pattern with all veins darker than the ground colour, except of CuA_2 that is always white or ivory yellow in both sexes (Figures 1A–10A). Wing venation similar in both sexes (Figures 1a–9a): in forewing 1A+2A forked at base; CuP obsolete; CuA_2 originating from hind margin of posterior cell; CuA_1, M_3 and M_2 separated and initiating from apical angle of posterior cell; M_1 initiating from distal margin of median cell; R_1 initiating from anterior margin of median cell; R_2 initiating from anterior angle of areole, R_3+R_4 long stalked, initiating from the tip of the areole, R_5 initiating from posterior angle of areole or is stalked with R_3+R_4 in both sexes; Sc more or less parallel to R_1. In hindwing CuA_2 initiating from hind margin of posterior cell; CuA_1, M_3 and M_2 initiating from apical angle of posterior cell, separated; M_1 and Rs initiating from apical angle of anterior cell, stalked in both sexes; with a bar from Rs to Sc+R_1 usually; with a small vein in discocellular cell on both forewing and hindwing; cilia long, more than 1.0mm.

Retinaculum and frenulum absent. *Abdomen:* With dense hair-like scales and short abdominal tuft, not longer than one-third of abdomen length.

Male genitalia. Saccus broad and short, *c.* half of weakly-sclerotized projection, usually rounded at tip; uncus large and broad, *c.* 50–60% of valva (lateral view), setose (ventral view); rather bifid. Valva ventral-posteriorly with one short and thorn-like appendice, slightly bent at its tip. From half of costal margin a large, setose and weakly-sclerotized projection and a large rounded emargination below (Figures 1b, 3b–4b, 6b–9b). Gnathos covered with many short teeth-like structures at its distal end; gnathal arms not connected by a band basally and not, or only slightly, bent towards uncus. The vinculum and tegumen are fused, forming a firm and very narrow ring. Juxta elongated, with two acuminate lobes and a deep emargination. Phallus simple, tube-like; vesica without cornuti (Figures 10c–10e, 10g).

Female postabdominal structure. Papillae anales obliquely 8-shaped or elliptic, covered with short and long setae; segment 8 only setose along its posterior margin, not emarginated dorso-anteriorly. Latero-ventral surface of segment 8 with one rather narrow, half ring-like plate (Figures 2b, 5b).

Distribution. The species of *Mountelgonia* **g. nov**. are found on highland and/or plateau areas as well as on high plains of eastern Africa, extending their range from Rwanda and Burundi, eastwards via Uganda into Kenya and Tanzania and further south to northern Zambia. Mount Elgon (on the frontier of Uganda and Kenya as well as *c.* 120km northeast of Lake Victoria) is currently the most northern distribution limit and Mbala (formerly Abercorn, northeast Zambia and *c.* 950km south of Lake Victoria) the most southern limit. The species of the new genus have probably only small distribution ranges in eastern Africa. The new genus is unknown on the Arabian Peninsula and on Madagascar (Figure 31).

Ecology. The species of *Mountelgonia* **g. nov.** seem to be forest and woodland species, occurring in areas that belong to submontane or montane zones, respectively. Montane zones are areas above 1.300m as defined for tropical Africa by Keay (1959a). The species of the new genus are associated with Afromontane forest types, dense woodlands, wooded grasslands and open shrubbed grasslands, with an average annual rainfall that is adequate moisture such that woody vegetation should form a more or less closed canopy (*c.* 650mm) if not disturbed by fire and/or humans. The species of the new genus may be linked to the following vegetation types: *"Afromontane rain forest"; "Undifferentiated Afromontane forest"*; *"Dry transitional montane forest"* including patches of *"Single-dominant Afromontane forest";"Zambezian miombo woodland"* with open canopies and high-grass or forming an undifferentiated *Brachystegia-Isoberlinia* woodland with or without Chipya (that is a mosaic of different stages of degradation/re-establishment of evergreen tropical forest that appears as fragments

of evergreen thicket with a luxurious herbaceous layer); *"Somalia-Masai Acacia-Commiphora deciduous bushland and thicket"; "Somalia-Masai edaphic grassland"; "Somalia-Masai riparian forest"* and *"Somalia-Masai evergreen and semi-evergreen bushland and thicket" sensu* White (1983). Different plant communities in the biotopes of the species of *Mountelgonia* **g. nov.** share a common feature: woody legumes are dominants or co-dominants with the exception of Afromontane forest.

Etymology. *Mountelgonia* **g. nov**. is named for Mount Elgon (4.321m) that is a stratovolcano of early Miocene age (25–10 myr B.P.) on the frontier of Kenya and Uganda. It is the type locality of *M. percivali* **sp. nov..** The gender of the new genus is feminine.

A key to the species of *Mountelgonia* g. nov.

The key is based exclusively on morphological characters. As for all seven species only one or a few specimens are available, identifications obtained with this key should be cross-checked carefully with the description, distribution and the figures presented in this paper.

1a. Male 2
1b. Female 8

2. Uncus with rather rounded lobes 3
4. Uncus with rather rectangular lobes 5
6. Uncus with rather pointed lobes 7

3a. Uncus with an emargination of 30% of the width of uncus; weakly-sclerotized projection and sacculus densely setose, valvae rectangular and only slightly elongated.....*percivali* sp. nov

3b. Uncus with an emargination of 50% of the width of uncus; weakly-slerotized projection setose, sacculus with few short setae, valvae rectangular and elongated .....*pagana*

5a. Uncus with an emargination of 60% of the width of uncus; weakly-sclerotized projection densely setose, sacculus with no setae, valvae rectangular and broad .. ..*lumbuaensis* sp. nov.

5b. Uncus with an emargination of 50% of the width of uncus; weakly-slerotized projection short, setose, sacculus with few short setae, valvae rectangular and elongated..... *abercornensis* sp. nov.

7a. Uncus with an emargination of 70% of the width of uncus; weakly-sclerotized projection and sacculus densely setose, valvae rectangular and slightly elongated .....*thikaensis* sp. nov.

7b. Uncus densely setose ventrally (long setae), emargination 75% of the width of uncus; weakly-slerotized projection densely setose, sacculus with few short setae, valvae rectangular, broad .....*urundiensis* sp. nov.

7c. Uncus densely setose ventrally (short setae), emargination 60% of the width of uncus, weakly-slerotized projection densely setose, sacculus with few short setae, valvae rectangular, broad.....*arcifera*

8a. Females unknown 8b

8b. *abercornensis* sp. nov.; *lumbuaensis* sp. nov.; *pagana; thikaensis* sp. nov.; *urundiensis* sp. nov.

8c. Segment 8 forming a sclerotized band ventrally 9

9a. Segment 8 forming a narrow sclerotized band ventrally with a v-shaped end laterally .....*percivali* sp. nov.

9b. Segment 8 forming a narrow sclerotized band ventrally that has a thorn-like, acuminate end laterally, ... *arcifera*.

Review of species

1. *Mountelgonia percivali* sp. nov.

Figures 1A, 2A; 1a, b; 2a, b; 10a.

Material examined. *Holotype* male, Kenya, Rift Valley Province, Trans-Nzoia District, Mount Elgon National Park, Chepnyalil Cave, 2.500m, 24.January.1992, A. Lobmayer leg., genitalia slide number 27/022012 I. Lehmann (MWM).

Paratypes: one female, Kenya, Rift Valley Province, Trans-Nzoia District, Mount Elgon National Park, Chepnyalil Cave, 2.500m, 24.January.1992, A. Lobmayer leg., genitalia slide number 31/032012 I. Lehmann (MWM); six males, Kenya Colony, Mount Elgon, eastern side, 2.050m, 28.February.1948, A. Holm leg.; same locality and altitude, 05.March.1948, A. Holm leg.; Kenya Colony, Mount Elgon, eastern side, 2.100m, 08.March.1948, A. Holm leg., genitalia slide number 08/072012 I. Lehmann (NRM); Kenya Colony, Kaptagat (today in Rift Valley Province, Uasin Gishu District), 23.December.1948, Walter leg. (NMK); Kenya Colony, Mount Elgon, January.1951, E. Pinhey leg., genitalia slide number 17/062012 I. Lehmann (NMK); Kenya, Eldoret (Rift Valley Province, Uasin Gishu District), February and March.1970, F. Knudsen leg., genitalia slide number 24/032008 I. Lehmann (NMK).

Description. Forewing length in male 10.0mm (wingspan 22.0mm), in female 12.5mm (wingspan 26.5mm); antenna-wing ratio 0.55:1 in male, 0.44:1 in female. *Head*: Yellow ocher, with glinty shine, in between eyes long hair-like scales; eyes olive with small black spots; antennae long, same colour as head; branches of antennae 5.5× width of shaft in males, 1.5× in females, covered with cream-coloured scales dorsally; antennal tips with long scales, bending towards apex; labial palpi sepia. *Thorax*: Patagia and tegulae yellow ocher with glinty shine. Hindfemora, -tibiae and -tarsi yellow ocher with fine hair-like scales and a glinty shine; tibial spurs 0.8mm long in male, 0.7mm in female.

Forewing sepia, not glossy; yellow ocher below cell and near base of wing; costal margin sepia and yellow ocher below; veins sepia except of CuA_2 that is ivory yellow, same colour extending in a band below cell to base of wing, cell yellow ocher edged sepia; cilia very long, 2.0mm in male, 1.2mm in female, ivory yellow mixed with sepia. Underside of forewing rough-scaled, ivory yellow, glossy; costal margin and veins sepia in both sexes. Hindwing upperside ivory yellow, glossy; underside as in forewing. Wing venation see Figures 1a and 2a. *Abdomen*: Mainly ivory yellow with glinty shine.

Male genitalia. Uncus with rounded lobes; gnathos long (slightly longer than basal width of valva); valva more or less rectangular, close to the costa and sacculus the valva carrying short setae, weakly-sclerotized projection setose and with a rounded tip, one short thorn-like process with rounded and slightly setose tip; median sector of valva without setae; a deep emargination, extending to almost the centre of the valva, in between the weakly-sclerotized projection and the thorn-like process. Saccus short, finger-shaped, gently rounded caudally. Phallus long, slightly longer than valva, straight, narrowest in middle, bilobed with a cleft.
Variation. The male paratypes do not differ to any major degree in regard to the holotype.

Female postabdominal structure. Papillae anales broad, 8-shaped, densely setose with long setae. Segment 8 without setae except along its posterior margin; dorso-anterior margin of abdominal plate without emargination; segment 8 with one narrow, latero-ventral sclerotized band with a v-shaped end laterally. Posterior apophyses straight, 2.0× width of anterior apophyses, the latter are slightly shorter than the former, anterior apophyses with bent tips.

Diagnosis. Three characteristics in the male genitalia are important: i) The uncus has got rather rounded lobes with a rounded emargination that is only 30% of the width of the uncus; ii) the weakly-sclerotized projection is densely setose; iii) the sacculus is densely setose. The female has got one outstanding character: Segment 8 has a latero-ventral plate with a v-shaped end. The female of *M. arcifera* is similar but has a latero-ventral plate with a thorn-like acuminate end and the anterior apophyses are almost twice as long as the posterior apophyses while in *M. percivali* **sp. nov.** the posterior apophyses are slightly longer than the anterior apophyses.

Distribution. *M. percivali* **sp. nov**. is known from areas east of the summits of Mount Elgon extending its range via Eldoret to Kaptagat (*c.* 110km southeast of Mount Elgon) in the Western Highlands of Kenya. The new species occurs most probably on the western side of Mount Elgon in Uganda.

Habitat of type locality. Chepnyalil (altitude 2.419m, average annual rainfall 1200–1460mm) is located on the northeastern side of Mount Elgon and within Mount Elgon National Park, *c.* 4km southeast of Masara (Kenya). It is a small, wide cave (26m deep, 54m wide and only 1.5m tall) that is associated with a surface water stream and initiated behind a waterfall. It is probably not older than Holocene. The cave was occupied by humans for shelter until about 90 years ago. The walls and ceiling show lots of soot and rock paintings (Lundberg & McFarlane 2006). Hence, it can be surmised that the forests surrounding the cave were modified by humans. The forests of Mount Elgon belong to the *"Afromontane archipelago-like regional centre of endemism"* and represent various types of *"Afromontane forest" sensu* White (1983). Many of the Afromontane tree species have a wide ecological tolerance and a large geographical distribution. Although Afromontane forest types overlap, the drier types are usually shorter and of distinctive floristic composition.

The forests that occur between 2.000 and 3.050m on the northeastern side of Mount Elgon were classified by Hamilton (1984) as *"Dry Lower Montane Forest"* with mainly evergreen sclerophyllous tree species. Hitimana *et al.* (2004) found that in more or less unlogged forests on the eastern side of Mount Elgon and at an altitude between 2.000 and 2.350m (the habitat of three paratypes), forests are up to 25–35m tall and comprise dominant species such as *Cassipourea malosana* (Baker) Alston, *Olea capensis* L. ssp. *welwitschii* (Knobl.) Friis & P.S. Green, *Diospyros abyssinica* (Hiern) F.White, *Croton macrostachys* Hochst., *Ficus thonningii* Blume, *Ehretia cymosa* Thonn., *Podocarpus latifolius* (Thunb.) R.Br., *Ekebergia capensis* Sparrm. and *Vernonia auriculifera* Hiern..

Ecology based on holotype and paratypes. *M. percivali* **sp. nov.** occurs in drier types of *"Afromontane forest" sensu* White (1983) at high altitudes (up to more than 2.400m).

Etymology. *M. percivali* **sp. nov.** is named after the naturalist Arthur Blayney Percival (born in March 1875, died on the 20th January 1941). He was Kenya's first Game Ranger from May 1901 to early 1923 and one of the founders of the *East Africa and Uganda Natural History Society* in 1910–11. His Majesty's Deputy Commissioner for the East Africa Protectorate (also known as British East Africa), Sir Frederick Jackson, used much of the data presented by Percival to set up steps towards a legal protection of Game. The efforts of Sir Jackson and Percival resulted in the establishment of the Game Department in 1907 (later called the Kenya Game Department) as a separate unit from the Colonial Service.

2. *Mountelgonia lumbuaensis* sp. nov.

Figures 3A; 3a, b; 10b.

Material examined. *Holotype* male, British East Africa (written in German as "Br. O. Afr." on the original label; today Kenya) and hence collected before the year 1920, "Lombwua" (= misspelling of Lumbua or Lumbwa, Rift Valley Province, Nakuru District or Kericho District), no date mentioned on label, Sandb. leg., genitalia slide number 24/062012 I. Lehmann (NRM).
Paratype: one male, same locality and collector, no genitalia dissection done (NRM).

Description. Forewing length in male 10.5mm (10.0mm in paratype), wingspan 25.0mm (24.0mm in paratype); antenna-wing ratio 0.62:1 (0.64:1 in paratype). *Head*: warm buff, in between eyes long hair-like scales, sepia towards the eyes; eyes wood brown with large black patches; antennae long, same colour as head; branches of antennae 5× width of shaft, covered with ivory yellow scales dorsally; antennal tips with long scales, bending towards apex; labial palpi warm buff, laterally sepia. *Thorax*: Patagia and tegulae densely scaled warm buff mixed with ivory yellow with glinty shine. Hindfemora, -tibiae and -tarsi warm buff with fine hair-like scales and a glinty shine; tibial spurs 1.0mm long. Forewing warm buff, not glossy; costal margin sepia; veins sepia except of CuA_2 that is pure white, same colour extending in a band below cell to base of wing; cilia long, 1.5mm, alternating sepia and ivory yellow. Underside of forewing rough-scaled, ivory yellow, not glossy, costal margin and veins sepia. Hindwing upperside ivory yellow, glossy, veins yellow ocher; underside as in forewing. Wing venation see Figure 3a. *Abdomen*: Mainly warm buff mixed with ivory yellow with glinty shine.
Variation. The male paratype does not differ to any major degree in regard to the holotype.

Male genitalia. Uncus with rather rectangular lobes, densely setose ventrally; gnathos long (longer than basal width of valva); valva more or less rectangular, close to the costa and sacculus the valva carrying no setae, weakly-sclerotized projection densely setose and with a rounded tip, one short thorn-like process with rounded tip that is not setose, median sector without setae, the emargination below the weakly-sclerotized projection is as long as 35% of the width of valva. Saccus short, broad, less finger-shaped, gently rounded caudally. Phallus long, slightly longer than valva, straight, narrowest in middle, bilobed with a cleft.

Female. Unknown.

Diagnosis. This is one of two large species of *Mountelgonia* **g. nov.** compared to the males. Three characters are noteworthy: i) The uncus has got rather rectangular lobes and an emargination that is 60% of the width of the uncus; ii) the saccus is broad (50% of width of weakly-sclerotized projection);

iii) the valvae are rectangular and very broad at base that means slightly broader than the length of uncus.

Distribution. *M. lumbuaensis* **sp. nov**. is known from the Mau Forest Complex that covers a large area of the southwestern Highlands of Kenya.

Habitat of type locality. The name "Lombwua" appears to be a misspelling of "Lumbua" or "Lumbwa" since only those two locality names were found in old textbooks as well as on several old maps by the author. Charles New (1873) briefly described a locality near a wide stream that is termed "Lumbua" by the natives of the Mau Forest. New marked this locality on his map southwest of Lake Nakuru as well as *c.* 25km northwest from "Mau na Erok" (today Mau Narok, altitude 2.829m, average annual rainfall 1160mm) in the Eastern Mau Forest (today mainly in Nakuru District). It is noteworthy that his map probably represents the only map that shows the native caravan trade routes that lead from the Indian Ocean to the interior, *e.g.* to the shores of Lake Victoria in the early 1870s. Various old textbooks, and more recently Kerfoot (1964), mention an old name for a locality in the Western Mau Forest termed "Lumbwa" by the Kipsigis (today Kipkelion, altitude 1.950m, average annual rainfall 1500mm, Kericho District). This locality used to be a centre of European settlement (since 1915) and is located on the Nyando River, *c.* 70km west from Lake Nakuru and *c.* 60km northwest from Mau Narok. Hence, the type locality might be either in the Western Mau Forest or in the Eastern Mau Forest.

The Mau Forest Complex (altitude 1.800–3.080m; size *c.* 400.000ha) belongs to White's (1983) *"Afromontane archipelago-like regional centre of endemism"* and represents the largest single block of closed-canopy forest in Kenya. Forests that constitute the complex comprise 20 forest blocks of various types of *"Afromontane forest" sensu* White (1983). All forests have been reduced at the expense of the tea industry, flax cultivation (since 1915), farmlands, fire, grasslands and plantations of *Pinus patula* Schltdl. & Cham. and *Cupressus lusitanica* Mill., planted largely since 1958. Today, destroyed natural forest cover decreases usually progressively from about 90 to 50% towards the upper slopes (*e.g.* Nkako *et al.* 2005). Hence, natural forest patches are very rare below 2.300m. The wetter Western Mau Forest (annual precipitation 1400–2000mm) appears to be mainly an old secondary evergreen to semi-deciduous *"Afromontane rain forest" sensu* White (1983) dominated in the upper canopy layers by *Albizia gummifera* (J.F.Gmel.) C.A.Sm., *Polyscias ferruginea* Harms, *P. kikuyuensis* Summerh., *Fagara macrophylla* Oliv. Engl., *Diospyros abyssinica* (Hiern) F. White, *Ekebergia rueppeliana* Fresen.A.Rich., *Casearia battiscombei* R.E.Fries and *Allophylus abyssinicus* (Hochst.) Radlk.. The first two tree species indicate an old secondary forest. The sub-dominant canopy comprises species such as *Nuxia congesta* R. Br., *Catha edulis* (Vahl) Forssk., *Cassipourea malosana* (Baker) Alston, *Prunus africana* (Hook.f.) Kalkm., *Drypetes gerrardii* Hutch., *Allophylus africanus* P. Beauv. and *A. macrobotrys* Gilg. The lower tree and shrub layers include several species that indicate

a secondary forest such as *Croton macrostachys* Hochst., *Ehretia cymosa* Thonn. and *Vernonia auriculifera* Hiern. Common riparian tree species comprise *Olea hochstetteri* Bak., *Syzygium guineense* (Willd.) DC., *Conopharyngia johnstonii* Stapf and the tree fern *Cyathea manniana* Hook. (Kerfoot 1964). *Tabernaemontana stapfiana* Britten, *Neoboutonia macrocalyx* Pax and *Macaranga kilimandscharica* Pax are gregarious primary colonizers in opened up sites.

The Eastern Mau Forest is drier (annual precipitation *c.* 1000–1200mm) and largely dominated by conifers comprising *Juniperus procera* Hochst. and *Podocarpus latifolius* (Thunb.) R.Br. as dominant species locally mixed with *Olea capensis* L. (Kinyanjui 2011). The Eastern Mau was targeted for excision and settlement, subsequently reduced from 65.921 to 30.620ha in 2001 (Michuki *et al.* 2008).

Ecology based on holotype and paratype. *M. lumbuaensis* **sp. nov.** occurs in various types of wetter and/or drier *"Afromontane forest" sensu* White (1983) at high altitudes (up to 2.830m).

Etymology. *M. lumbuaensis* **sp. nov.** is named after the locality Lumbua (Kenya) as mentioned and figured by Charles New (1873).

3. *Mountelgonia arcifera* (Hampson, 1909)**, comb. nov.**

Original combination: *Marshalliana arcifera* Hampson, 1909

Synonyms: *Metarbela arcifera* (Hampson, 1909)

In: Hampson (1910), von Dalla Torre & Strand (1923), Gaede (1929);

Metarbelodes arcifera (Hampson, 1909) in Janse (1925);

Metarbela pallescens Le Cerf, 1914 (*cf.* note below).

Figures 4A, 5A, 6A; 4a, b; 5a, b; 10c, 11–15.

Note: The type of "*Metarbela pallescens* Le Cerf, 1914" was not found by the author in museum collections. Nevertheless, it is possible that *M. pallescens* represents a synonym of *M. arcifera* since Gaede (1929, p. 507) described the former species as follows: *"Forewing white, at the base somewhat rusty brown. At the inner margin an irregular grey spot. At the inner angle a dark shadow, in front continued in dark streaks. Hindwing dingy white. Male 22 mm. East Africa. This may also be only a faded arcifera."* The latter observation is of particular interest. It is also noteworthy that the type locality of *M. pallescens* is Voi (Kenya, *c.* 275km southeast from Stony Athi that is the paratype locality of *M. arcifera*) located in similar habitats as described below. Due to the observation of Gaede, *Metarbela pallescens* is treated here preliminarily as a synonym of *M. arcifera*.

Material examined. *Holotype* male, Naitolia, British East Africa (today Tanzania, Arusha Region, Monduli District), 26.February.1900, C.S. Betton leg., no genitalia dissection done (BMNH).
Paratype: one male, Athi-ya-Mawe (today Stony Athi, Kenya, Eastern Province, Machakos District), 15.March.1899, C.S. Betton leg., on bottom of label: "1900–10" (indicating that this specimen is most probably from the BMNH, *cf.* note below), genitalia slide number 19/082012 I. Lehmann (ZFMK).
Note: This specimen is treated here as a paratype of *M. arcifera* and as one of the twelve males collected in Athi-ya-Mawe by C.S. Betton as mentioned by Hampson (1909). Hampson did not expressly exclude those males from the type series (*cf.* Article 72.4.1 ICZN 1999). Additionally, he described one of the five females collected in Athi-ya-Mawe by C.S. Betton. Hence, the type series of *M. arcifera* is based on one male from Naitolia (called "type" by Hampson) as well as five females (from which one is described by Hampson) and twelve males. The latter 17 specimens were collected at Athi-ya-Mawe. It is very likely that the male from the ZFMK is originally from the BMNH where I.L. found only seven males (instead of twelve) collected in Athi-ya-Mawe by C.S. Betton between 13.March and 16.March.1899.

Additional specimens: one female, Kenya Colony, southern Masai Reserve (today Rift Valley Province, Narok District), 07.February.1935, Dr B. Benzon leg., genitalia slide number 10/062012 I. Lehmann (ZMUC); one male, Kenya Colony, southern Masai Reserve, 07.February.1935, Dr B. Benzon leg., genitalia slide number 25/022012 I. Lehmann (ZMUC); four males, same locality, same date and collector, no genitalia dissection done (ZMUC); one male, Kenya Colony, northern Masai Reserve, "Tellek" (= misspelling of Talek, Rift Valley Province, Narok District), 10.September.1947, F. W. Brostrup leg., no genitalia dissection done (ZMUC); one male, Kenya Colony, Kajiado (today Rift Valley Province, Kajiado District), October.1951, J. Nagle leg., genitalia slide number 26/042012 I. Lehmann (NMK); one male, same locality, date and collector, genitalia slide number 13/052012 I. Lehmann (NMK); three males, Kenya, Athi River-Kapiti Plains, Eastern Province, Machakos District, Game Ranching and Research Limited, 15.March.1999, I. Lehmann leg., one genitalia slide number 102000 I. Lehmann (deposited in the authors private collection); one male, Kenya, Rift Valley Province, Narok District, Lemek, 15–25.March.2002, Dr. Politzar leg., genitalia slide number 01/042012 I. Lehmann (MWM).

Additional re-description. Forewing length in male paratype 11.0mm (wingspan 24.0mm), in female 12.0mm (wingspan 26.5mm); antenna-wing ratio in male paratype 0.64:1; in female 0.48:1. *Head*: warm buff, in between eyes long and dense hair-like scales, eyes ecru-olive with black patches in both sexes; antennae long in male, ivory yellow, bipectinate, branches of antennae 7× width of shaft, covered with ivory yellow scales dorsally, antennal tips with long scales, bending towards apex; antennae in female shorter, rather unipectinate, branches of antennae 1.5× width of shaft, covered with ivory yellow scales dorsally, antennal tips with long scales, not bending towards apex (Figures 13–15); labial palpi warm buff. *Thorax*: Patagia and tegulae densely covered with hair-like scales, warm buff

mixed with ivory yellow and pure white with glinty shine. Hindfemora, -tibiae and -tarsi warm buff, tibial spurs 1.1mm long in both sexes. Forewing in male and female ivory yellow, costal margin warm buff; all veins warm buff, except CuA_2 ivory yellow or pure white; at top of CuA_2 a patch of warm buff; cilia long, 1.1mm in male, 1.3mm in female, ivory yellow. Underside of forewing in both sexes ivory yellow, veins warm buff, rough-scaled, glossy. Hindwing upperside ivory yellow, veins slightly darker, glossy. Underside as in forewing. Wing venation see Figures 4a, 5a. *Abdomen*: Ivory yellow.

Male genitalia. Uncus with rather pointed lobes, densely setose with short setae ventrally; emargination in between lobes 60% of the width of uncus; gnathos 1.5× longer than basal width of valva which is rectangular and broad, costa and sacculus broad with few long setae, weakly-sclerotized projection covered with short as well as long setae, thorn-like process short with rather rounded tip and without setae, median sector of valva with scattered setae, emargination below the weakly-sclerotized projection long, 50% of the width of valva. Saccus short, broad, not finger-like, rounded caudally. Phallus slightly bent, base 3× broader than distal end, slightly longer than width of valva, bilobed with a cleft.

Female postabdominal structure. Papillae anales broad, 8-shaped, densely setose with long and short setae. Segment 8 with scattered setae as well as with setae along its posterior margin and with one narrow, latero-ventral sclerotized band that has a thorn-like, acuminate end laterally. Dorso-anterior margin of abdominal plate without an emargination. Posterior apophyses straight, with a narrow, hook-like base posteriorly, almost of equal width as anterior apophyses, the latter are slightly longer than the former and without bent tips.

Diagnosis. The male of *M. arcifera* has got three characters that are different compared with the remaining species: i) The lobes of the uncus are densely covered with short setae ventrally; ii) the saccus is short, broad and not finger-shaped; iii) the median sector of the valva has scattered setae. The female has got two characters that are probably unique for this species: i) Segment 8 forming a narrow sclerotized band latero-ventrally that has a thorn-like, acuminate end laterally; ii) the posterior apophyses have got a narrow and long hook-like base.

Distribution. *M. arcifera* is known from southern Kenya and north-central Tanzania. The Masai Mara National Reserve (southwestern Kenya) is currently the western distribution limit; the Athi River-Kapiti Plains (south-central Kenya) the eastern limit; the area close to Mount Lukenya, the northern limit and Naitolia (north-central Tanzania), the southern limit.

Habitat of type locality. Naitolia (altitude 1.050–1.100m, average annual rainfall 650–700mm) is a Masai village *c.* 14km southeast of Makuyuni. Naitolia (the GPS point in degrees decimals is -3.671;

36.107) belongs to the *"Somalia-Masai regional centre of endemism" sensu* White (1983). The area is largely covered by bushland which probably has originated after the mass destruction of wildlife, woodland and forest on account of the British Administrations anti-tsetse fly campaign between 1929 and 1935. The bushland comprises species that are usually up to 3m tall with taller trees widely scattered, not forming a conspicuous canopy. Dominant species include *Acacia mellifera* (Vahl) Benth., *A. tortilis* (Forsk.) Hayne, *Balanites aegyptiaca* (L.) Del., *Commiphora africana* (A.Rich.) Engl., *Grewia* spp., *Combretum zeyheri* Sond., *Terminalia brownii* Fresen. and *Adansonia digitata* L.. The Naitolia floodplains dominate the landscape towards the east with tall grasslands and many trees of *A. digitata* L. at its margins. Numerous drainage courses occur and drain west into the Tarangire River. Hence, riparian woodlands and riverine forests are present, comprising *Ficus* spp., *Acacia sieberiana* DC., *Kigelia africana* (Lam.) Benth., *Cordia ovalis* R.Br. and *Salvadora persica* L. (T. Davenport, pers. comm.).

Habitat descriptions for three study sites. Long-term field studies were undertaken by the author between 1989 and 2002 *c.* 14km northwest from Stony Athi (the paratype locality) and *c.* 3–5km west and southwest from Mount Lukenya (1.837m) on a privately owned game ranch created in 1976 (Figures 1–5). All study sites are situated within the *"Somalia-Masai regional centre of endemism" sensu* White (1983) and on the Athi River-Kapiti Plains in gently rolling terrain at altitudes between 1.580 and 1.610m (average annual rainfall between 457 and 740mm). The Athi River-Kapiti Plains are high plains (altitude range *c.* 1.570–1.650m) which were formed by volcanic Tertiary tuffs and ashes capping on the Kapiti Phonolite. The following three habitats were studied in regard to Lepidoptera and plant species diversity: First, the habitat of one male of *M. arcifera* that comprises largely open *Balanites glabra* Mildbr. and *Acacia drepanolobium* Sjöstedt dwarf tree grassland including scattered shrubs and herbs such as *Aloe secundiflora* Engl., *Hibiscus flavifolius* Ulbr., *Ipomoea jaegeri* Pilg., *I. longituba* Hall., *Aerva lanata* (L.) Juss. and *Schkuhria pinnata* (Lam.) Thell.. The grass species *Themeda triandra* Forssk. and *Pennisetum stramineum* Peter are dominant (Figures 2–4). Secondly, two males of *M. arcifera* were collected by day sitting on dead wood in a strip of woodland running along a drainage line and dominated by *Acacia xanthophloea* Benth., *A. seyal* De Wild. and *Cordia crenata* Del. with scattered trees of *C. ovalis* R. Br. (Figure 5). Thirdly, about 5km to the east from the latter collecting site occur rocky outcrops on the slopes of Mount Lukenya comprising different tree species such as *Commiphora schimperi* (O.Berg) Engl., *Ficus cordata* Thunb. and *Clausena anisata* (Willd.) Benth..

Ecology. *M. arcifera* occurs in various types of open shrubbed and/or treed grasslands belonging to the *"Somalia-Masai Acacia-Commiphora deciduous bushland and thicket"* and to *"Somalia-Masai edaphic grassland" sensu* White (1983) at medium to high elevations (1.050–1.650m).

1

2

3

4

5

Figures 1–5. **1.** The author's research camp in the Athi River-Kapiti Plains, Kenya (January 1995). **2.** Dwarf tree grassland with *Acacia drepanolobium* in flower (background) and lilac flowers of *Ipomoea jaegeri* in the foreground (February 1998). **3.** *Themeda triandra* grassland with scattered trees of *Balanites glabra* and *Acacia drepanolobium* (August 1989). **4.** Habitat of *Mountelgonia arcifera* (Hampson) in *Themeda triandra* grassland with *Acacia xanthophloea* and *A. drepanolobium* (March 1999). **5.** Habitat of *Mountelgonia arcifera* (Hampson) in a strip of woodland running along a drainage line with *Acacia xanthophloea, A. seyal, Cordia crenata* and *C. ovalis* (January 2001).

4. *Mountelgonia abercornensis* sp. nov.

Figures 7A; 6a, b; 10d.

Material examined. *Holotype* male, North Rhodesia (today Zambia), Northern Province, Abercorn (today Mbala), August.1969, "I.R.L.C.S." (= International Red Locust Control Service) leg., genitalia slide number 10/082012 I. Lehmann (NMK).

Description. Forewing length in male 10.5mm (wingspan 25.0mm); antenna-wing ratio 0.62:1. *Head*: warm buff, in between eyes long and dense hair-like scales, eyes wood brown with small black spots; antennae long, same colour as head; branches of antennae 7× width of shaft, covered with warm buff scales dorsally; antennal tips with long scales, bending towards apex; labial palpi warm buff. *Thorax*: Patagia and tegulae densely scaled warm buff and ivory yellow with glinty shine. Hindfemora, -tibiae and -tarsi warm buff with fine hair-like scales and a glinty shine, one pair of tibial spurs, 1.2 mm long. Forewing damaged and faded; warm buff, costal margin buckthorn brown; veins probably also buckthorn brown, CuA_2 white; cilia long, 0.9mm, ivory yellow. Underside of forewing faded, rough-scaled, warm buff, not glossy, costal margin buckthorn brown. Hindwing upperside warm buff, glossy; underside as in forewing. Wing venation see Figure 6a. *Abdomen*: Warm buff.

Male genitalia. Uncus with rectangular lobes and with short setae ventrally; emargination in between lobes large, 50% of the width of uncus; gnathos long (1.5× longer than basal width of valva); valva rectangular, costa with short setae, sacculus with few short setae, weakly-sclerotized projection setose, not elongated, with a short extension at tip, the latter is rounded; thorn-like process short with rounded tip and few setae; median sector of valva with a few short setae; emargination below the weakly-sclerotized projection short, 20% of the width of valva. Saccus short, broad, rounded caudally; juxta peculiar as it has an acuminate process at tip. Phallus long, slightly longer than width of valva, strongly bent basally (lateral view), narrowest in middle, bilobed with a cleft.

Female. Unknown.

Diagnosis. Two characters are outstanding: i) the weakly-sclerotized projection extends slightly at its tip (the tip looks as it has got a tiny process, *cf.* Figure 6b); ii) the juxta has got an acuminate, flag-like process at tip.

Distribution. *M. abercornensis* **sp. nov.** is known from Mbala (formerly called Abercorn, northeast Zambia) located on the Central African Plateau.

Habitat of type locality. Mbala (8°50'S, 31°22'E; altitude 1.676m, average annual rainfall 1240mm) belongs to the *"Zambezian regional centre of endemism" sensu* White (1983). Five distinct vegetation types occur: First, miombo woodland including stands with more open canopies resulting in high-grass woodland with *Erythrophloeum africanum* (Welw.) Harms and *Pterocarpus angolensis* DC.; secondly, two distinct types of "chipya-woodland" with *Parinari curatellifolia* Planch., *Pterocarpus angolensis* DC., *Burkea africana* Hook.; thirdly, undifferentiated *Brachystegia-Isoberlinia* woodlands; fourthly, *Diplorrynchus* scrub-grassland on ironstone soils and soils on the plateau and fifthly, small remnants of tropical moist forest as well as riparian forest. The miombo woodlands cover most of the surroundings of Mbala and were classified by Chidumayo (1997) as *"northern wet miombo."* The most common canopy dominants include, *e.g. Brachystegia spiciformis* Benth., *B. utilis* Burtt Davy & Hutch., *B. floribunda* Benth., *B. wangermeeana* De Wild, *B. allenii* Burtt Davy & Hutch., *Julbernardia paniculata* (Benth.), *Isoberlinia angolensis* (Welw.) Hoyle & Brenan, *Albizia antunesiana* Harms, *Pericopsis angolensis* (Bak.) van Meeuwen and *Marquesia macroura* Gilg (Lawton 1963, 1978; Smith & Trapnell 2002). Chipya is regarded as a mosaic of different stages of degradation/re-establishment of evergreen tropical forest that appears as fragments of evergreen thicket (climbers and lianas present, miombo dominants absent) with a tall and dense grass cover as well as a luxuriant herbaceous component. Chipya comprises species occurring in the Guineo-Congolian Region as swamp forest species, *e.g. Mitragyna stipulosa* (DC.) Kuntze, *Syzygium owariense* (P.Beauv.) Benth., *Uapaca guineensis* Müll. Arg. and *Xylopia aethiopica* (Dunal) A.Rich. as well as moist tropical forest species, *e.g. Antiaris toxicaria* Lesch., *Synsepalum brevipes* (Baker) T.D.Penn., *Vitex doniana* Sweet, *Erythrophleum suaveolens* (Guill. & Perr.) Brenan and Afromontane species like *Prunus africana* (Hook.f.) Kalkm. and the Afromontane near-endemic *Ocotea usambarensis* Engl..

Ecology based on holotype. *M. abercornensis* **sp. nov.** occurs in a woodland mosaic that mainly comprises a species-rich, legume-dominated miombo and distinct types of chipya at high elevations (above 1.600m) representing mainly *"Zambezian miombo woodland" sensu* White (1983).

Etymology. *M. abercornensis* **sp. nov**. is named from the type locality Abercorn (today Mbala, Zambia).

5. *Mountelgonia thikaensis* sp. nov.

Figures 8A; 7a, b; 10e.

Material examined. *Holotype* male, Thika, Kenya Colony (today Kenya, Central Province, Thika District), October.1950, E. Pinhey leg., genitalia slide number 23/022012 I. Lehmann (NMK).

Description. Forewing length in male 9.5mm (wingspan 20.0mm); antenna-wing ratio 0.63:1. *Head*: warm buff, in between eyes long and dense hair-like scales, eyes wood brown with small black spots; antennae long, same colour as head; branches of antennae 5× width of shaft, covered with ivory yellow scales dorsally; antennal tips with long scales, bending towards apex; labial palpi warm buff, sepia laterally. *Thorax*: Patagia and tegulae densely scaled warm buff with glinty shine. Hindfemora, -tibiae and -tarsi warm buff with glinty shine, tibial spurs 1.1mm long. Forewing warm buff, costal margin and veins with clay colour; CuA_2 ivory yellow; cilia long, 1.0mm, alternating ivory yellow and clay colour. Underside of forewing ivory yellow, rough-scaled, glossy, costal margin clay colour. Hindwing upperside ivory yellow, veins slightly darker, glossy; underside as in forewing. Wing venation see Figure 7a. *Abdomen*: Warm buff mixed with ivory yellow.

Male genitalia. Uncus with rather pointed lobes and short setae ventrally; emargination in between lobes large, 70% of the width of uncus; gnathos slightly longer than basal width of valva which is rectangular and slightly elongated, costa without setae, sacculus and weakly-sclerotized projection densely covered with short setae, thorn-like process short with rounded tip and without setae, median sector of valva with some short setae, emargination below the weakly-sclerotized projection long, 40% of the width of valva. Saccus short, broad, rounded caudally. Phallus bent, as long as width of valva, bilobed with a cleft.

Female. Unknown.

Diagnosis. *M. thikaensis* **sp. nov.** is similar to *M. arcifera*. The new species comprises four characters that are different compared with the latter species: i) The lobes of the uncus are more pointed; ii) the uncus is ventrally less setose; iii) the valva has an emargination that is not longer than 40% of the width of valva; iv) the male forewing is more narrow.

Distribution. *M. thikaensis* **sp. nov.** is known from Thika, located east of the Eastern Great Rift Valley in the Central Highlands of Kenya.

Habitat of type locality. Thika (1°01'S, 37°04'E; altitude 1.502m, average annual rainfall 950mm) is a town located *c.* 38km northeast of Nairobi, near the confluence of the Thika and Chania rivers. It belongs to the *"Somalia-Masai regional centre of endemism"* and is also situated at the outskirts of the *"Afromontane archipelago-like regional centre of endemism" sensu* White (1983). Beentje (1990) mentioned a riverine forest on the Thika River near Thika town that is *"... an interesting variant with moist western elements and several endemics."* Most riverine forests in the Central Highlands of Kenya represent an impoverished type of *Newtonia* forest whereas in the Western Highlands of Kenya

Diospyros-Olea riverine forests are usually found. On the Thika River *Newtonia buchananii* (Bak.) Gilb. & Bout. and *Ficus scassellatii* Pamp. ssp. *thikaensis* C.C. Berg occur, the latter is known only from localities near Thika. The shrub layer comprises species such as the Kenyan endemic *Baphia keniensis* Brummit and *Indigofera thikaensis* Gillett. Most of the natural vegetation around Thika was a *"scattered tree grassland with low tree and high grass"* in the early 1950s (Edwards & Bogdan 1951). The dominant species were *Combretum* spp., *Erythrina abyssinica* DC., *Dombeya burgessiae* Gerrard, *Terminalia prunioides* Laws., *Ozoroa insignis* Del., *Delonix elata* (L.) Gamble, *Acacia senegal* (L.) Willd. and *A. mellifera* (Vahl) Benth.. This natural vegetation was largely destroyed through agriculture, horticulture and the establishment of sisal as well as coffee plantations (near Thika existed already 17 coffee plantations totaling 716ha and several sisal plantations totaling 2.000ha in 1915). The planting of pineapple was begun in 1948, resulting in a large plantation. This is the only pineapple plantation in Kenya and was bought by Del Monte in 1965. It comprises *c.* 5.400ha and hence, covers a large area around Thika today. It is likely that the habitat of the holotype of *M. thikaensis* **sp. nov.** does no longer exist.

Ecology based on holotype. *M. thikaensis* **sp. nov.** occurs in a mosaic of scattered tree grassland and riverine forest. It is noteworthy that Elliot Pinhey often collected along streams and that the Thika riverine forest comprises a species-rich vegetation, including several Kenyan endemics, at high elevations (above 1.500m). The habitat belongs to the *"Somalia-Masai Acacia-Commiphora deciduous bushland and thicket"* and *"Somalia-Masai riparian forest" sensu* White (1983).

Etymology. *M. thikaensis* **sp. nov**. is named from the type locality Thika (Kenya).

6. *Mountelgonia pagana* (Strand, 1909)**, comb. nov.**
Original combination: *Metarbela pagana* Strand, 1909
Figures 9A; 8a, b; 10f.

Material examined. *Holotype* male, Northeast-Rwanda (written in German as "Nordost-Ruanda" on the original label), no locality mentioned (neither on the label nor by Strand), August 1907, Wintgens S.G. leg., genitalia slide number 09/122009 I. Lehmann (ZMHB).
Paratype: one male, same locality, date and collector, no genitalia dissection done (ZMHB).

Additional re-description. Forewing length in male 9.0mm (wingspan 21.5mm); antenna-wing ratio 0.77:1. *Head*: warm buff, in between eyes long hair-like scales, eyes wood brown with small black spots; antennae very long, wood brown; branches of antennae 7× width of shaft, covered with ivory yellow scales dorsally; antennal tips with long scales, bending towards apex; labial palpi warm buff. *Thorax*: Patagia and tegulae warm buff. Hindfemora, -tibiae and -tarsi warm buff with fine hair-like

scales and a glinty shine, tibial spurs 1.1mm long. Forewing warm buff, not glossy; costal margin as well as veins CuA_2 and 1A+2A chamois. Cilia long, 1.2mm and ivory yellow. Underside rough-scaled, warm buff, glossy. Hindwing upperside ivory yellow, glossy. Cilia and underside as in forewing. Wing venation see Figure 8a. *Abdomen*: Mainly warm buff.

Variation. The male paratype does not differ to any major degree in regard to the holotype.

Male genitalia. Uncus with rather rounded lobes with few setae ventrally; emargination in between lobes large, 50% of the width of uncus; gnathos long (1.5× longer than basal width of valva); valva rectangular, costa without setae, sacculus with few short setae, weakly-sclerotized projection setose, elongated and with a rounded tip, one short thorn-like process with rounded tip, not setose, median sector of valva without setae, emargination below the weakly-sclerotized projection 35% of the width of valva. Saccus short, broad, rounded caudally. Phallus long, slightly shorter than width of valva, straight, narrowest in middle, bilobed with a cleft.

Female. Unknown.

Diagnosis. Three characters are unique: i) The uncus is elongated; ii) the saccus is not finger-shaped but short and broad (20% of width of weakly-sclerotized projection); iii) the weakly-sclerotized projection and the valva are elongated (Figure 10f).

Distribution. *M. pagana* is known from northeastern Rwanda, located in the equatorial highlands of east-central Africa along the eastern lip of the Western Great Rift Valley.

Habitat of type locality. Unknown. The northeastern part of Rwanda belongs to the *"Lake Victoria regional mosaic" sensu* White (1983) that was mainly formed during the middle Pleistocene. Endemism is very low among plants, mammals, birds, reptiles and amphibians (White 1983; Burgess *et al.* 2004) probably due to the young geological age of this area. Originally, the eastern parts of Rwanda (altitude 1.300–1.600m; average annual rainfall 1000–1400mm) were once covered by drier forests mixed with savanna woodlands. Today the wooded savanna is dominated by trees such as *Acacia sieberiana* DC., *A. senegal* (L.)Willd., *Lannea humilis* (Oliv.) Engler, *Albizia petersiana* (Bolle) Oliv. and *Rhamnus staddo* A. Rich., *e.g.* in the Akagera National Park. Drier forests still occur on hill summits and south of Lake Ihema with dominant trees of *Haplocoelum gallaense* (Engl.) Radlk., *Strychnos usambarensis* Gilg, *Canthium lactescens* Hiern and *Nuxia congesta* R.Br. (Fischer *et al.* 2010). The vegetation in the Lake Victoria lowland environment has been significantly modified by human use about 2000 years B.P. (Hamilton *et al.* 2001). Today more than 80% of Rwanda bears either anthropogenic vegetation or agriculturally used areas. For example, in the mid-1990s the Tutsi

had fled Rwanda to Uganda returned to Rwanda, bringing *c.* 650.000 cattle to graze in Akagera National Park. Hence, 60% of its area was retracted as protected area to help the refugees (Kelman 2004). It is likely that the habitat of the holotype does no longer exist.

Ecology based on holotype. *M. pagana* occurs in a mosaic of wooded savanna, farmland and dry forest at elevations above 1.300m.

7. *Mountelgonia urundiensis* sp. nov.

Figures 10A, 9a–9b, 10g.

Material examined. *Holotype* male, Urundi (today Burundi), Kitega (today Gitega, Gitega Province, Commune of Gitega), 18.July.1962, Dr M. Fontaine leg., genitalia slide number 20/052012 I. Lehmann (RMCA).

Description. Forewing length in male 9.5mm (wingspan 21.0mm); antenna-wing ratio 0.72:1. *Head*: warm buff, in between eyes long and dense hair-like scales, eyes ecru-olive with a large black patch; antennae very long, pale olive-buff; branches of antennae 6× width of shaft, covered with pale olive-buff scales dorsally; antennal tips with long scales, strongly bending towards apex; labial palpi warm buff mixed with sepia. *Thorax*: Patagia and tegulae densely scaled warm buff mixed with sepia and marguerite yellow with glinty shine. Femora, tibiae and tarsi warm buff, hindlegs missing. Forewing warm buff, costal margin with sepia; all veins sepia, except CuA_2 ivory yellow; cilia very long, 1.9 mm, warm buff. Underside of forewing warm buff, all veins deep colonial buff, rough-scaled, glossy. Hindwing upperside ivory yellow, veins slightly darker, glossy. Underside as in forewing. Wing venation see Figure 9a. *Abdomen*: Warm buff.

Male genitalia. Uncus with rather pointed lobes, densely setose with long setae ventrally; emargination in between lobes very large, 75% of the width of uncus; gnathos slightly longer than basal width of valva; valva rectangular and broad, costa without setae, sacculus with few short setae, weakly-sclerotized projection densely covered with short as well as long setae, thorn-like process short with acuminate tip and without setae, median sector of valva without setae, emargination below the weakly-sclerotized projection long, 35% of the width of valva. Saccus short, narrow, finger-like, rounded caudally. Phallus slightly longer than width of valva, bilobed with a cleft.

Female. Unknown.

Diagnosis. *M. urundiensis* **sp. nov.** has got one character that is outstanding: The rather pointed lobes of the uncus are densely covered with long setae ventrally (Figure 10g).

Distribution. *M. urundiensis* **sp. nov**. is known from Gitega. The town is located on the high Central Plateau of Burundi that covers the whole central part of the country.

Habitat of type locality. Gitega (3°25'S, 29°55'E; altitude 1.685m, average annual rainfall 1179mm) is a large town in the central part of Burundi in an area that is covered by numerous hills divided by large valleys and crisscrossed by a dense network of stream drainages. It belongs to the *"Lake Victoria regional mosaic" sensu* White (1983). Gitega undergoes a rapid expansion and high demographic pressures contribute to exhaustion of the land for cultivation. The natural vegetation is now seriously degraded. It used to be a meeting place of distinct floras, *e.g.* of Zambezian and Afromontane species. White (1983) mentioned a *"Transitional rain forest"* that once occurred in Burundi on the higher western parts of the *"Lake Victoria regional mosaic"* (as on the hills around Gitega) with Afromontane tree species such as *Alangium chinense* (Lour.) Harms, *Chrysophyllum gorungosanum* Engl., *Newtonia buchananii* (Bak.) Gilb. & Bout., *Strombosia scheffleri* Engl., *Syzygium guineense* (Willd.) DC. and *Xymalos monospora* (Harv.) Warb.. Only small fragments of this forest type remain (White 1983). About 20km northeast and east of Gitega wooded grasslands occur on altitudes between 1.350 and 1.840m with *Combretum collinum* Fresen., *C. molle* R. Br., *Cussonia arborea* Hochst., *Entada abyssinica* Steud., *Hymenocardia acida* Tul., *Protea madiensis* Oliv. and, mainly on hillsides, *Parinari curatellifolia* Planch. and *Pericopsis angolensis* (Bak.) van Meeuwen (Masharabu 2011). This species composition is very similar to *"Zambezian 'chipya' woodland and wooded grassland" sensu* White (1983) that occurs on the transition to lake basin soils on the Central African Plateau around Mbala, northeastern Zambia (*cf.* habitat description for *M. abercornensis* **sp. nov.**). Based on the descriptions of White (1983) and Masharabu (2011) it is very likely that the areas around Gitega were once covered by a mosaic of *"Transitional rain forest"* on its surrounding hills, riparian forests with *Phoenix reclinata* Jacq. and papyrus swamps flanked along stream drainages, as well as wooded grasslands with 'chipya' owing their existence to cultivation and/or fire in large valleys.

Ecology based on holotype. *M. urundiensis* **sp. nov.** occurs in a forest/woodland mosaic with riverine forests at high elevations (above 1.600m) comprising mainly tree species that are linked to the Afromontane and Zambezian regions.

Etymology. *M. urundiensis* **sp. nov**. is named for Urundi. This was the country name of Burundi before independence in July 1962.

1A

2A

3A

4A

5A

6A

Figure 1A. *Mountelgonia percivali* **sp. nov.,** male, holotype, Kenya, Rift Valley Province, Mount Elgon National Park.

Figure 2A. *Mountelgonia percivali* **sp. nov.,** female, paratype, Kenya, Rift Valley Province, Mount Elgon National Park.

Figure 3A. *Mountelgonia lumbuaensis* **sp. nov.,** male, paratype, Kenya, Rift Valley Province, Lumbua (or Lumbwa).

Figure 4A. *Mountelgonia arcifera* **(Hampson, 1909),** male, Kenya, Rift Valley Province, Southern Masai Mara National Reserve.

Figure 5A. *Mountelgonia arcifera* **(Hampson, 1909),** female, Kenya, Rift Valley Province, Southern Masai Mara National Reserve.

Figure 6A . *Mountelgonia arcifera* **(Hampson, 1909),** male, Kenya, Rift Valley Province, Lemek.

7A

8A

9A

10A

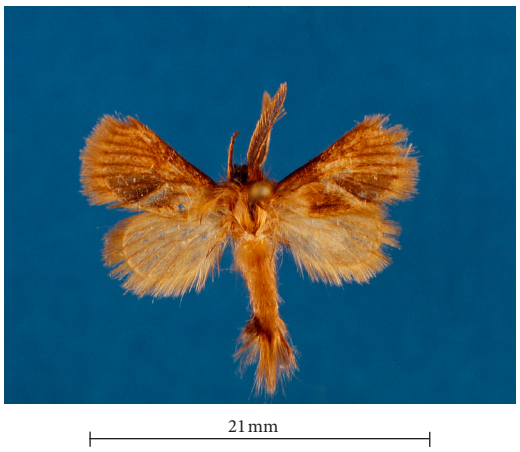


Figure 7A. *Mountelgonia abercornensis* **sp. nov.,** male, holotype, Zambia, Northern Province, Mbala (formerly Abercorn).

Figure 8A. *Mountelgonia thikaensis* **sp. nov.,** male, holotype, Kenya, Central Province, Thika.

Figure 9A. *Mountelgonia pagana* **(Strand, 1909),** male, holotype, Rwanda, northeastern part of the country.

Figure 10A. *Mountelgonia urundiensis* **sp. nov.,** male, holotype, Burundi, Gitega Province, Gitega (formerly Kitega).

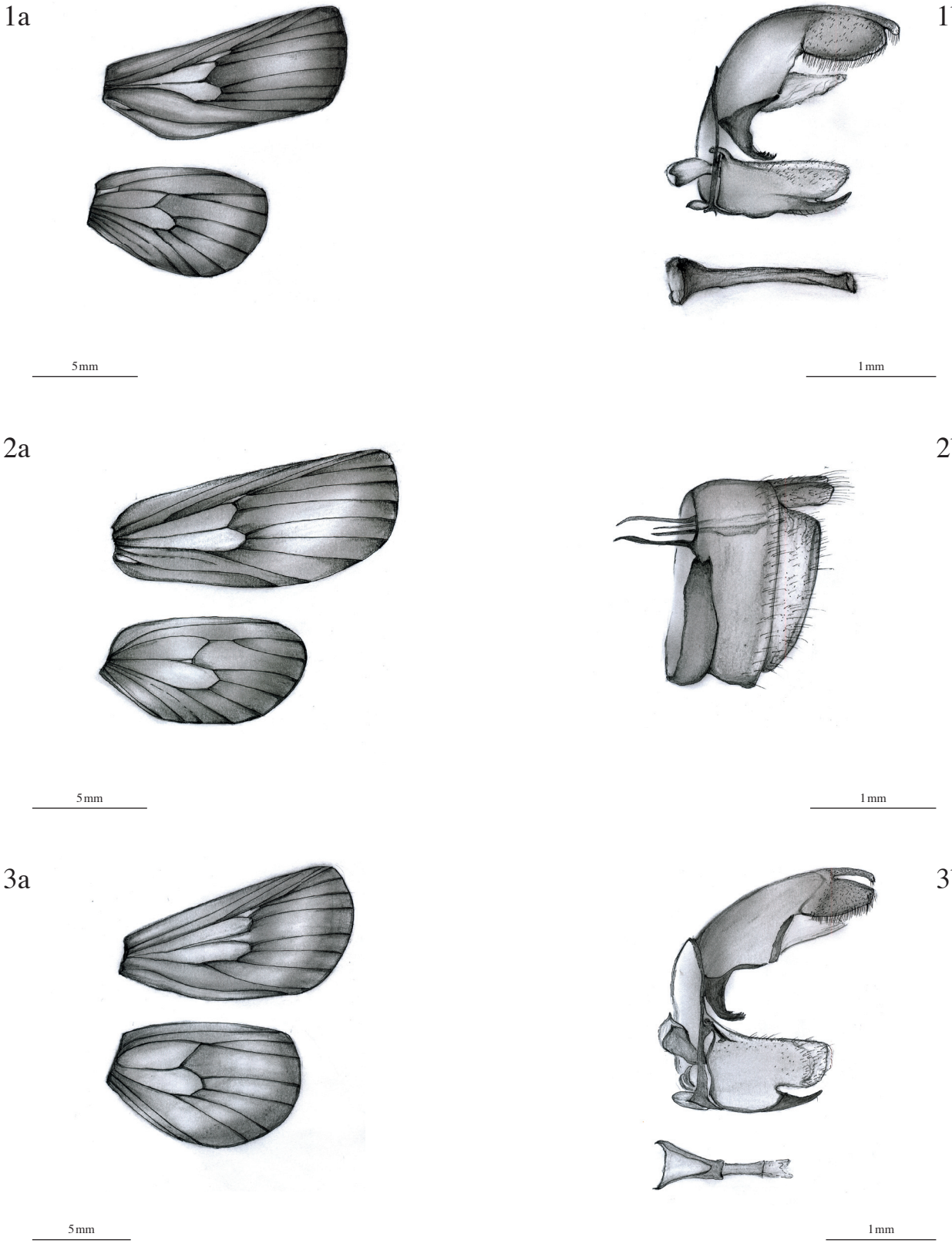
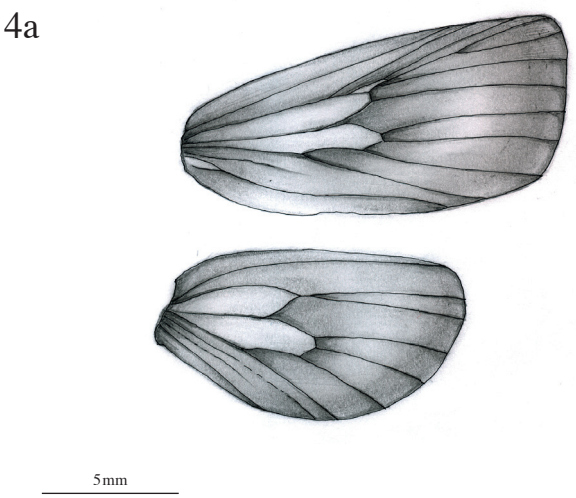
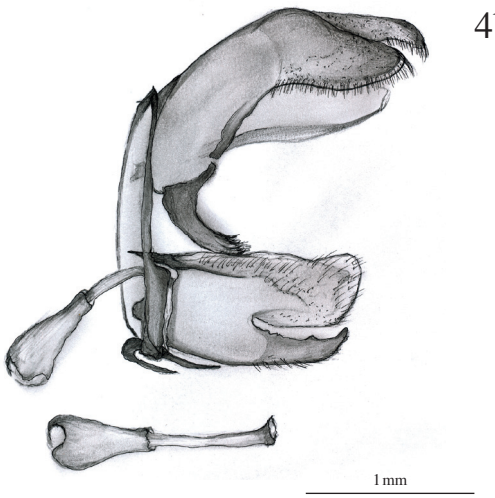
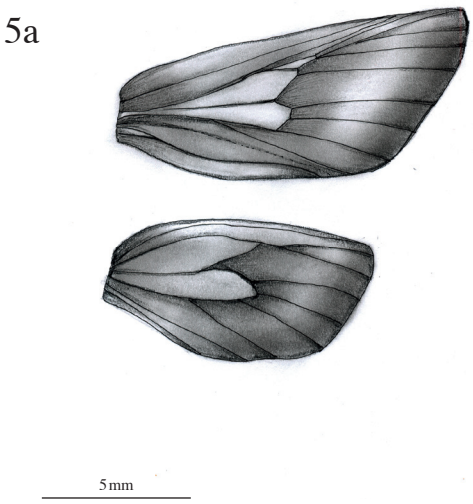


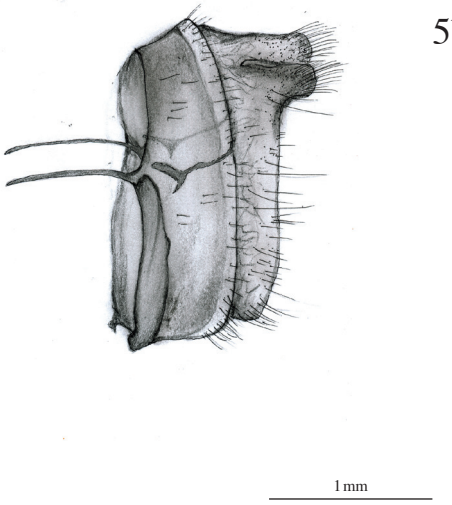
Figure 1a. Wing venation of: *Mountelgonia percivali* **sp. nov.,** male, holotype. 2a. *Mountelgonia percivali* **sp. nov.,** female, paratype. 3a. *Mountelgonia lumbuaensis* **sp. nov.,** male, holotype.

Figure 1b. Genitalia of: *Mountelgonia percivali* **sp. nov.,** male, holotype. 2b. *Mountelgonia percivali* **sp. nov.,** female, paratype. 3b. *Mountelgonia lumbuaensis* **sp. nov.,** male, holotype.









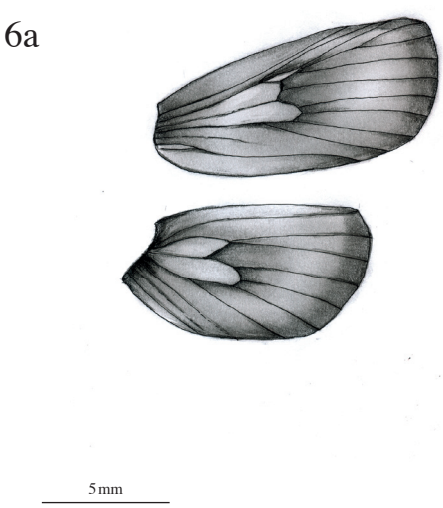


Figure 4a. Wing venation of: *Mountelgonia arcifera* **(Hampson, 1909)**, male, paratype. 5a. *Mountelgonia arcifera* **(Hampson, 1909)**, female. 6a. *Mountelgonia abercornensis* **sp. nov.,** male, holotype.

Figure 4b. Genitalia of: *Mountelgonia arcifera* **(Hampson, 1909)**, male, paratype. 5b. *Mountelgonia arcifera* **(Hampson, 1909)**, female. 6b. *Mountelgonia abercornensis* **sp. nov.,** male, holotype.

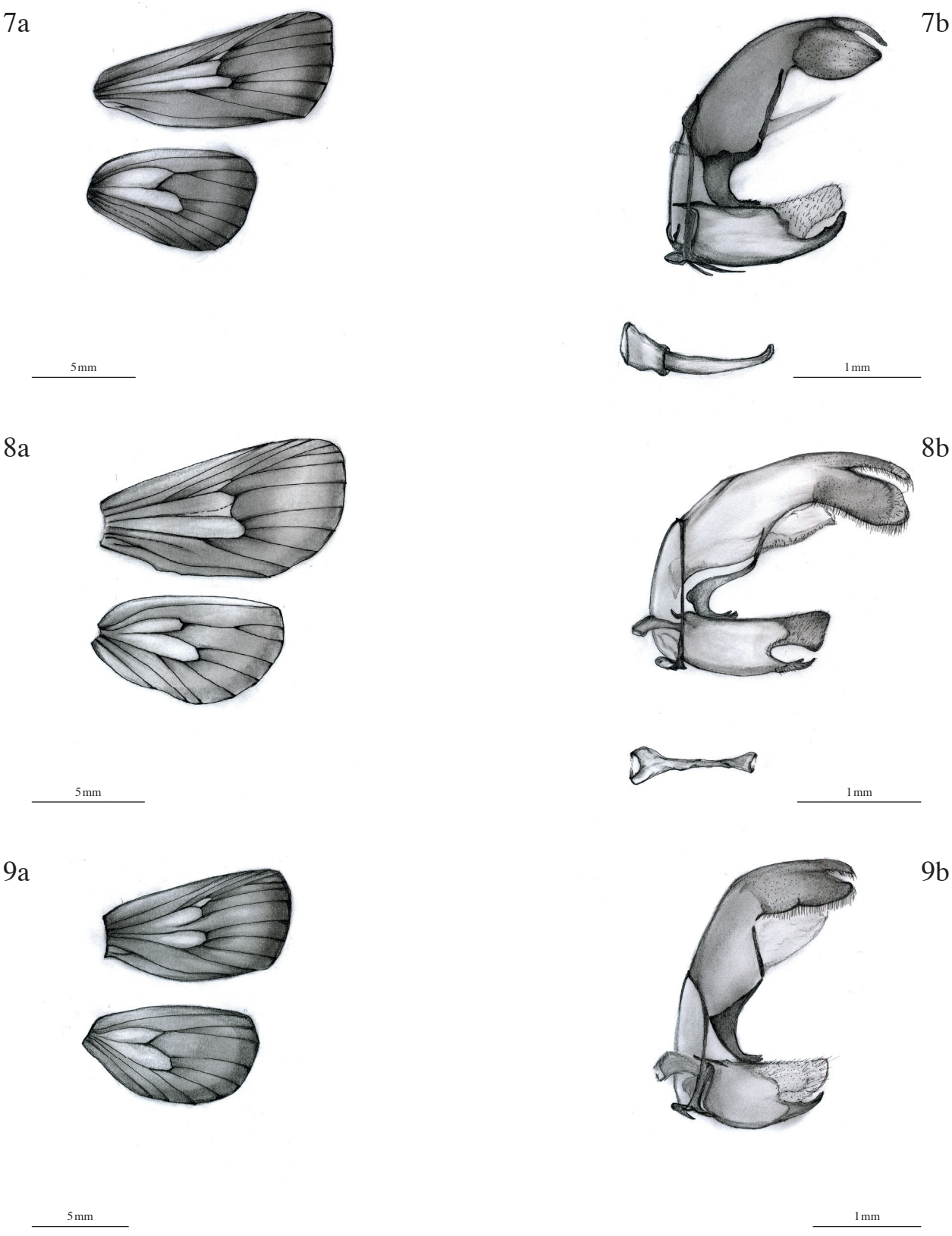


Figure 7a. Wing venation of: *Mountelgonia thikaensis* **sp. nov.,** male, holotype. 8a. *Mountelgonia pagana* **(Strand, 1909),** male, holotype. 9a. *Mountelgonia urundiensis* **sp. nov.,** male, holotype.

Figure 7b. Genitalia of: *Mountelgonia thikaensis* **sp. nov.,** male, holotype. 8b. *Mountelgonia pagana* **(Strand, 1909),** male, holotype. 9b. *Mountelgonia urundiensis* **sp. nov.,** male, holotype.

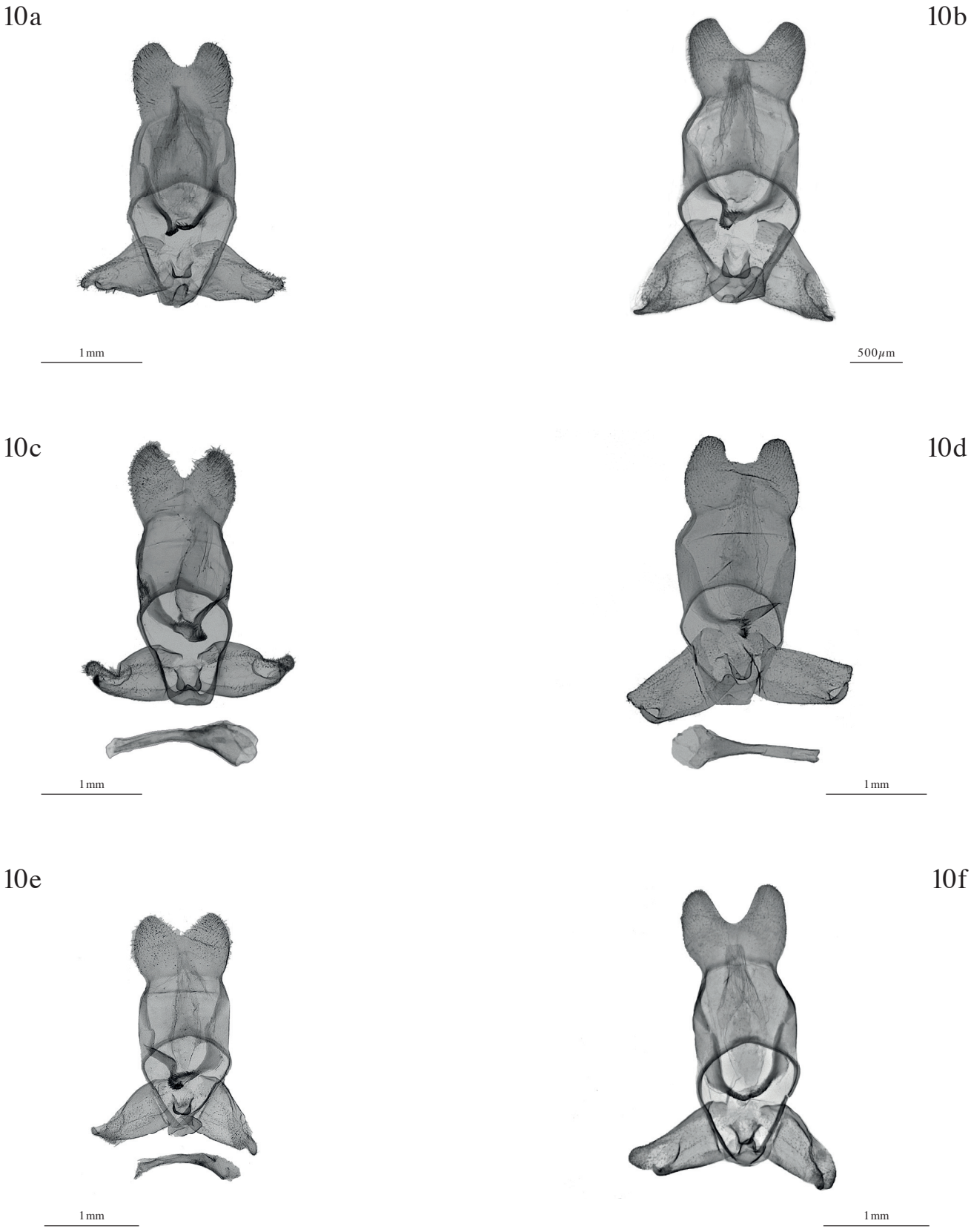
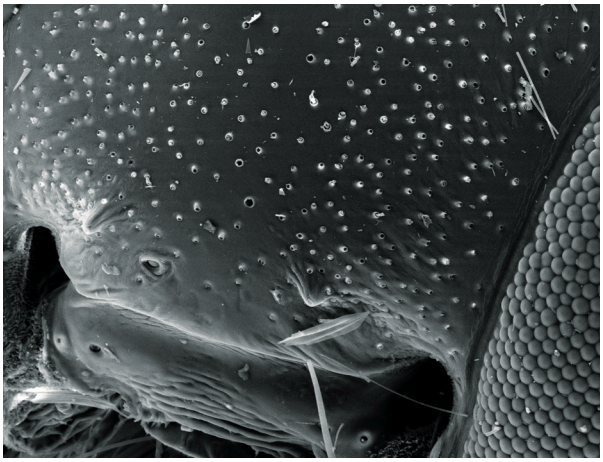


Figure 10a. Genitalia (ventral view) of: *Mountelgonia percivali* **sp. nov.,** male, holotype. 10b. *Mountelgonia lumbuaensis* **sp. nov.,** male, holotype. 10c. *Mountelgonia arcifera* **(Hampson, 1909),** male, paratype. 10d. *Mountelgonia abercornensis* **sp. nov.,** male, holotype. 10e. *Mountelgonia thikaensis* **sp. nov.,** male, holotype. 10f. *Mountelgonia pagana* **(Strand, 1909),** male, holotype.

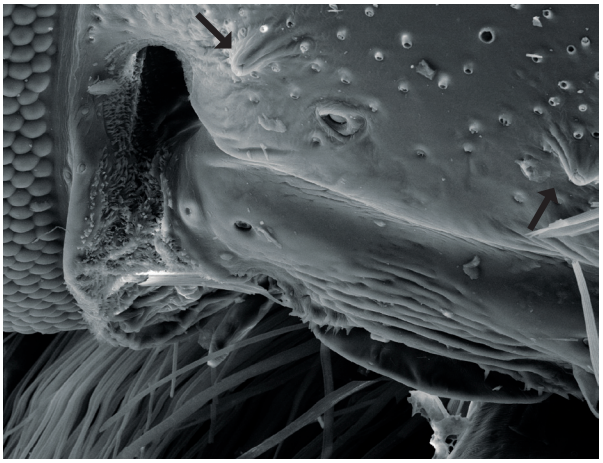
10g

Figure 10g. Genitalia (ventral view) of:
Mountelgonia urundiensis **sp. nov.,** male, holotype.

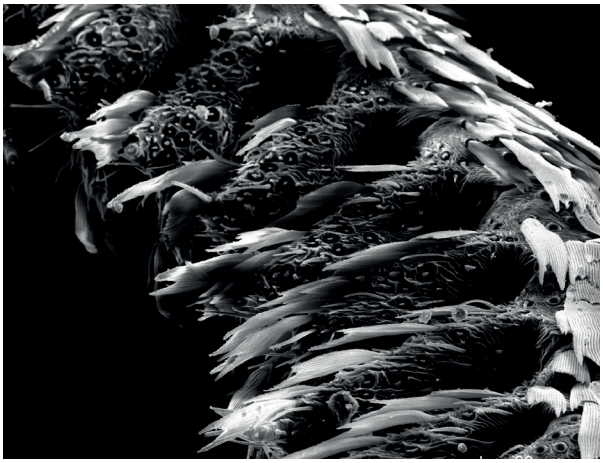
11



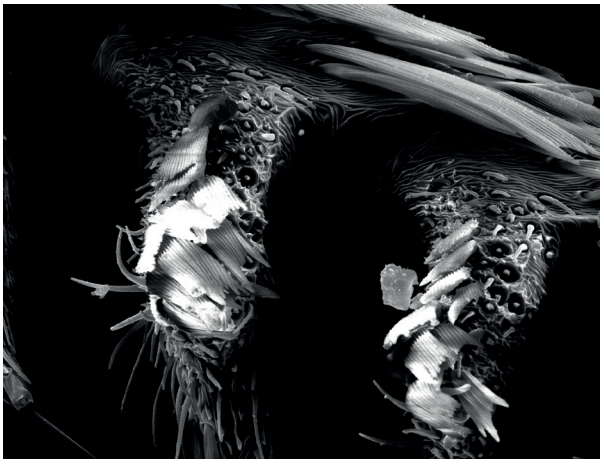
12



13



14



15

Figures 11–15. Details of *Mountelgonia arcifera* **(Hampson, 1909),** female.
11. Head of ♀, a pair of frontoclypeal projections (ventral view).
12. Head of ♀, frontoclypeal structure with a pair of projections (*cf*. the two arrows) and one oval shaped pit behind the labial palpus (the latter is absent on the picture).
13. Head of ♀, antenna.
14. Head of ♀, surface structure of antenna shaft and branches (lateral view).
15. Head of ♀, surface structure of antenna branches (dorsal view).

II. *Moyencharia* g. nov.

Type species: *Moyencharia mineti* **sp. nov.**

Diagnosis. The new genus comprises species that are of medium size in regard to the family Metarbelidae. *Moyencharia* **g. nov.** possesses typical metarbelid characters (Edwards *et al*. 1998; Lehmann 2008a, 2012) which were presented above with some additions in context with the new genus *Mountelgonia*.

Moyencharia **g. nov.** shares one unique character (apomorphy) with the genera *Metarbelodes* Strand, 1909 and *Mountelgonia* **g. nov**.: The gnathos of the male genitalia of all three genera is covered with short teeth-like structures at its distal end with gnathal arms that are not basally connected by a band. This character is plesiomorphic within all three genera. Nevertheless, there is one difference in this context that suggests the existence of three separated lineages: The distal end of the gnathal arms of *Moyencharia* **g. nov.** is more bent upwards towards the uncus while in *Metarbelodes* and *Mountelgonia* **g. nov**. the distal ends are never or only slightly bent towards the uncus (*cf.* Figures 10a–10f in contrast to 24a–24f).

It is also noteworthy, that the species of *Moyencharia* **g. nov.** do not share the common apomorphies described above for *Metarbelodes* and *Mountelgonia* **g. nov..** For example, the thorn-like process on the ventral-posterior margin of the valva as well as the weakly-sclerotized projection above this thorn-like process are absent. Additionally, the species of *Moyencharia* **g. nov.** have neither pits nor projections on the lower frontoclypeus and two pairs of tibial spurs on hindlegs are present. A geometric design and/or a wing pattern (as defined by Lehmann 2011) with several contrasting colours is present within the genus, *e.g. Moyencharia mineti* **sp. nov.**, *M. winteri* **sp. nov.** and *M. sommerlattei* **sp. nov..** The genera *Metarbelodes* and *Mountelgonia* **g. nov**. have conical projections on the lower frontoclypeus (*cf.* Figures 11–12 in contrast to 25), only one pair of tibial spurs on hindlegs and no geometric design on their wings. The wing colour is extremely similar among all species within each of the two latter genera. Hence, *Moyencharia* **g. nov.** is not closely related to *Metarbelodes* and *Mountelgonia* **g. nov.** although the gnathal arms suggest that the former genus is somehow related to the latter two genera**.**

Moyencharia is defined as a new genus based on putative morphological apomorphies of the male genitalia (**i–ii**) and female postabdominal structure (**iii**):

i) An elongated emargination, which is almost as long as the width of valva, is present in between two short thorn-like structures. The latter occur at the inner (ventral) surface and at the upper half of the valva.

ii) A plate-like process is attached to the vinculum (or this plate might represent a broader part of the vinculum) and extends into a large emargination that occurs at the outer base of the valva. The plate-like process has no setae, it is separated from the valva and has a rather rectangular shape (it is best visible in a lateral view; *cf.* Figures 16b, 18b, 20b–22b).

iii) The base of the posterior apophysis is broad (at least 3× broader than the tip of the posterior apophysis) and long (almost as long as half of the posterior apophysis; *cf.* Figures 17b, 19b, 23b, 24b).

The combination of characters presented above demand the erection of a new genus. Six Afrotropical species are currently recognized: *Moyencharia mineti* **sp. nov.**, *M. joeli* **sp. nov.,** *M. winteri* **sp. nov.**, *M. herhausi* **sp. nov.** and *M. sommerlattei* **sp. nov..** *Moyencharia ochreicosta* (Gaede, 1929) has been transferred into the new genus from *Teragra* Walker, 1855. *Teragra basiplaga* Gaede, 1929 is treated here as a synonym of *M. ochreicosta*. Therefore, the subspecific rank of *Teragra basiplaga* f. *fuscoradiata* Gaede, 1929 is not adopted here (*cf.* Figures 23A–27A). The species name *"ochreicosta"* is given precedence and will be fixed according to the "Principle of the First Reviser" (ICZN 1999).

Description. *Head:* Rough-scaled with hair-like scales; a pair of pits as well as a pair of projections are absent on the lower frontoclypeus in both sexes, but a large lip-like structure is present (Figure 27). This lip-like structure occurs also in few other genera among the Metarbelidae where it is smaller in size, *e.g.* in *Mountelgonia* **g. nov.** (Figure 12). The two pits behind the labial palpi are remarkably small and flat (*cf.* Figure 11 in contrast to 26); the labial palpi are as long as eye diameter or a little longer, they consist of three segments of almost equal length but sometimes the central segment is longer than the two other ones in both sexes; male antennae very long (antenna-wing ratio at least 0.50:1) and bipectinate; female antennae shorter (antenna-wing ratio less than 0.50:1) and only slightly bipectinate; flagellum and dorsal side of branches densely scaled in both sexes (*cf.* Figures 28–30). *Thorax:* Densely covered with hair-like scales; patagia and tegulae usually with a collar ring in both sexes; with a short crest on metathorax. Epiphyses are absent in both sexes. Hindlegs with two pairs of narrow tibial spurs (at least 0.6mm long) in both sexes. Forewing upperside with a geometric design and/or with a wing pattern of several contrasting colours; CuA_2 at its end with a light spot of white or ivory yellow usually and with some dark as well as light spots in males, CuA_2 less distinctly marked in females (*cf.* Figures 16A–27A). Wing venation similar in both sexes (*cf.* Figures 16a–23a): In forewing 1A+2A forked at base; CuP obsolete; CuA_2 originating from hind margin of posterior cell; CuA_1, M_3 and M_2 separated and initiating from apical angle of posterior cell; M_1 initiating from distal margin of median cell; R_1 initiating from anterior margin of median cell; R_2 originates free from the anterior tip of the areole, R_3+R_4+R_5 long stalked or R_5 originates from the same point as R_3+R_4, the latter originate from the posterior tip of the areole in both sexes; Sc more or less parallel to R_1. In hindwing CuA_2 initiating from hind margin of posterior cell; CuA_1, M_3 and M_2 initiating from apical angle of posterior cell, separated, or CuA_1 and M_3 from the same point; M_1 and Rs initiating from

apical angle of anterior cell, stalked in both sexes; usually with a bar from Rs to Sc+R_1; with a small vein in discocellular cell on both forewing and hindwing; cilia long, more than 1.0mm. Retinaculum and frenulum absent. *Abdomen:* With dense hair-like scales and short abdominal tuft, not longer than one-third of abdomen length.

Male genitalia. Saccus variable, sometimes broad and rounded caudally, or broad at base but narrow towards tip, rather finger-shaped, or very small or absent; a structure extends sometimes from the saccus posteriorly towards or below the sacculus, it can be very long, almost as long as half of width of valva and might be a part of the saccus; uncus large and broad, *c.* 70–90% of the size of the valva (lateral view), densely setose on ventral surface; bilobed. Valva on the ventral surface and on the upper half with two thorn-like and bent appendices, tips acuminate. In between of the two thorn-like appendices there is an elongated, narrow emargination that is almost as long as the width of valva (*cf.* Figures 16b, 18b, 20b–22b, 24a, 24c–24f). A skin-like structure (weakly-sclerotized with many setae) extends on the ventral surface from the costa towards the median sector of the valva but covers only the inner half of the emargination. Gnathos with many short teeth-like structures at its distal end; gnathal arms not basally connected by a band and strongly bent towards uncus. The vinculum and tegumen are fused, forming a firm and very narrow ring. Juxta oval-shaped, without acuminate lobes, a deep emargination is absent (*cf.* Figures 24c–24f). Phallus simple, tube-like, sometimes strongly bent and/or with two tiny acuminate appendices; vesica without cornuti.

Female postabdominal structure. Papillae anales obliquely 8-shaped and elliptic or beak-like (lateral view), covered with short and long setae; segment 8 usually setose along its posterior margin but sometimes with only few scattered setae; rarely, few scattered setae occur on the whole segment 8 (Figure 23b); it is not emarginated dorso-anteriorly. The base of the posterior apophysis is very broad (at least 3× broader than the tip of the posterior apophysis) and long (*c.* half of the posterior apophysis; *cf.* Figures 17b, 19b, 23b, 24b).

Distribution. The species of *Moyencharia* **g. nov**. occur in western and north-central Africa, namely from the Republic of Guinea via Burkina Faso (formerly Upper Volta), Ghana and Nigeria, eastwards via southern Chad into the Republic of South Sudan and further south to the northeastern Democratic Republic of the Congo (DRC). Bobo Dioulasso (southwestern Burkina Faso) is currently the most northern distribution limit and Moto (northeastern DRC) the most southern limit; the Republic of Guinea the most western limit and Tambura (Republic of South Sudan) the most northeastern limit.

The species of *Moyencharia* **g. nov.** from Burkina Faso represent the first published records of the family Metarbelidae from the country Burkina Faso. The species of the new genus do not occur south of Lower Guinea and Congolia subdivisions of the Guineo-Congolian Region as defined by White (1979) and include various of the most northern species records among the family Metarbelidae

on the African mainland (Afrotropical Region). The species of *Moyencharia* **g. nov.** are currently the only ones among the Metarbelidae which extend from the Guineo-Congolian Region northwards into the Sudanian Region. The new genus is unknown on the Arabian Peninsula and on Madagascar (Figure 32).

Ecology. The species of *Moyencharia* **g. nov.** are forest and woodland species occurring in tropical lowland areas (altitude below 1.300m) with an average annual rainfall of at least 900mm. The species of the new genus are associated with lowland tropical rain forests as well as with a mosaic that contains various wetter and drier types of forests, riparian forests, woodlands, open wooded grasslands and open shrubbed grasslands. Woody legumes are not always dominant, but species of the genera, *e.g. Anogeissus*, *Khaya* and *Prosopis*. Sometimes pockets of forest remnants occur in wooded grasslands that might represent relicts of a wetter climate during the interglacial periods (White 2001).

Many of the wooded grasslands or shrubbed grasslands within the distribution range of *Moyencharia* **g. nov.** are determined by recurrent fires (*e.g.* Richards 1959, 1998) and were termed by Keay (1959b) *"Derived Savanna"* which arise *"... from moist forest by degradation."* Hence, the species of the new genus might be potential indicators for a former continuous rain forest, moist and/or dry forest or woodland cover. Two examples are *Moyencharia ochreicosta* (Gaede, 1929) and *M. winteri* **sp. nov.** that extend from the rain forests of the *"Guineo-Congolian regional centre of endemism"* into the *"Sudanian regional centre of endemism" sensu* White (1983; Figure 32).

According to the present data, the species of *Moyencharia* **g. nov.** appear to be mainly linked to the following vegetation types of the Sudanian Region, Guinea-Congolia/Sudania Transition Zone and Guineo-Congolian Region (from north to south): *"Sudanian swamp forest and riparian forest"* that includes a number of tree species also occurring in the Guineo-Congolian Region; *"Sudanian dry forest"* that is dominated by woody legumes, mainly by two evergreen caesalpiniaceous tree species; *"Sudanian transition woodland"* that also comprises tree species that are not fire-tolerant and hence, includes places where the forest invades savanna; *"Sudanian woodland"* and *"Sudanian grassland"* including several subtypes; *"Drier peripheral semi-evergreen Guineo-Congolian rain forest and similar forest in the transition zones"* and *"Mixed moist semi-evergreen Guineo-Congolian rain forest" sensu* White (1983). The latter two comprise various types of (rain) forest which used to be widespread, *e.g.* in the distribution ranges of *Moyencharia ochreicosta*, *M. joeli* **sp. nov.** and *M. winteri* **sp. nov.**, but they have been extensively destroyed, *e.g.* by fire, cultivation or mining.

It is likely that the species of *Moyencharia* **g. nov.** originated in the lowland tropical rain forests of the Guineo-Congolian Region and hence, they might represent relicts of a wetter climate during the interglacial periods in the Sudanian Region.

Etymology. *Moyencharia* **g. nov**. is named for the Region du Moyen-Chari in south-central Chad. It is the type locality of *M. mineti* **sp. nov.** (*cf.* habitat description below). The Moyen-Chari was selected for the new genus name since it represents an area with one of the most northern records of the family Metarbelidae on the African mainland. The gender of the new genus is feminine.

Bionomics: The author assumes that the caterpillars of all species of Metarbelidae, including the species of *Mountelgonia* **g. nov.** and *Moyencharia* **g. nov.**, feed on the bark and/or in the wood of (mainly legume) tree species, perhaps also in roots of small (mainly legume) woody plants. However, the biology of all Metarbelidae species is unknown at present. The little knowledge that exists about the biology was presented by Lehmann (2008a) for few species that belong to other genera.

A key to the species of *Moyencharia* g. nov.

The key is based exclusively on morphological characters. As for all six species only one or a few specimens are available, identifications obtained with this key should be cross-checked carefully with the description, distribution and the figures presented in this paper.

1a. Male 2
1b. Female 8

2. Uncus with rather narrow elongated lobes and short extension of saccus posteriorly 3
4. Uncus with rather broad rounded lobes and without extension of saccus posteriorly 5
6. Uncus with rather broad rounded lobes and rather long extension of saccus posteriorly 7

3. Saccus extends posteriorly only to below base of sacculus, uncus densely setose (long setae) ventrally .....*mineti* sp. nov

5. Saccus does not extend posteriorly to below sacculus, uncus densely setose (short setae) ventrally .....*sommerlattei* sp. nov.

7a. Saccus extends posteriorly to below sacculus and to *c.* 35% of width of valva, uncus densely setose ventrally with long setae (prickly appearance).....*joeli* sp. nov.

7b. Saccus extends posteriorly to below sacculus and to *c.* 40% of width of valva, uncus densely setose ventrally with short setae (no prickly appearance).....*herhausi* sp. nov.

7c. Saccus anteriorly absent, but extends posteriorly to below sacculus and to *c.* 15% of width of valva, uncus densely setose ventrally with short setae .....*ochreicosta*

8a. Females unknown 8b

8b. *joeli* sp. nov.; *herhausi* sp. nov.; *sommerlattei* sp. nov.

8c. Base of posterior apophysis broad and long 9

9a. Base of posterior apophysis 3× broader than tip of posterior apophysis, base long but less than half of length of posterior apophysis .....*winteri* sp. nov.

9b. Base of posterior apophysis 5× broader than tip of posterior apophysis, base long but less than half of length of posterior apophysis .....*mineti* sp. nov.

9c. Base of posterior apophysis 7× broader than tip of posterior apophysis, base long and *c.* half of length of posterior apophysis .....*ochreicosta*.

Review of species

1. *Moyencharia mineti* sp. nov.

Figures 16A, 17A; 16a, b; 17a, b; 24a, b; 25–30.

Material examined. *Holotype* male, Chad, Region du Moyen-Chari, Canton[1)] de Gondey, Makoga, 04.–12.May.1965, chassé a la lumiére (= at light), J.M. Fonteneau leg., genitalia slide number 22/012012 I. Lehmann (MNHN).

Paratype: one female, Chad, Region du Moyen-Chari, Canton de Gondey, Makoga, 04.–12.May.1965, J.M. Fonteneau leg., on second label: "Muséum Paris don de H. Ungemach", genitalia slide number 06/012012 I. Lehmann (MNHN).

Description. Forewing length in male 9.0mm (wingspan 20.0mm), in female 14.0mm (wingspan 32.0mm); antenna-wing ratio 0.61:1 in male, 0.29:1 in female. *Head*: Cream-buff mixed with sepia and hair-like scales with white or ivory yellow tips, glossy; in between eyes long hair-like scales; eyes ecru-olive with black patches; antennae bipectinate and long in male, bipectinate but short in female (Figures 28–30), same colour as head; branches of antennae 4.5× width of shaft in males, 1.5× in females, branches and shaft covered with ivory yellow scales dorsally in both sexes; antennal tips with longer scales, bending towards apex; labial palpi cream-buff. *Thorax*: Patagia with white collar ring in both sexes; tegulae cream-buff with scales that have a sepia coloured tip and pure white scales forming a second collar ring in male; tegulae in female yellow ocher with short scales that have a sepia

1) During the colonial era, the French superimposed a territorially based administration over pre-colonial Sara (who live mainly in the Moyen-Chari) and their social and political institutions. On the local level, this took the form of the "canton" or county. The "canton" was headed by a chief named by the central government, who in turn named "village chiefs."

coloured tip and longer scales that are pale drab-grey; patagia and tegulae with glinty shine in both sexes. Hindfemora, -tibiae and -tarsi cream-buff mixed with ivory yellow, with fine hair-like scales and a glinty shine; tibial spurs 0.7mm long in male, 0.9mm in female. Forewing warm buff, not glossy; both sexes have a slightly different wing pattern: female with a large yellow ocher patch in the centre of the forewing (absent in male); a broad cinnamon-brown subterminal band from apex to dorsum that is edged black and white towards termen (reduced in male from M_1 to apex); the blackish patch below the centre of the discocellular cell and below 1A+2A is larger than in the male; the cinnamon-brown striae in the outer half of the forewing are numerous if compared with the male; at top of CuA_2 occurs a small pure white patch in both sexes; at the centre of M_1 small pure white patches that extend via the centre of M_2 to CuA_1 in both sexes; near apex three larger buffy olive striae in both sexes; cilia long, 1.1mm in male, 1.3mm in female, cream-buff mixed with very long scales of pure white in both sexes. Underside of forewing rough-scaled, cream-buff mixed with olive, glossy, in both sexes. Hindwing upperside largely buffy olive, but olive ocher towards base of wing in both sexes, outer half with more striae in female, glossy; underside as in forewing. Wing venation see Figures 16a–17a. *Abdomen*: Mainly yellow ocher, mixed with cream-buff in female, glossy.

Male genitalia. Saccus broad and rounded caudally, finger-shaped, extending a little bit posteriorly towards sacculus; uncus large and broad, with a deep emargination, *c.* 55% of the length of uncus; uncus densely setose on ventral surface with long setae, bilobed, lobes elongated (ventral view). Valva on ventral surface and on the upper half with two short thorn-like appendices, bent towards uncus, tips acuminate. In between of the two thorn-like appendices there is an elongated, narrow emargination that is as long as 60% of the width of valva. A weakly-sclerotized structure with long setae covers the ventral surface of the valva and two-thirds of the emargination. It extends from the costa towards the median sector of the valva. Costa, sacculus and median sector of valva covered with setae. Gnathos strongly bent towards uncus. A plate-like rectangular process, slightly larger than the saccus, extends into a large emargination that occurs at the outer base of the valva. Juxta oval-shaped without acuminate lobes. Phallus simple, tube-like, not bent; vesica without cornuti.

Female postabdominal structure. Papillae anales obliquely 8-shaped, beak-like and broad ventrally (lateral view); densely covered with short and long setae; segment 8 with few setae along its posterior margin. The base of the posterior apophysis is broad (5× broader than the tip of posterior apophysis) and long (slightly less than half of the posterior apophysis). The anterior apophyses are a little bit longer than the posterior apophyses and narrow.

Diagnosis. The male of *M. mineti* **sp. nov.** has an uncus with two elongated, rather narrow lobes with a deep emargination in between (ventral view). The papillae anales of the female are beak-like but broad ventrally; the posterior apophysis of the female has a broad, elongated base that is almost as long as half of the posterior apophysis (*cf.* Figures 24a–24b).

Distribution. *M. mineti* **sp. nov**. is known from Makoga. This locality is, according to the label of the type specimens, located in the canton de Gondey (southeastern Moyen-Chari, southern Chad). The new species most probably extends 16km southwards into the Central African Republic.

Habitat of type locality. The Region du Moyen-Chari or Middle Chari (altitude 340–520m; average annual rainfall 900–1060mm) belongs to the *"Sudanian regional centre of endemism" sensu* White (1983). It is located in the humid tropical lowlands of the southern Lake Chad Basin and in south-central Chad. The basin floor slopes upwards towards the south forming locally low sand and clay plateaus of Tertiary continental sediments. The soils comprise mainly lacustrine and alluvial sediment sequences. The plateau areas are geologically older and are locally called 'Koros'. They have altitudes of 40–50m and are naturally covered by legume-dominated dense woodlands (Bocquier & Barbery 1968) and hence, appear to be typical habitats for Metarbelidae (Lehmann 2008a). 'Koros' occur as large patches *c.* 50km north of the village Gondey, *e.g.* south and west of the town Singako, while the surrounding alluvial soils are much younger and are mainly covered by open woodlands that are not dominated by legumes. The landscape is dissected by numerous rivers and floodplains during the rainy season. Riparian forests occur along larger rivers. Endemism among plants, mammals, reptiles and birds is low (Magin 2004a). Some areas, *e.g.* the Manda National Park *c.* 90km northwest from the canton de Gondey, have a number of biome-restricted species (BirdLife International 2012). Its diverse flora comprises 368 species in the herbaceous and shrub layer alone, *e.g.* the solid-stemmed bamboo *Oxytenanthera abyssinica* (A. Rich.) Munro (Guisse *et al.* 2012).

The Moyen-Chari is characterized by large fertile croplands, *e.g.* sorghum, millet, peanuts, cassava, yam and garden vegetables. Cotton is an indigenous crop to southern Chad. Large-scale production of cotton was promoted (in particular in the southwestern Moyen-Chari) for export since 1920.

The canton de Gondey is located in the southeastern part of the Moyen-Chari, some kilometers east of the northern limit of cotton growing and *c.* 50km east of the Chari River. The Chari River is *c.* 1.200km long and is the major river of Chad. The floodplains of the Chari and its tributaries, *e.g.* the rivers Mya, Bahr Aouk and Bahr Keita (mainly located in the canton de Gondey), are inundated during the rainy season (April–October). The landscape is largely an open and mixed wooded Sudanian savanna that is not dominated by woody legumes. The woodland grows mainly on alluvial soils; 'Koros' are absent. Gondey village is located in the southern part of the canton. Dominant tree species near Gondey (altitude 385m; average annual rainfall at Kyabé *c.* 50km northwest of Gondey is

1032mm) comprise: *Anogeissus leiocarpus* (DC.) Guill. & Perr., *Combretum glutinosum* Perr., *C. collinum* Fresen. ssp. *hypopilinum* (Diels) Okafor, *Terminalia macroptera* Guill. & Perr. (often near small rivers and sometimes on inundated land), *Acacia sieberiana* DC., *Bauhinia reticulata* DC. and, rather rare, *Lannea humilis* (Oliv.) Engl.. Along the main rivers of the canton de Gondey, the Mya and Bahr Aouk, tree species such as *Bauhinia reticulata* DC., *Acacia seyal* DC., *Mitragyna inermis* (Willd.) O.Ktze., *Lannea humilis* (Oliv.) Engl. and *Diospyros mespiliformis* Hochst. ex A.DC. are dominant and locally form a riparian forest. Trees such as *Butyrospermum paradoxum* (Gaertn. f.) Hepper, *Parkia biglobosa* (Jacq.), *Guiera senegalensis* J.F. Gmel., *Annona senegalensis* Pers. and *Grewia mollis* Juss. occur but are more common in the periphery of 'Koros', *e.g.* near Singako. In fallow woodland *Pterocarpus lucens* Guill. & Perr., *Grewia tenax* (Forsk.) Fiori, *G. mollis* Juss., *Parkia clappertoniana* Keay and *Bridelia scleroneura* Müll. Arg. are characteristic secondary tree species (Bocquier & Barbery 1968).

The type locality "Makoga" was not found by the author, neither on maps nor in old or modern textbooks. Hence, the habitat descriptions above refer to the whole canton de Gondey as well as to the surroundings of the village Gondey.

Ecology based on holotype. *M. mineti* **sp. nov.** occurs in a mosaic of riparian forest, open woodland and wooded floodplain grassland at low elevations (below 500m) comprising mainly tree species of genera that do not represent woody legumes, *e.g. Anogeissus*, *Combretum*, *Terminalia* and *Mitragyna*. The dominant tree species are mainly linked to the Sudanian Region.

Etymology. *M. mineti* **sp. nov**. is named for one of the leading scientists on the taxonomy of Lepidoptera, Professor Dr Joël Minet (Head of the Lepidoptera Section within the Département Systématique et Evolution, MNHN), for his kind provision of Metarbelidae as well as for our valuable discussions about various important characters of the family Metarbelidae during my visit in Paris.

Joël presented his Thesis about the tympanal organs of the Pyraloidea (*"Eléments pour une étude phylogénétique des organes tympaniques des Pyrales, Lepidoptera Pyraloidea")* in November 1980 at the "Université Paris XI (Orsay)" where he had followed courses in Entomology. His "Habilitation à diriger des recherches (HDR)" (PhD equivalent) was presented in March 1992 at "Université Paris VI" and dealt with ditrysian phylogeny (*"Phylogénie des Lépidoptères ditrysiens"*). Joël was promoted to MNHN Professor in December 1996.

2. *Moyencharia joeli* sp. nov.

Figures 18A; 18a, b; 24c.

Material examined. *Holotype* male, Nigeria, Kaduna State, Kaduna, 13. April.1970, Dr Politzar leg., genitalia slide number 14/042012 I. Lehmann (ZSM).
Paratype one male, Nigeria, Gombe State, Bara, 15.June.1974, Dr Politzar leg., genitalia slide number 21/042012 I. Lehmann (ZSM).

Description. Forewing length in male holotype 10.0mm (wingspan 22.0mm), in male paratype 9.0mm (wingspan 21.5mm); antenna-wing ratio 0.60:1 in holotype, 0.56:1 in paratype. *Head*: Warm buff with sepia, in between eyes long hair-like scales, glossy; eyes black with wood brown patches; antennae bipectinate, same colour as head, branches of antennae 6× width of shaft, branches and shaft covered with warm buff scales dorsally, antennal tips with longer scales, bending towards apex; labial palpi warm buff. *Thorax*: Patagia and tegulae warm buff with glinty shine. Hindlegs of holotype broken; hindfemora, -tibiae and -tarsi of paratype warm buff with fine hair-like scales, glossy; tibial spurs 1.1mm long (apical pair), medial pair with two spurs of different length, 1.1mm and 0.6mm. Forewing warm buff and light orange-yellow mixed with sepia and clay colour, not glossy; a broad light orange-yellow subterminal band from R_5 to CuA_2; a band of the same colour along the costa and a patch of light orange-yellow at the base of forewing; at top of CuA_2 a small pure white patch; in between base of M_2 and M_1 as well as below CuA_2 sepia coloured patches; small spots of sepia along the termen, edged ivory yellow; in between M_1 and CuA_2 as well as below the outer half of 1A+2A a patch of clay colour; cilia long, 1.3mm, warm buff alternating with ivory yellow. Underside of forewing rough-scaled, warm buff with scattered scales of sepia. Hindwing upperside warm buff and ivory yellow; underside as in forewing. Wing venation see Figure 18a. *Abdomen*: Mainly yellow ocher mixed with warm buff and a glinty shine; a small crest and a short abdominal tuft of sepia present.

Male genitalia. Saccus short anteriorly extending posteriorly to below sacculus of valva as narrow and long rod-like process, *c.* 35% of length of valva (lateral view), that is rounded caudally and finger-shaped; uncus large and broad, bilobed, lobes not elongated with a flat emargination (ventral view); uncus densely setose with very long and rather broad setae that give the ventral surface an almost prickly appearance. Valva on ventral surface and on the upper half with two thorn-like appendices, bent towards uncus, tips acuminate. In between of the two thorn-like appendices there is an elongated, narrow emargination with a weakly-sclerotized structure. Along the costa, the sacculus and towards the median sector of the valva long setae occur. These setae have the same prickly appearance as those on the ventral surface of the uncus. Gnathos rather narrow in a lateral view and with short teeth-like structures at its distal end, bent towards uncus. A plate-like, rectangular process of the vinculum, not larger than the saccus, extends into an emargination that occurs at the outer base of the valva. Juxta

oval-shaped and without acuminate lobes. Phallus simple, tube-like, strongly bent at one side; vesica without cornuti.

Variation. The male paratype does not differ to any major degree in regard to the holotype.

Female. Unknown.

Diagnosis. The male of *M. joeli* **sp. nov.** has got long setae on the ventral surface of the uncus, on the costa and sacculus extending to almost the median sector of the valva. These setae have a prickly appearance. The vinculum, and/or an appendice of the vinculum, extends below the valva (lateral view). It looks finger-like with a broad base in ventral view (*cf.* Figures 18b, 24c).

Distribution. *M. joeli* **sp. nov**. is known from Kaduna (north-central Nigeria) and Bara (northeast-central Nigeria). Bara (10°22' N, 10°43' E; altitude 330m) is located *c.* 320km east from Kaduna. The new species probably extends 290km further east into northwestern Cameroon.

Habitat of type locality. Nigeria is the largest country in West Africa and is as densely populated as Western Europe. Hence, the increase in area of subsistence farming to feed a growing population and the spread of cash cropping by peasant farmers has destroyed all large areas of natural forest outside of protected areas. Natural forests were carefully managed until the early 1960s but forest exploitation had become virtually unregulated on a massive scale, both legally and illegally, by the 1980s. Forests are now largely restricted to protected areas (Sayer *et al.* 1992).

Kaduna (10°32' N, 7°26' E; altitude 646m; average annual rainfall 1285mm) is located in the humid tropical lowlands of the Kaduna Plains and at the Kaduna River in north-central Nigeria. The climate of Kaduna is dominated by two strongly contrasting seasons, namely the dry-season with a cool dry north-easterly, dust-laden Harmattan wind that blows from the desert in October–April and obscures the sun as well as the rainy-season with a moist south-westerly wind that blows in May–September. Kaduna belongs to the *"Sudanian regional centre of endemism" sensu* White (1983) and to the *"Southern Guinea Savanna Zone" sensu* Keay (1959a). The latter includes many forest fragments as well as many high-forest tree species in the savanna if not disturbed by cultivation or fire. Endemism among plants, mammals and birds is low and most endemic species have only survived in protected areas (Magin 2004b). Kaduna belongs to that part of the Kaduna Plains that has been occupied until recent times by a *"Derived Savanna" sensu* Keay (1959b) including forest remnants and open floodplain grasslands ('fadamas') with scattered low trees of *Mitragyna inermis* (Willd.) O. Ktze. and *Terminalia glaucescens* Benth.. Little of this savanna woodland was still present in 1976 (Blair Rains *et al.* 1977). Most of the woody vegetation of the *"Derived Savanna"* on the Kaduna Plains was not dominated by legumes (the association of *Isoberlinia* spp. – *Monotes kerstingii* Gilg – *Uapaca togoensis* Pax was confined to shallow droughty soils further north of Kaduna) but comprised

largely tree species such as *Acacia gourmaensis* A. Chev., *Bombax costatum* Pellegr. & Vuillet, *Bridelia ferruginea* Benth., *Combretum sericeum* Don, *Crossopteryx febrifuga* (Afzel. ex G.Don) Benth., *Cussonia barteri* Seem., *Daniellia oliveri* (Rolfe) Hutch. & Dalz., *Lophira lanceolata* Van Tiegh. ex Keay, *Piliostigma thonningii* (Schumach.), *Terminalia avicennioides* Guill. & Perr. and *T. laxiflora* Engl.. The tree *Terminalia glaucescens* Benth. was often abundant on river terraces and alluvial soils, *e.g.* along the Kaduna River.

The true climax vegetation for Kaduna is wetter semi-deciduous forest with evergreen tree species of the *"Drier peripheral semi-evergreen Guineo-Congolian rain forest and similar forest in the transition zones" sensu* White (1983). Since extensive areas of the Kaduna Plains had been much modified by humans, *e.g.* forest clearing for cultivation, lopping for browse, burning and grazing by nomadic pastoralists, forest tree species occurred in few forest remnants in 1976 comprising, *e.g. Albizia zygia* (DC.) J.F. Macbr., *Antiaris africana* Engl., *Aubrevillea kerstingii* (Harms) Pelegr., *Cola gigantea* A. Chev., *Khaya grandifoliola* C. DC., *Uvaria chamae* P. Beauv. and *Milicia excelsa* (Welw.) C.C. Berg. Dense riparian forests once included *Adina microcephala* (Del.) Hiern, *Syzygium guineense* (Willd.) DC. and *Ricinodendron heudelotii* (Baill.) Pierre, but were already reduced to scattered trees, comprising often *Khaya senegalensis* (Desr.) A. Juss., in 1976 (Blair Rains *et al.* 1977).

Not only forest remnants but also most of the present woody savanna vegetation of the Kaduna Plains are a result of cultivation, recurrent dry-season fires and associated disturbance. Few large indigenous tree species are still common near Kaduna as those of *Butyrospermum paradoxum* (Gaertn. f.) Hepper. Only little patches of *"Derived Savanna"*, moist and riparian forests still remain near Kaduna and hence, it is very likely that the habitat of the holotype does no longer exist.

Ecology based on holotype. *M. joeli* **sp. nov.** occurs in a mosaic of wooded farmland, 'fadamas', small patches of *"Derived Savanna"* as well as drier peripheral semi-evergreen Guineo-Congolian rain forest and riparian forest at low elevations (below 650m), comprising mainly tree species of genera that do not belong to woody legumes, *e.g. Bridelia*, *Crossopteryx*, *Combretum*, *Terminalia*, *Mitragyna*, *Antiaris* and *Milicia*. The dominant tree species are mainly linked to the wetter parts of the Sudanian Region and to the Guinea-Congolia/Sudania Transition Zone with its drier peripheral semi-evergreen lowland rain forest. It is important to note, that fierce dry-season fires occur in the *"Derived Savanna"* and hence, might reduce the habitats and populations of the new species.

Etymology. *M. joeli* **sp. nov**. is named for Joel Mutisya Kioko (Nairobi) who received his MSc from the University of Oldenburg (Germany). He is the Director of Metrology and Testing at Kenya Bureau of Standards (KEBS) as well as the Vice Chairman of the Africa Metrology Organisation (AFRIMETS). Joel promotes the Mithanga School Development Team during his spare time for more than ten years. He organizes and oversights funds, the construction, renovation and repair of school buildings to support the rural community of Mumbuni Location.

I am very grateful for his honest friendship, his generous hospitality with his family in Nairobi since 1994 as well as for the unforgettable wonderful days we spent together in Mithanga with its nice people and pupils of Machakos District (south-central Kenya).

3. *Moyencharia winteri* sp. nov.

Figures 19A, 20A; 19a, b.

Material examined. *Holotype* female, South-Sudan, "Tembura" (today Republic of South Sudan, Western Equatoria State, Tambura County, Tambura) December.1922, Acq. Janson (London), on second label: "Ex Oberthür Coll., Brit. Mus. 1927–3", genitalia slide number 19/022012 I. Lehmann (BMNH).

Paratype one female, Haut-Uele, Moto town (today Democratic Republic of the Congo, Orientale Province, Moto) 11.March.1926, L. Burgeon leg., genitalia slide number 14/072012 I. Lehmann (RMCA).

Description. Forewing length in female holotype 15.5mm (wingspan 32.0mm), in female paratype 13.0mm (wingspan 29.0mm); antenna-wing ratio 0.45:1 in holotype, 0.46:1 in paratype. *Head*: Clay coloured scales with sepia towards tips and a glinty shine, in between eyes long hair-like scales; eyes wood brown with small black patches; antennae bipectinate, same colour as head, branches of antennae 1.5× width of shaft, branches and shaft covered with warm buff scales dorsally, antennal tips with longer scales, bending towards apex; labial palpi warm buff. *Thorax*: Patagia with a white collar ring; tegulae clay cloured, scales sepia towards tip, with a second pure white collar ring. Hindfemora, -tibiae and -tarsi warm buff with fine hair-like scales and a glinty shine; tibial spurs 1.3mm long (apical pair) and 1.2mm (medial pair). Forewing ecru-olive with striae and small patches of liver brown, glossy; a large ochraceous-tawny patch above CuA_2, extending towards half of M_2 as well as to the lower part of the discocellular cell; a small rounded patch of the same colour near the base of forewing; pure black from CuA_2 towards dorsum with a patch of ochraceous-tawny below 1A+2A; along termen alternating striae of pure white and liver brown; costa warm buff with striae of ecru-olive; cilia long, 1.5mm, warm buff with sepia tips. Underside of forewing rough-scaled, ecru-olive, glossy. Hindwing upperside ecru-olive with a glinty shine; underside as in forewing. Wing venation

see Figure 19a. *Abdomen*: Mainly ecru-olive mixed with warm buff, glossy; a short abdominal tuft present.

Variation. In the female paratype the areole is absent on the left forewing and present on the right forewing. Note that one forewing is broken in this specimen (*cf.* Figure 20A). This forewing is fixed on a piece of paper that is attached below the paratype.

Male. Unknown.

Female postabdominal structure. Papillae anales obliquely 8-shaped, beak-like and narrow ventrally (lateral view), densely covered with short setae; few setae along the posterior margin of segment 8. The base of the posterior apophysis is broadened (3× broader than the tip of posterior apophysis) and long (as long as half of posterior apophysis). The anterior apophyses are slightly longer than the posterior apophyses and narrow.

Diagnosis. *M. winteri* **sp. nov.** differs from its congeners by distinctly darker forewing colours and in particular the pure black patches are outstanding. Hence, it cannot be considered as possibly conspecific to the males of *joeli* **sp. nov.**, *herhausi* **sp. nov**. and *sommerlattei* **sp. nov..** Moreover, these taxa do not occur sympatrically with *M. winteri* **sp. nov..** The venation of the latter species represents the typical venation of *Moyencharia* **g. nov.** and the posterior apophysis of the female has the broad, elongated base that is almost as long as half of the posterior apophysis (Figure 19b). The papillae anales of the female of *M. winteri* **sp. nov.** is shaped beak-like and narrow ventrally (lateral view).

Distribution. *M. winteri* **sp. nov**. is known from Tambura (southwestern Sudan) and Moto (northeastern DRC). Moto is located *c.* 370km southeast of Tambura. The new species extends most probably from Tambura 21km east into the Central African Republic.

Habitat of type localities. The Republic of South Sudan is the youngest independent state of Africa, established on 09th July 2011 after a six year lasting peace process. It was previously known as 'Southern Sudan'. The landscape is mainly a basin-like plain with elevations between 300–900m. There are few hills, *e.g.* the Didinga Hills and two mountain ranges, the Imatong Mountains with Mount Kinyeti (3.181m, the highest peak in the country) and the Dongotona Mountains (*c.* 2.600m). The Western Equatoria State (including Tambura County) and the mountain ranges have got the highest average annual rainfall of 1200–2200mm in South Sudan. Two forest types occur only as relicts (often on fire protected sites) near the southwestern frontiers to the Central African Republic, DRC and Uganda. First, Afromontane Forest and secondly, drier types of Guineo-Congolian lowland tropical rain forest, *e.g.* large rain forests exist towards Li Yubu (45km southwest of Tambura) or as

pockets in *"Derived Savanna" sensu* Keay (1959b). In contrast, riparian forests are present in the whole Western Equatoria.

Tambura (formerly Tembura; 5°36'N, 27°28'E; altitude 645m) is a village according to one map of the Sudan Survey of 1932 (revised edition of 1976) and located 3km northeast of the ruins of Fort Hussinger in the south-central part of Tambura County (average annual rainfall 1335mm during 1974–2004 with two rainy seasons April–June and August–November). Tambura village is situated in a remoted area 21km east of the frontier to the Central African Republic. It is on the borderline of the *"Guinea-Congolia/Sudania Transition Zone"* and the *"Sudanian regional centre of endemism" sensu* White (1983). The village is closely located to several swampy sites and rivers, *e.g.* 2km south of the Yubo River and 5km north of the Moiko River. Hence, the Gambiense sleeping sickness, transmitted by *Glossina fuscipes fuscipes* Newstead, a riverine species of tsetse fly, is very common and regularly causes the death of many people around Tambura (records exist since 1918). Several rock formations as the Bukita and Wanga rocks occur *c.* 7km southwest of Tambura (highest rock 812m).

The vegetation of Sudan was classified by Harrison & Jackson (1958). According to this Tambura County is located in only one of six divisions, namely in the *"High Woodland Savanna with high rainfall of 900–1300mm."* The woodland is an open and broadleaved tree woodland, thorny trees are rare. The dominant genera include *Anogeissus*, *Khaya* and *Isoberlinia*. Dominant species around Tambura village include *Anogeissus leiocarpus* (DC.) Guill.& Perr., *Combretum binderianum* Kotschy and *Khaya senegalensis* (Desr.) A. Juss.. Fires are fierce due to tall grasses, *e.g. Hyparrhenia edulis* C.E. Hubbard and *Loudetia esculenta* C.E. Hubbard. Towards the southwest woodlands occur with patches that are derived from lowland rain forest with *Annona chrysophylla* Bojer, *Bridelia scleroneuroides* Pax, *Dombeya quinqueseta* (Del.) Exell, *Milicia excelsa* (Welw.) C.C. Berg and *Khaya grandifoliola* C. DC. (FAO & UNEP 1984). Towards Mupoi several younger Teak plantations exist, *e.g.* 16km southeast of Tambura. The village belongs to the *"Greenbelt Zone"* (Livelihood Profiles 2006) that is considered as a breadbasket of South Sudan. Households of Tambura village depend exclusively on agriculture to meet their food needs and woodlands were locally replaced by lime orchards (including old orchards), cotton fields, maize, groundnuts and finger millet. Wooded farm lands around Tambura comprise trees, *e.g. Butyrospermum paradoxum* ssp. *niloticum* (Kotschy) Hepper, *Ficus religiosa* L. (introduced) and *Mangifera indica* L..

Natural riparian forests occur around the village comprising trees, *e.g. Khaya senegalensis* (Desr.) A. Juss., *Cola* spp., *Syzygium guineense* (Willd.) DC., *Mitragyna* spp., *Albizia zygia* (DC.) J.F. Macbr., *Acacia polyacantha* Willd. ssp. *campylacantha* (Hochst. Ex A. Rich.) Brenan and *Humularia sudanica* P.A. Duvign in the undergrowth.

Since the paratype locality represents the most southern distribution record of the species of *Moyencharia* **g. nov.** and since it is situated in one of two major Pleistocene forest refuge areas of Central Africa, Moto is briefly described here. Moto (894m, average annual rainfall 1500–1800mm, one dry season January–March) is located 200km east of Isiro and 60km west of the Albertine Rift

region (Orientale Province, northeastern DRC). The town is situated in the *"Guineo-Congolian regional centre of endemism"*, but is in the transition to the *"Guinea-Congolia/Sudania Transition Zone" sensu* White (1983). The exposed geological landscape around Moto is one of the oldest in Africa and represents the Late Archean crust (3000–2500 million years old) of the African Platform. The exposed Late Archean Upper Zaire granitoid massif at Moto belongs to the oldest units of the Congo and Kibalian cratons, comprising *c.* 2600 million years old rocks of the Western Nile Formation with granite-gneiss domes as well as Late Archean greenstone belts (Goldfarb *et al.* 2001). The latter are exposed as rocks that are dark green in colour and consist mainly of mica and quartz. They occur as outcrops or open pits that are usually devoid of vegetation. The Moto Greenstone Belt includes important gold and other metallic deposits. Hence, the hilly terrain has been heavily converted and used for gold mining on a large scale since 1911. Degraded forest remnants, artisanal mines, cultivated lands and secondary moist grasslands dominate the landscape today and it is very likely that the habitat of the paratype does no longer exist.

The forest cover was continuous at Moto before 1911. The forests surrounding the outcrops belong to the *"East Central Pleistocene forest refuge"* that includes forest sites that are between 12000 and 3000 years old while the riverine forest sites are much older, probably at least 20000 years (Colyn *et al.* 1991). Dense moist forest remnants still occur near Moto today and belong according to Verhegghen *et al.* (2012) to the *"Mixed moist semi-evergreen Guineo-Congolian rain forest" sensu* White (1983). They have a very diverse flora and fauna with high endemism (Blom & Schipper 2004). Tree species that occur near Moto comprise, *e.g. Entandrophragma candollei* Harms, *E. cylindricum* (Sprague) Sprague, *Diospyros crassiflora* Hiern and *Dialium excelsum* Louis ex Steyaert. South of Moto and towards Mongbwalu occur very rare tree species such as *Brazzeia longipedicellata* Verdc. (SRK Consulting 2011). Forest remnants, often degraded forest patches at Moto as well as forests towards the transition zone further north, include, *e.g. Milicia excelsa* (Welw.) C.C. Berg and *Khaya anthotheca* (Welw.) C. DC.. Riparian forests comprising, *e.g. Turreanthus africanus* (Welw. ex C.DC.) Pellegr., *Berlinia grandiflora* (Vahl) Hutch. & Dalz., *Cynometra vogelii* Hook. f., *Pterocarpus santalinoides* L'Hérit ex DC., *Parinari congensis* F. Didr. and *Hymenocardia ulmoides* Oliv. (the latter two tree species extend further north into South Sudan).

Ecology based on holotype and paratype. *M. winteri* **sp. nov.** occurs in *"Mixed moist semi-evergreen Guineo-Congolian rain forest" sensu* White (1983) as well as in a mosaic of wooded farmland, swampy sites, *"Derived Savanna"* with drier peripheral semi-evergreen Guineo-Congolian rain forest and riparian forest at low elevations (below 1.300m). Various forest sites of the paratype locality are older than 12000 years. Dominant tree species belong to genera (in particular in drier areas) that are not woody legumes, *e.g. Anogeissus, Bridelia*, *Khaya, Mitragyna, Antiaris, Diospyros, Hymenocardia* and *Milicia*. Fierce dry-season fires occur in the habitat of the Sudanian Region and might reduce the populations of the new species.

Etymology. *M. winteri* **sp. nov**. is named for Philip Enever Winter (Juba, South Sudan) who received his M.A. (Classics) from Cambridge University in 1971. Philip is Independent Diplomat's Representative working closely with the Government of the Republic of South Sudan in foreign relations and diplomacy. He has managed *"Save the Children"* Fund programmes for more than 25 years in the UK, Kenya, South Sudan, DRC, Burundi and Rwanda working with the UN, rebels and governments in three war zones. Several times Philip was Senior Advisor on diplomacy and conflict resolution, *e.g.* for the United Nations Organisation Mission in the DRC. He received The Most Excellent Order of the British Empire (O.B.E.) for *"services to conflict resolution in Africa"* in 2004.

Philip has done an outstanding favour for me during his work by the British Foreign Office as Chief of Staff to the former President of Botswana, Sir Quett Ketumile Joni Masire, who acted as Facilitator in the Inter-Congolese Dialogue. I am also very grateful for our various valuable conversations about Philip's life and work in very remote and dangerous areas of Africa.

4. *Moyencharia herhausi* sp. nov.

Figures 21A; 20a, b; 24d.

Material examined. *Holotype* male, Obervolta, Bobo Dioulasso (today Burkina Faso, Hauts- Bassins Region, Houet Province) 30. April.1975, Dr Politzar leg., genitalia slide number 09/042012 I. Lehmann (ZSM).

Description. Forewing length in male 12.5mm (wingspan 26.0mm); antenna-wing ratio 0.56:1. *Head*: Warm buff mixed with ivory yellow, glossy, in between eyes long hair-like scales which are in length *c.* half of eye diameter; eyes wood brown with small black patches; antennae bipectinate, same colour as head, branches of antennae 5× width of shaft, branches and shaft covered with ivory yellow scales dorsally, antennal tips with longer scales, bending towards apex; labial palpi ivory yellow. *Thorax*: Patagia and tegulae ivory yellow with glinty shine. Hindfemora, -tibiae and -tarsi warm buff with fine hair-like scales, glossy; tibial spurs 1.2mm long (apical pair), medial pair with two spurs of different length, 1.3mm and 1.1mm. Forewing warm buff and light orange-yellow mixed with ivory yellow, not glossy; a broad light orange-yellow subterminal band from R_5 towards near top of CuA_2; a band of the same colour along the costa and a large patch of light orange-yellow at the base of forewing, the latter patch is edged with a smaller patch of sepia towards CuA_2; at top of CuA_2 a small pure white patch; small spots of sepia along costa and below CuA_2; a reticulated pattern of sepia in between base of R_5 and R_3; lunules of ivory yellow along termen, edged sepia; in the outer half of the discocellular cell a patch of light orange-yellow edged sepia; cilia long, 1.5mm, alternating warm buff and light-orange yellow. Underside of forewing rough-scaled, warm buff with ivory yellow, some scales with sepia coloured tips. Hindwing upperside warm buff mixed with ivory yellow; underside as in forewing.

Wing venation see Figure 20a. *Abdomen*: Mainly warm buff with ivory yellow, glossy; a small crest and a short abdominal tuft of sepia are present.

Male genitalia. Saccus very small anteriorly, but extending posteriorly to below sacculus of valva as narrow and long process (*c.* 40% width of valva; lateral view) that is rounded caudally and finger-shaped (ventral view); uncus large and broad with a flat emargination, densely setose on ventral surface with short setae, bilobed, lobes not elongated. Valva on ventral surface and on the upper half with two thorn-like appendices, bent towards uncus, tips acuminate. In between of the two thorn-like appendices there is a broad emargination, *c.* 25% of the width of valva, with a weakly-sclerotized structure that covers two-thirds of this emargination. Along the costa, the sacculus and towards the median sector of the valva long setae occur. These setae do not have a prickly appearance. Gnathos rather broad in lateral view and bent towards uncus. A large plate-like rectangular process, broader than the emargination in between the thorn-like appendices, extends into an emargination that occurs at the outer base of the valva. Juxta oval-shaped and without acuminate lobes. Phallus simple, tube-like, strongly bent at one side, at its bended end with two tiny processes; vesica without cornuti.

Female. Unknown.

Diagnosis. Saccus very small anteriorly, but extending posteriorly to below sacculus of valva as narrow and long process (lateral view). The uncus has got a flat emargination and is densely setose with short setae ventrally. The phallus is strongly bent at one side. At its upper end two tiny processes occur (*cf.* Figures 20b, 24d).

Distribution. *M. herhausi* **sp. nov**. represents, together with *Kroonia carteri* Lehmann 2010a from Sénégal, one of the most northern records of the Metarbelidae on the African mainland. The new species is the first published record of the family Metarbelidae for the country Burkina Faso. It is known from Bobo Dioulasso (southwestern Burkina Faso). *M. herhausi* **sp. nov**. most probably extends from Bobo Dioulasso 110km westwards into southeastern Mali.

Habitat of type locality. The majority of Burkina Faso is situated on a savanna plateau (altitude 200–300m) and has got a long dry season (October–April) and a short rainy season (May–September).
In general, the diversity of the flora and fauna in Burkina Faso is not well known. Trees, woody shrubs and creepers comprise 376 species including 95 exotic species. Among the 30000 estimated insect species only 1515 species have been recorded (Ministry of Environment and Water 1999). Endemism is low among plants, mammals and birds (Magin 2004b).

Bobo Dioulasso (11°10’N, 04°16’W; altitude 462m; average annual rainfall 1000mm based on records of 1971–2000) is located in the Sudanese domain that is less arid and covers the southern part

of the country. The town and its environment belong to the *"Sudanian regional centre of endemism" sensu* White (1983). Historically, areas close to Bobo Dioulasso were an important producer of natural rubber from natural plantings of *Landolphia heudelotii* A. DC., a shrub or climber that usually grows near rivers, at the beginning of the last century. During World War II, different states of French West Africa provided 3446 tons of rubber as their contribution to the war effort against Hitlerian fascism (Aubréville 1950). Bobo-Dioulasso is largely surrounded by tall-grass savanna that can be classified as *"Sudanian woodland" sensu* White (1983). It is not dominated by *Acacia* spp. but comprising broad-leaved tree species, *e.g. Lannea microcarpa* Engl. & K. Krause, *Ximenia americana* L., *Ficus ingens* Miq., *Combretum micranthum* G. Don, *Erythrophleum africanum* (Welw. ex Benth.) Harms, *Bombax costatum* Pellegr. & Vuillet, *Swartzia madagascariensis* Desv., *Acacia hockii* De Wild., *A. macrostachya* Reichenb. ex Benth. and *Tricalysia okelensis* Hiern. Trees of rather secondary savanna vegetation include, *e.g. Burkea africana* Hook., *Daniellia oliveri* (Rolfe) Hutch. & Dalz. and *Parkia biglobosa* (Jacq.) Benth.. Relicts of dry forest occur, often constituting 'sacred woods' and hence have survived until present, *e.g.* northwest and west of Bobo Dioulasso. Two examples are the Forét la Guinguette (surrounding the spring of the river Kou) and the Forét Classée du Kou (116ha). The latter is located *c.* 14km west of Bobo Dioulasso and has survived because it is legally protected since 1935. Half of the forest is a *"Sudanian swamp forest and riparian forest" sensu* White (1983) that borders the Kou River. It comprises, *e.g. Detarium microcarpum* Guill. & Perr., *Berlinia grandiflora* (Vahl) Hutch. & Dalz., *Ficus congoensis* Engl., *Kigelia africana* (Lam.) Benth., *Vitex doniana* Sw., *Cola laurifolia* Mast., *Elaeis guineensis* Jacq., *Carapa procera* DC., *Dialium guineense* Willd., *Macrosphyra longistyla* (DC.) Hiern, *Adenia cissampeloides* (Planch. ex Benth.) Harms, *Euphorbia macrophylla* Pax, *Mimusops kummel* A. DC., *Bauhinia rufescens* Lam. and *Adina microcephala* (Del.) Hiern. The other 50% can be classified as *"Sudanian transition woodland" sensu* White (1983) that still includes forest trees, *e.g. Antiaris africana* Engl. and large trees of *Ceiba pentandra* (Linn.) Gaertn., a secondary forest species that often occurs close to savannas. The woodland associates comprise species such as *Anogeissus leiocarpus* (DC.) Guill. & Perr., *Diospyros mespiliformis* Hochst. ex A. DC., *Linociera nilotica* Oliv., *Pterocarpus erinaceus* Poir., *Celtis integrifolia* Lam., *Acacia pennata* (Linn.) Willd. and *Garcinia ovalifolia* Oliv..

Ecology based on holotype. *M. herhausi* **sp. nov.** occurs in a mosaic of wooded farmland, Sudanian woodland with pockets of dry and riparian forest at low elevations (below 500m).

Etymology. *M. herhausi* **sp. nov**. is named for Frank Herhaus (Wiehl, Germany) who studied landscape ecology at the University of Duisburg-Essen. He is an executive secretary of the regional nature conservation stations Oberberg/ Rhein-Berg (state of North Rhine-Westphalia) which are involved in various activities and projects on nature and environment protection, landscape management, inventories of protected areas, landscape ecology and environment education based on a

collaboration with several larger nature conservation associations at the state level. Frank is a member of the advisory board of the German Association for Landcare, an umbrella organization of *c.* 140 local or regional German landcare organizations. He has published several papers on the diversity and protection of stone quarries, valley bogs and bats in Germany.

I first met Frank in Arnsberg in 1984 when I was 19 years old and just six months after two years of political imprisonment by the Government of the GDR. I am very grateful for his honest friendship since that time and for his valuable help in various ways in particular during 1984–1989.

5. *Moyencharia sommerlattei* sp. nov.

Figures 22A; 21a, b; 24e.

Material examined. *Holotype* male, Guinée Française (today Republic of Guinea), no locality, no date, no collector; on second label "1920–1932, Ex coll. L. & J. de Joannis, muséum Paris", genitalia slide number 22/022012 I. Lehmann (MNHN).

Description. Forewing length in male 10.5mm (wingspan 24.0mm); antenna-wing ratio 0.57:1. *Head*: Warm buff mixed with ivory yellow, in between eyes long hair-like scales which are in length *c.* half of eye diameter; eyes wood brown with small black patches; antennae bipectinate, same colour as head, branches of antennae 7× width of shaft, branches and shaft covered with ivory yellow scales dorsally, antennal tips with longer scales, bending towards apex; labial palpi narrow and warm buff. *Thorax*: Patagia and tegulae warm buff with glinty shine, patagia with an ivory yellow collar ring. Hindfemora, -tibiae and –tarsi ivory yellow with fine hair-like scales, glossy; tibial spurs long, 1.1mm (apical pair), medial pair with two spurs of different length, 1.0mm and 0.9mm. Forewing with a broad band of warm buff along the costa including a few sepia coloured striae, ivory yellow patches below this band, patches edged sepia with smoke grey in between; one ivory yellow patch at top of CuA_2; a broad patch of olive-ocher extending from CuA_2 via the outer half of the discocellular cell towards apex; below CuA_2 small patches of smoke grey edged sepia, glossy; a large patch of warm buff at the base of forewing; lunules of ivory yellow along termen, edged sepia; one narrow patch of smoke grey from CuA_1 to apex, glossy; cilia long, 1.2mm, alternating warm buff and ivory yellow. Underside of forewing rough-scaled, warm buff, some scattered scales with sepia coloured tips. Hindwing upperside warm buff with ivory yellow, glossy; underside as in forewing. Wing venation see Figure 21a. *Abdomen*: Mainly warm buff with ivory yellow and a glinty shine; one small crest and one short abdominal tuft of sepia are present.

Male genitalia. Saccus small anteriorly and not extending posteriorly to below sacculus of valva, rounded caudally; uncus large and broad with a flat emargination, densely setose on ventral surface with short setae, bilobed, lobes not elongated (ventral view). Valva on ventral surface and on the upper half with two thorn-like appendices, bent towards uncus, tips acuminate; the base of the upper appendice with a small oval-shaped weakly-sclerotized hole (visible only before mounting in Euparal, *cf.* Figure 21b). In between of the two thorn-like appendices there is a broad emargination, *c.* 25% of the width of valva, with a weakly-sclerotized structure that has long scattered setae and covers two-thirds of this emargination. Along the costa, the sacculus and towards the median sector of the valva long setae occur. Gnathos rather broad in lateral view and bent towards uncus. A large plate-like rectangular process, broader than the emargination in between the thorn-like appendices, extends into an emargination that occurs at the outer base of the valva. Juxta oval-shaped and without acuminate lobes. Phallus simple, tube-like, broad, not bent, with two tiny acuminate processes at one end; vesica without cornuti.

Female. Unknown.

Diagnosis. Saccus small anteriorly, not extending posteriorly to below sacculus of valva, not finger-shaped. The phallus is broad, not bent and has got two tiny acuminate processes at one end. The valva is C-shaped (best visible in ventral view) between the lower thorn-like appendice and the sacculus. Hence, the valva extends slightly posteriorly at its ventral side (*cf.* Figures 21b, 24e).

Distribution. *M. sommerlattei* **sp. nov**. is known from the Republic of Guinea (West Africa).

Habitat of type locality. Unknown. The majority of Guinea comprises lowlands. There are only few highland areas, namely the Fouta Djallon with Mount Loura (1.538m) and the 'Dorsale Guinéene' which includes Pic de Fon (1.656m), Mount Nimba (1.752m) and the Ziama massif (1.387m). The latter two mountain ranges have got high rare and endemic species richness among plants, mammals, reptiles, birds and insects (Wieringa & Poorter 2004). Montane forests are rare in West Africa. Guinea has only 210km^2 of montane forest dominated by, *e.g. Parinari excelsa* Sabine (Sayer *et al.* 1992) and *Uapaca chevalieri* Beille along streams (Poorter *et al.* 2004).

The lowland areas of Guinea become increasingly dry towards the north and east. Guinea straddles the Upper Guinea tropical lowland rain forest, the moist transitional savanna/forest mosaic and the drier Sudanian Region towards the north. The majority of the northern half of Guinea was originally covered with lowland dry forests (except of the Fouta Djallon) and receiving an average annual rainfall of 1250–1600mm and a dry season of 3–7 months. These lowland dry forests were largely destroyed by humans in the last century. Dominant tree species comprised, *e.g.* in the west *Parkia biglobosa* (Jacq.) Benth., *Pterocarpus erinaceus* Poir. and solid-stemmed bamboo

Oxytenanthera abyssinica (A. Rich.) Munro in the undergrowth; in the north *Afzelia africana* Pers., *Khaya grandifoliola* C. DC., *Tabernaemontana africana* Hook.; in the east *Erythrophleum guineense* G. Don and in the south *Uapaca togoensis* Pax, *Isoberlinia doka* Craib & Stapf and *I. dalzielii* Crain & Stapf. A number of riparian forests still occur in these drier areas including trees, *e.g. Anisotes guineensis* Lindau, *Cathormion rhombifolium* (Benth.) Keay with *Ixora hiernii* Scott-Elliot in the understory. The southwestern part of Guinea is still covered with *"Mixed moist semi-evergreen Guineo-Congolian rain forest" sensu* White (1983) comprising 4482km^2 (Sayer *et al.* 1992) including Upper Guinea endemic tree species such as *Anthocleista nobilis* G. Don as well as trees with a wider distribution, *e.g. Anthonotha fragrans* (Baker f.) Exell & Hillcoat, *Chrysophyllum giganteum* A. Chev., *Erythrophleum ivorense* A. Chev., *Funtumia africana* (Benth.) Stapf, *Parinari excelsa* Sabine and *Piptadeniastrum africanum* (Hook. F.) Brenan. The average annual rainfall in this area is 1700–2700mm.

The coastal areas receive very high average annual rainfall (>3000mm). Almost the entire coast of Guinea is covered by mangrove forests, often dominated by *Rhizophora harrisonii* Leechman. Swamp and riparian forests occur including, *e.g. Ficus ottoniifolia* (Miq.) Miq. ssp. *multinervia* C.C. Berg and *Raphia palma-pinus* (Gaertn.) Hutch.. Other coastal forest types were once widespread and rich in *Terminalia ivorensis* A. Chev., *Milicia excelsa* (Welw.) C.C. Berg, *Aningeria* and *Carapa* spp. (Sayer *et al.* 1992; Poorter *et al.* 2004).

Ecology based on holotype. *M. sommerlattei* **sp. nov.** most probably occurs in various (mainly riparian?) forest types at low elevations (below 1.300m) with an average annual rainfall of at least 1250mm.

Etymology. *M. sommerlattei* **sp. nov.** is named for Dr Herbert Sommerlatte (born on the 01st November 1905 in Berlin, died on the 20th January 1995 in Zug/Switzerland) in remembrance of our interesting time spent together discussing his various geological explorations in Africa.

Herbert Sommerlatte was one of the first German mining engineers to receive a DAAD Exchange Research Fellowship for a post-graduate study in the United States of America in 1932–1934. During his long professional career he worked on various mining projects in such countries as Burma, India, South Africa, Rhodesia, Congo, Mozambique and Ethiopia and on a variety of mineral deposits which included, *e.g.* gold, Witwatersrand ores, chrome ores and zinc. His personal interests included researching the history of geology whereby he was one of the first ten persons to research one of the most important and earliest geological and mineral distribution maps, the *"Turin papyrus"*, of the area of Wadi Hammamat (Eastern Desert, Egypt) that dates from the reign of RAMSES (Ra-messes) IV (*c.* 1156–1150 or 1153–1147 B.C.). Herbert Sommerlatte was probably the first who

interpreted the striae in the spotted pattern on the papyrus as systematic drawings of near-surface gold deposits. His result was confirmed by the two scientists J.A. Harrel & V.M. Brown only three years before he died. In 1987, Herbert Sommerlatte published his book *"Gold and Ruins of Zimbabwe"* (translated from German) about the self-taught geographer and geologist Karl Mauch (1837–1875) who produced one of the earliest geological maps of the area between the Vaal River and the Zambezi River (southeastern Africa) and as the first German, additional information of the Great Zimbabwe ruins which he visited in 1871.

6. *Moyencharia ochreicosta* (Gaede, 1929)**, comb. nov.**

Original combination: *Teragra ochreicosta* Gaede, 1929

Synonyms: *Teragra basiplaga* Gaede, 1929

Teragra basiplaga f. *fuscoradiata* Gaede, 1929.

Figures 23A–27A; 22a, b; 23a, b; 24f.

Material examined. *Holotype* male, West Africa, "Kete-Kratje" (today Kete-Krachi, Krachi West District, Volta Region, Ghana), no date, Graf Zech S. G. leg., genitalia slide number 13/122009 I. Lehmann (ZMHB).

Note: The collector of the holotype was Julius Graf von Zech auf Neuhofen who was the Gouvenor of the German Colony Togoland in 1905–1910. Togoland included eastern Ghana. Graf von Zech arrived in Kete-Krachi (southeast-central Ghana) in 1895 where he was appointed Executive Officer at the German Administration Station Kete-Krachi in the same year. He left Kete-Krachi and moved to Anecho in 1900. Hence, the author assumes that the holotype was collected in Kete-Krachi between1895–1900.

Additional specimens: one male (probably from the type series of *Teragra basiplaga*, *cf.* note below) labelled *"Gold Coast, Gambaga, 05.May.1902, Dr Bury"* and on second label *"*f. *fuscoradiata det. M. Gaede"*, genitalia slide number 17/082007 I. Lehmann (BMNH).

Note: Gaede (1929, p. 511) mentioned two *"types"* from the *"Gold Coast"* (today Ghana) for *Teragra basiplaga*, namely one for *T. basiplaga* and one for *Teragra basiplaga* f. *fuscoradiata*. The author found nine specimens in the BMNH that were collected in Gambaga by Dr Bury. According to the authors' opinion all nine specimens belong to one species since all have the same wing pattern. Two specimens, among the nine mentioned above, are determined as *Teragra ochreicosta*. The remaining seven specimens include one *"type"* determined as *T. basiplaga* and labelled "*Gold Coast, Gambaga, Dr Bury"* and on second label *"*f. *fuscoradiata det. M. Gaede."* The second *"type"* was not found by the author. It seems that Gaede included the seven specimens from Gambaga directly into one type series comprising *T. basiplaga* as well as f. *fuscoradiata* (*cf.* Article 72.4.1 ICZN 1999).

One specimen of this type series (?) from Gambaga was dissected and studied by the author and is mentioned above (Figure 27A).

Two other specimens in the BMNH bear the label *"Gold Coast, N. Territories, Kete-Krachi, A.W. Cardinall, B.M. 1925–146"* and *"Gold Coast, N. Territories, Kete-Krachi, A.W. Cardinall, B.M. 1925–241."* Both are incorrectly determined as *Metarbela micra* Karsch. A genitalia dissection of the latter specimen was done by the author (genitalia slide number 18/082007 I. Lehmann) and indicates that it is the male of *Moyencharia ochreicosta* (Gaede, 1929). The second specimen also belongs to the latter species.

One male, North Nigeria, Zungeru, 17.April.1911, Scott Macfie leg., B.M. 1911–269, genitalia slide number 07/112006 I. Lehmann (BMNH); one male, South Nigeria, Lagos, no date, no collector and on second label *"Teragra ochreicosta det. M. Gaede"*, genitalia slide number 30/072012 I.Lehmann (BMNH); one male, Obervolta (today Burkina Faso), Kourinyon (= misspelling of Kourignon near Nbié, Hauts-Bassins Region),"Voltaquellen", 16.April.1975, Dr Politzar leg., genitalia slide number 23/012012 I. Lehmann (ZSM); one female, same locality, same date and collector, genitalia slide number 07/042012 I. Lehmann (ZSM).

Additional re-description. Forewing length in male holotype 11.0mm (wingspan 23.5mm), in female 10.0mm (wingspan 21.0mm); antenna-wing ratio 0.55:1 in male holotype, 0.45:1 in female. *Head*: Deep colonial buff, scales around eyes with tips of amber brown, in between eyes long hair-like scales; eyes ecru-olive with light brownish olive patches; antennae bipectinate, same colour as head, branches of antennae 8× width of shaft, branches and shaft covered with pale olive-buff scales dorsally, antennal tips with longer scales, bending towards apex; labial palpi narrow, slightly longer than diameter of eye and deep colonial buff. *Thorax*: Patagia and tegulae deep colonial buff, tips of scales amber brown, without collar ring. Hindfemora, -tibiae and –tarsi warm buff with fine hair-like scales, glossy; tibial spurs long, 1.1mm (apical pair), medial pair with two spurs of different length, 1.0mm and 0.9mm. Forewing warm buff and ivory yellow or light orange-yellow and ivory yellow, not glossy; a broad band of light orange-yellow, *e.g.* in specimens from Burkina Faso, or ivory yellow, *e.g.* in specimens from Nigeria, along the costa including sepia coloured striae from near apex to near base of forewing in both sexes; one small and elongated white or light orange-yellow patch at top of CuA_2 in both sexes; a broad patch of sepia from below CuA_2 and below of the discocellular cell towards the base of forewing in both sexes; base of forewing from costa to dorsum light orange-yellow or ivory yellow in both sexes; lunules ivory yellow or light orange-yellow along termen, edged sepia; a broad patch of deep olive-buff from CuA_1 to the centre of R_5; cilia long, 1.5mm, warm buff or light orange-yellow. Underside of forewing rough-scaled, deep colonial-buff. Hindwing upperside warm buff with ivory yellow towards the base of hindwing, glossy; underside as in forewing. Wing venation see Figures 22a, 23a. *Abdomen*: Mainly warm buff with ivory yellow; one small crest and one short abdominal tuft of sepia are present.

Variation. The forewing upperside is mainly warm buff and ivory yellow in specimens from southeast-central Ghana (Kete-Krachi) as well as northern and southern Nigeria (Zungeru, Lagos) or mainly light orange-yellow and ivory yellow in specimens from northeastern Ghana (Gambaga) as well as western Burkina Faso (Kourignon). The latter specimens are largely light orange-yellow with little ivory yellow. However, the venation and genitalia of the latter specimens do not differ to any major degree to the holotype from Kete-Krachi (*cf.* Figures 23A–27A).

Male genitalia. Saccus absent or extremely short anteriorly but extending posteriorly just to below base of sacculus (*c.* 10% of width of valva), finger-like, rounded caudally (ventral view); uncus large and broad with a flat emargination, densely setose with short setae on ventral surface, bilobed, lobes not elongated. Valva on the ventral surface and on the upper half with two thorn-like appendices, bent towards uncus, tips acuminate. In between of the two thorn-like appendices there is a broad emargination, *c.* 25% of the width of valva, weakly-sclerotized with long scattered setae. Along the costa, the sacculus and towards the median sector of the valva long setae occur. Gnathos rather broad in lateral view, bent towards uncus. A large plate-like rectangular process, broader than the emargination in between the thorn-like appendices, extends into an emargination that occurs at the outer base of the valva. Juxta large, oval-shaped and without acuminate lobes. Phallus simple, tube-like, broad, strongly bent; vesica without cornuti.

Female postabdominal structure. Papillae anales obliquely 8-shaped and rather elliptic, less beak-like, broad dorsally (lateral view); densely covered with short and long setae; segment 8 with few scattered long setae on its lateral surface; long setae along posterior margin occur. The base of the posterior apophysis is very broad (7× broader than the tip of posterior apophysis) and long (*c.* half of the posterior apophysis). The anterior apophyses are as long as the posterior apophyses, narrow and with a wave-like shape in the middle.

Diagnosis. Saccus absent or extremely short anteriorly, but extending posteriorly just to below base of sacculus (*c.* 10% of width of valva), finger-shaped. The phallus is broad and strongly bent. The valva is not C-shaped between the lower thorn-like appendice and the sacculus (*cf. M. sommerlattei* **sp. nov.**).

In the female, segment 8 has few scattered long setae on its surface and few long setae along its posterior margin. The base of the posterior apophysis is very broad (7× broader than the tip of posterior apophysis) and long (*c.* half of the posterior apophysis).

Distribution. *M. ochreicosta* is known from West Africa. It occurs in western Burkina Faso (Kourignon) extending its range southwards via northeast and southeast Ghana to southeast and east-central Nigeria. *M. ochreicosta* most probably occurs in the countries Togo and Benin that are located in between Ghana and Nigeria.

Habitat of type localities. The most spectacular topographical feature of Ghana is the Voltaian Escarpment (762m) that extends over much of eastern Ghana and is associated to the Gambaga Scarp (518m) in the northeast. Montane zones, as defined by Keay (1959a) for tropical Africa, do not exist in Ghana. The highest hill of the country being Mount Afadjato or Afadjoto (885m), adjoining the Agumatsa Range *c.* 90km southeast of Kete-Krachi.

Kete-Krachi (altitude 110m; average annual rainfall 1422mm) is located in southeast-central Ghana and in the south-central part of the Voltaian Basin. The town belongs to the *"Guinea-Congolia/Sudania regional transition zone" sensu* White (1983). The Voltaian Basin has undergone tremendous environmental changes since the formation of Lake Volta, one of the largest man-made lakes. The Akosombo Dam, that flooded the basin, was officially opened on 22nd January 1966.

The following description of Kete-Krachi refers to the old Kete-Krachi that is, except of a handful of old German buildings, under water since 1966. Hence, the holotype locality does no longer exist.

Many Middle Stone Age sites have been recorded around Kete-Krachi and available evidence indicates that by at least 4000 years ago various ethnic groups inhabitat that place (Agorsah 1988). Additionally, Kete-Krachi used to be an important port at the Volta River where slaves from the north where shipped in boats to river ports further south. It was also a nodal point on a main north-south caravan route. Hence, the vegetation around Kete-Krachi was modified by people for some millennia. Kete-Krachi was surrounded by three main vegetation types: First, a riparian forest of the*"Guinea-Congolia/Sudania regional transition zone" sensu* White (1983). This was a large forest that extended along the Volta River, *e.g.* to the village Dadiase 2km south of Kete-Krachi. Many people, *e.g.* the Krachi, used to live in this riparian forest. Tree species at Kete-Krachi comprised *Hymenocardia heudelotii* Müll. Arg., *Afzelia africana* Pers., *Erythrophleum guineense* G. Don, *Berlinia grandiflora* (Vahl) Hutch. & Dalz. and the shrub *Rotula aquatica* Lour.. Secondly, the *"Derived Savanna" sensu* Keay (1959b) with tree species, *e.g. Lophira lanceolata* Van Tiegh. ex Keay, *Hannoa undulata* (Guill. & Perr.) Planch., *Lannea acida* A.Rich., *Parinari curatellifolia* Planch. ex Benth., *Parkia clappertoniana* Keay, *Albizia lebbeck* (Linn.) Benth., *Ficus polita* Vahl, *F. ovata* Vahl, *F. platyphylla* Del. with shrubs such as *Tricalysia chevalieri* K. Krause, *Teramnus buettneri* (Harms) Bak.f. and *Erythrococca anomala* (Juss. ex Poir.) Prain. Thirdly, pockets of *"Drier peripheral semi-evergreen Guineo-Congolian rain forest and similar forest in the transition zone" sensu* White (1983). This type of forest occurred as far as 100km northeast of Kete-Krachi where dense, large forests were described by Jeník & Hall (1966). The small moist forest tree *Vernonia colorata* (Willd.) Drake that grows in

forest pockets around the modern Kete-Krachi is probably a good indicator for a larger moist forest that occurred there before 1966. Common trees of this once larger forest type included *Antiaris africana* Engl., *Ricinodendron heudelotii* (Baill.) Pierre, *Milicia excelsa* (Welw.) C.C. Berg and *Anogeissus leiocarpus* (DC.) Guill. & Perr.. Jeník & Hall (1966) observed northeast of the old Kete-Krachi, that except of the riparian forests, almost all the area was burnt annually.

Gambaga (altitude 385m; average annual rainfall 1143mm) belongs to the *"Sudanian regional centre of endemism" sensu* White (1983) and lies *c.* 300km north of Kete-Krachi and *c.* 50km west of the frontier to Togo. It is located close to the northern end of the Voltaian Basin and just south of the Gambaga Scarp. Gambaga was largely surrounded by (dry?) forests towards the north and northeast according to the vegetation map of the Survey of Ghana printed in 1969. East as well as west of Gambaga once large riparian forests occurred, termed *"Sudanian swamp forest and riparian forest" sensu* White (1983), along the tributaries of the White Volta River comprising, *e.g. Berlinia grandiflora* (Vahl) Hutch. & Dalz., *Zanha golungensis* Hiern, *Adina microcephala* (Del.) Hiern, *Psychotria psychotrioides* (DC.) Roberty with shrubs such as *Crotalaria* spp., *Culcasia saxatilis* A.Chev. and *Tephrosia mossiensis* A.Chev.. All forests are smaller in size today. Based on the survey of 1969 occurred (and still occur) south and southeast of Gambaga *"Guinea savanna woodland"* with low inselbergs and outcrops as well as with a stony savanna surface on the remaining area. This surface was briefly described by Brash (1962). According to this, *e.g.* bauxitized laterite occurs as ironpan outcrops. The latter belong to the old Gondwana surface or to the early Tertiary surface. However, small trees on such outcrops include, *e.g. Gardenia sokotensis* Hutch., *Plectranthus hallii* J.K. Morton, *Entada* spp., orchids such as *Eulophia quartiniana* A.Rich and tall grasses, *e.g. Andropogon pteropholis* W.D. Clayton. A very common savanna tree around Gambaga is *Prosopis africana* Taub.. Other legume tree species include, *e.g. Swartzia madagascariensis* Desv., *Piliostigma reticulatum* (DC.) Hochst., *Isoberlinia dalzielii* Craib & Stapf and *Acacia dudgeoni* Craib ex Holl.. Additionally, *Combretum micranthum* G. Don, *C. collinum* Fresen. ssp. *hypopilinum* (Diels) Okafar , *C. nigricans* var. *elliotii* (Engl. & Diels), *Ficus abutilifolia* (Miq.) Miq., with local stands of the solid-stemmed bamboo *Oxytenanthera abyssinica* (A.Rich.) Munso, occur. These tree species form woodlands towards the escarpment of the Gambaga Scarp.

Ecology. *M. ochreicosta* occurs at low elevations (below 500m) with an average annual rainfall of at least 1150mm. It is noteworthy that all localities that are mentioned above for Burkina Faso, Ghana and Nigeria occur close to rivers with riparian forests. Hence, it is likely that *M. ochreicosta* is a rain forest and/or riparian forest species that prefers various forest types, *e.g."Drier peripheral semi-evergreen Guineo-Congolian rain forest and similar forest in the transition zone"sensu* White (1983). *M. ochreicosta* probably extends from forests into the wooded savanna and/or "*Derived Savanna" sensu* Keay (1959b).

Acknowledgements

I am very grateful to Professor Dr Johann-Wolfgang Wägele, Dr Dieter Stüning and Karin Ulmen (ZFMK, Bonn) for their kind advice and technical assistance. Dr Hossein Rajaei (Bonn) kindly photographed the genitalia in the ventral view at ZFMK. I thank Dr Tim Davenport (Wildlife Conservation Society, Tanzania Program Director) who contributed important and unpublished information about the locality of Naitolia (Tanzania) and Heike Langenheim (Apelern, Germany) for correcting my language. Sebastian Fechner and Stefan Kornath (Hamburg) kindly produced the plates.

I would like to thank Martin Honey (BMNH, London), Dr Wolfgang Speidel and Thomas Josef Witt (MWM, Munich), Dr Esther Kioko (NMK, Nairobi), Dr Johannes Bergsten (NRM, Stockholm), Dr Jurate de Prins and Dr Ugo Dall'Asta (RMCA, Tervuren), Ole Karsholt (ZMUC, Copenhagen), Dr Wolfram Mey (ZMHB, Berlin) and Dr Axel Hausmann (ZSM, Munich) for allowing me to study their museums' collections of the Metarbelidae species (*Mountelgonia* **g. nov.** and *Moyencharia* **g. nov.**) in the frame of my PhD project at the University of Bonn.

References

Agorsah, E.K. (1988). The settlement history of the Northern Volta Basin in Ghana. *National Geographic Research*, 4(3), 371–385.

Aubréville, A. (1950). *Flore forestière Soudano-Guinéenne: Afrique Occidentale Française, Cameroun, Afrique Équatoriale Française.* Société d'Éditions Géographiques Maritimes Coloniales. Paris, 523 pp.

Beentje, H.J. (1990). The forests of Kenya. *Mitteilungen des Instituts für Allgemeine Botanik Hamburg.* Band 23a, pp. 265–286.

BirdLife International (2012). *Important Bird Areas. Factsheet Chad.* Available from http://www.birdlife.org

Blair Rains, A., Lawton, R.M., Mansfield, J.E. & Rose Innes, R. (1977). *Land resources of central Nigeria. Environmental aspects of the Kaduna Plains. Volume 2: Climate and vegetation.* Ministry of Overseas Development, Land Resources Devision, Surbiton, Surrey, England. Land Resource Report, 19, pp. i–ix + 1–77.

Blom, A. & Schipper, J. (2004). Northeastern Congolian Lowland Forests. *In*: Burgess, N., D'Amico Hales, J., Underwood, E., Dinerstein, E., Olson, D., Itoua, I., Schipper, J., Rickketts, T., and Newman, K. (Eds.), *Terrestrial ecoregions of Africa and Madagascar : a conservation assessment.* World Wildlife Fund (United States), Island Press, Washington, pp. 244–246.

Bocquier, G. & Barbery, J. (1968). *Notice Explicative – Carte Pédologique de Reconnaissance AU 1/200.000, Feuille Singako.* ORSTOM, Centre de Fort-Lamy. Paris, 113 pp.

Brash, H.T. (1962). Geomorphology. *In:* Wills, B.J. (Ed.), *Agriculture and Land Use in Ghana*. Published for the Ghana Ministry of Food and Agriculture by the Oxford University Press, London, pp. 77–87.

Burgess, N., D'Amico Hales, J., Underwood, E., Dinerstein, E., Olson, D., Itoua, I., Schipper, J., Rickketts, T. and Newman, K. (Eds.) (2004). *Terrestrial ecoregions of Africa and Madagascar : a conservation assessment.* World Wildlife Fund (United States), Island Press, Washington, xxiii + 499 pp.

Chidumayo, E.N. (1997). *Miombo ecology and management: an introduction.* IT Publications & Stockholm Environment Institute. Hants, U.K., 166 pp.

Colyn, M., Gautier-Hion, A. & Verheyen, W. (1991). A re-appraisal of palaeoenvironmental history in Central Africa: evidence for a major fluvial refuge in the Zaire Basin. *Journal of Biogeography,* 18, 403–407.

Dalla Torre, K.W. von & Strand, E. (1923). Lepidarbelidae. *In:* Strand, E. (Ed.), *Lepidopterorum Catalogus*, Volume 4: Pars 28, pp. 3–10. W. Junk, Berlin.

De Prins, J. & De Prins, W. (2012). Afromoths, online database of Afrotropical moth species (Lepidoptera). Belgian Biodiversity Platform. Available from http://www.afromoths.net

Edwards, D.C. & Bogdan, A.V. (1951). *Important grassland plants of Kenya.* Sir Isaac Pitman & Sons Limited, Nairobi, 124 pp.

Edwards, E.D., Gentili, P., Horak, M., Kristensen, N.P. & Nielsen, E.S. (1998). The Cossoid/Sesioid Assemblage. *In*: Kristensen, N.P. (Ed.), *Lepidoptera, Moths and Butterflies*. Volume 1: *Evolution, Systematics and Biogeography*. *Handbook of Zoology*, volume IV, part 35. Walter de Gruyter, Berlin, New York, pp. 181–197.

FAO & UNEP (1984). *Forest resources of tropical Africa. Part II: Country briefs. Sudan – Technical report*, No. 2, 1–29. Report prepared by FAO and UNEP in 1981, Rome, Italy. Reprinted 1984.

Fischer, E., Killmann, D., Delepierre, G. & Lebel, J.P. (2010). The orchids of Rwanda. *Koblenz Geographical Colloquia, Series Biogeographical Monographs,* 2, 438 pp.

Fletcher, D.S. & Nye, I.W.B. (1995). Volume 4: Bombycoidea, Castnioidea, Cossoidea, Mimallonoidea, Sesioidea, Sphingoidea. *In:* Nye, I.W.B. (Ed.), *The generic names of moths of the world.* The Natural History Museum, London, 192 pp.

Fletcher, T.B. (1922). Notes and Oberservations. *The Entomologist*, LV (713), p. 231.

Gaede, M. (1929). 21. Family: Metarbelidae. *In*: Seitz, A. (Ed.), *The Macrolepidoptera of the World.* Volume 14: The African Bombyces and Sphinges. Alfred Kernen, Stuttgart, pp. 501–513 + pl. 78.

Goldfarb, R.J., Groves, D.I. & Gardoll, S. (2001). Orogenic gold and geologic time: a global synthesis. *Ore Geology Reviews,* 18, 1–75.

Guisse, A., Saradoum, G., Diallo, A. and Ngom Faye, M. (2012). Characterization of the Herbaceous Vegetation of the National Park of Manda in Chad. *International Journal of Science and Advanced Technology,* 2(6), 1–10.

Hamilton, A.C. (1984). *Deforestation in Uganda*. Oxford University Press with The East African Wildlife Society, Nairobi, pp. 1–95.

Hamilton, A., Taylor, D. & Howard, P. (2001). Hotspots in African forests as Quaternary Refugia. *In:* Weber, W., White, L.J.T., Vedder, A. & Naughton-Treves, L. (Eds.), *African rain forest ecology and conservation : an interdisciplinary perspective.* Yale University Press, New Haven and London, pp. 57–67.

Hampson, G.F. (1909). Ruwenzori expedition reports. 11. Lepidoptera Heterocera. Arbelidae. *Transactions of the Zoological Society of London.* Volume xix, p. 133.

Hampson, G.F. (1910). Descriptions of new African moths. Arbelidae. *Annals and Magazine of Natural History*, 8(6), 117–128.

Hampson, G.F. (1914). Two new species of wood-boring moths from West Africa. *Bulletin of Entomological Research*, 5, 245 + pl. 17.

Harrison, M.N. & Jackson, J.K. (1958). Ecological classification of the Vegetation of the Sudan. *Forests Bulletin,* No. 2, 1–45. Agricultural Publications Committee, Khartoum, Sudan.

Hitimana, J., Kiyiapi, J.L. & Njunge, J.T. (2004). Forest structure characteristics in disturbed and undisturbed sites of Mt. Elgon Moist Lower Montane Forest, western Kenya. *Forest Ecology and Management*, 194(1–3), 269–291.

Holland, W.J. (1893). Descriptions of new species and genera of West African Lepidoptera. *Psyche, Cambridge*, 6, 393–400.

Holloway, J.D. (1986). The moths of Borneo. Part 1: Key to families: Cossidae, Metarbelidae, Ratardidae, Dudgeoneidae, Epipyropidae and Limacodidae. *Malayan Nature Journal*, 40, 1–165, + 9 pls.

International Commission on Zoological Nomenclature (ICZN) (1999). *International Code of Zoological Nomenclature.* Fourth Edition. The International Trust for Zoological Nomenclature. The Natural History Museum, London, 306 pp.

Janse, A.J.T. (1925). A revision of the South African Metarbelinae. *South African Journal of Natural History*, 5, 61–100 + 5 pls.

Jeník, J. & Hall, J.B. (1966). The ecological effects of the Harmattan wind in the Djebobo Massif (Togo Mountains, Ghana). *Journal of Ecology*, 54, 767–779.

Jordan, K. (1907). New African Zygaenidae. *The Entomologist*, 40(529), 121–127.

Keay, R.W.J. (1959a). *An outline of Nigerian Vegetation.* Third edition, Government Printer, Lagos, pp. 1–46.

Keay, R.W.J. (1959b). Derived savanna – derived from what? *Bulletin de l'Institut Fondamental d' Afrique Noire Serie A*, 21(2), 427–438.

Kelman, I. (2004). Victoria Basin Forest-Savanna Mosaic. *In*: Burgess, N., D'Amico Hales, J., Underwood, E., Dinerstein, E., Olson, D., Itoua, I., Schipper, J., Rickketts, T. and Newman, K. (Eds.), *Terrestrial ecoregions of Africa and Madagascar : a conservation assessment.* World Wildlife Fund (United States), Island Press, Washington, pp. 291–293.

Kerfoot, O. (1964). The vegetation of the South-West Mau Forest. *East African Agricultural and Forestry Journal*, April 1964, 295–318.

Kinyanjui, M.J. (2011). NDVI-based vegetation monitoring in Mau forest complex, Kenya. *African Journal of Ecology*, 49(2), 165–174.

Klots, A.B. (1970). Lepidoptera. *In*: Tuxen, S.L. (Ed.), *Taxonomist's Glossary of Genitalia in Insects*. Munksgaard, Copenhagen, pp. 115–130.

Lawton, R.M. (1963). Palaeoecological and ecological studies in the Northern Province of Northern Rhodesia. *Kirkia*, 3, 46–77.

Lawton, R.M. (1978). A study of the dynamic ecology of Zambian vegetation. *Journal of Ecology*, 66, 175-198.

Le Cerf, F. (1914). Diagnoses sommaires de Lépidoptères nouveaux de l'Afrique orientale anglaise. *Bulletin de la Société entomologique de France*, 8, 399–401.

Lehmann, I. (1997). *Metarbela haberlandorum* spec. nov., a new moth from Kenya (Lepidoptera: Metarbelidae). *Nachrichten Entomologischer Verein Apollo,* 18(1), 45–53.

Lehmann, I. (2007). Metarbelidae. *In*: Mey, W. (Ed.), The Lepidoptera of the Brandberg Massif in Namibia. Part 2. *Esperiana Memoir,* 4, 169–185 + pl.17.

Lehmann, I. (2008a). Ten new species of Metarbelidae (Lepidoptera: Cossoidea) from the coastal forests and the Eastern Arc Mountains of Kenya and Tanzania, including one species from two upland forests. *Journal of East African Natural History,* 97(1), 43–82.

Lehmann, I. (2008b). Six new species of Metarbelidae (Lepidoptera: Cossoidea) from the Eastern Arc Mountains of Tanzania, including one new species from Marenji Forest in southeast coastal Kenya. *Journal of East African Natural History,* 97(2), 187–206.

Lehmann, I. (2010a). A new genus of Metarbelidae (Lepidoptera: Cossoidea) from the Afrotropical Region with the description of seven new species. *Esperiana Memoir,* 5, 294–321 + pl. 21.

Lehmann, I. (2010b). *A revision of the genus* Arbelodes *Karsch (Lepidoptera: Cossoidea: Metarbelidae) from southeast-central and southern Africa with the description of thirteen new species.* Published by the author, Hamburg & Wismar, 82 pp., 8 b/w pls., 5 colour pls.

Lehmann, I. (2011). *The description of a new genus and twenty-three new species of Metarbelidae (Lepidoptera: Cossoidea) from the lowland tropical rain forests of the Guineo-Congolian Region with notes on habitats and biogeography.* Published by the author, Hamburg, 67 pp., 10 b/w pls., 6 colour pls., 1 coloured map.

Lehmann, I. (2012). Description of a new genus and species of Metarbelidae (Lepidoptera, Cossoidea) from the Albertine Rift region of Tanzania, East Africa. *Norwegian Journal of Entomology,* 59, 234–240.

Lehmann, I. & Kioko, E. (2000). Preliminary survey on butterflies and moths and their habitats in two Kaya forests of the Kenya coast. *Metamorphosis – Journal of the Lepidopterists' Society of Africa.* Occasional supplement 4, 1–52.

Lehmann, I. & Kioko, E. (2005). Lepidoptera diversity, floristic composition and structure of three Kaya forests on the south coast of Kenya. *Journal of East African Natural History*, 94, 121–163.

Livelihood Profiles (2006) (in draft). *Southern Sudan Livelihood Profiles.* Written in collaboration with Save the Children UK and USAID Famine Early Warning Systems Network. Southern Sudan Centre for Census, Statistics and Evaluation (SSCCSE). Juba, South Sudan.

Lundberg, J. & McFarlane, D.A. (2006). Speleogenesis of the Mount Elgon elephant caves, Kenya. *Geological Society of America. Special Paper* 404, 51–63.

Magin, C. (2004a). East Sudanian Savanna. *In*: Burgess, N., D'Amico Hales, J., Underwood, E., Dinerstein, E., Olson, D., Itoua, I., Schipper, J., Rickketts, T. and Newman, K. (Eds.), *Terrestrial ecoregions of Africa and Madagascar : a conservation assessment.* World Wildlife Fund (United States), Island Press, Washington, pp. 285–286.

Magin, C. (2004b). West Sudanian Savanna. *In*: Burgess, N., D'Amico Hales, J., Underwood, E., Dinerstein, E., Olson, D., Itoua, I., Schipper, J., Rickketts, T. and Newman, K. (Eds.), *Terrestrial ecoregions of Africa and Madagascar : a conservation assessment.* World Wildlife Fund (United States), Island Press, Washington, pp. 282–284.

Masharabu, T. (2011). *Climate change risks to ecosystems and biodiversity in Ruvubu National Park, Burundi*. UDSM/ IRA, Dar es Salaam, 10 pp. Unpublished presentation.

Michuki, J., Kiyiapi, J., Nkako, F., Noor, H., Mwinzi, M., Kipngetich, J., Kiroken, A. & Lambrechts, C. (2008). *Mau Complex and Marmanet forests. Environmental and economic contributions. Current state and trends.* Naishi, Lake Nakuru, pp. 1–33. Unpublished briefing notes.

Ministry of Environment and Water (1999). *Country study on Burkina Faso biodiversity*. Conducted by the National Technical Committee of the Convention on the Biological Diversity under the aegis of the Ministry in charge of Environment and Water. Published by the Permanent Secretariat of the National Council for the Management of the Environment. Ouagadougou, Burkina Faso, 156 pp.

Mutanen, M., Wahlberg, N. & Kaila, L. (2010). Comprehensive gene and taxon coverage elucidates radiation patterns in moths and butterflies. *Proceedings of the Royal Society B,* 277, 2839–2848.

New, C. (1873). *Life, Wanderings, and Labours in Eastern Africa. With an account of the first successful ascent of the equatorial snow mountain, Kilima Njaro and remarks upon East African Slavery.* Frank Cass and Company Limited, London, 528 pp. + 1 map.

Nkako, F.M., Lambrechts, C., Gachanja, M. & Woodley, B. (2005). *Maasai Mau Forest Status Report 2005*. Ewaso Ngiro South Development Authority, Narok, Kenya, pp. 1–32.

Poorter, L., Bongers, F., Kouamé, F.N'. & Hawthorne, W.D. (2004) (Eds.), *Biodiversity of West African forests : an ecological atlas of woody plant species.* CABI Publishing, Cambridge, MA, 521 pp.

Regier, J.C., Zwick, A., Cummings, M.P., Kawahara, A.Y., Cho, S., Weller, S., Roe, A., Baixeras, J., Brown, J.W., Parr, C., Davis, D.R., Epstein, M., Hallwachs, W., Hausmann, A., Janzen, D.H., Kitching, I.J., Solis, M.A., Yen, S.-H., Bazinet, A.L. & Mitter, C. (2009). Toward reconstructing the evolution of advanced moths and butterflies (Lepidoptera: Ditrysia) : an initial molecular study. *BMC Evolutionary Biology*, 9 (1), 280.

Richards, P.W. (1959). *The types of vegetation of the Humid Tropics in relation to the soil.* Joint Unesco/CCTA Symposium on Vegetation in relation to the soil in the plains and lower mountain regions of the equatorial and sub-equatorial zones and in the adjoining tropical areas. Adiopodoumé-Abidjan, Ivory Coast, 20–24 October 1959, pp.1–11. Unpublished presentation.

Richards, P.W. (1998). *The tropical rain forest : an ecological study*. Cambridge University Press, Cambridge, reprint, pp. ix–xxiii + 1–575.

Ridgway, R. (1912). *Color Standards and Color Nomenclature*. Published by the author, Washington, 43 pp. + 53 pls.

Sayer, A.J., Harcourt, C.S. & Collins, N.M. (1992). *The Conservation atlas of tropical forests. Africa.* IUCN. Macmillan Publishers, 288 pp.

Scoble, M.J. (1995). *The Lepidoptera: form, function and diversity.* The Natural History Museum in association with Oxford University Press, London, 404 pp.

Sibatani, A., Ogata, M., Okada, Y. & Okagaki, H. (1954). Male genitalia of Lepidoptera: Morphology and Nomenclature. I. Divisions of the valvae in Rhopalocera, Phalaenidae (= Noctuidae) and Geometridae. *Annals Entomological Society of America*, 47, 93–106.

Smith, P.P. & Trapnell, C.G. (2002). Chipya in Zambia : a review. *Kirkia*, 18(1), 16–34.

SRK Consulting (2011). *Mongbwalu Project. Final draft environmental impact study and management plan of the project for public disclosure. Volume 1: EIS and EMPP report.* Report No. 438643. Johannesburg (SRK Consulting South Africa) and Lubumbashi (SRK Consulting CONGO), i–xxxv + 1–439 pp.

Strand, E. (1909). Lepidoptera aus Deutsch-Ostafrika gesammelt von Herrn Oberleutnant Wintgens. Familie Metarbelidae (Hollandiidae). *Deutsche Entomologische Zeitschrift „Iris"*, 22, 118–121.

Van Dyck, H. (2011). Habitat-use in butterflies: how to move from structural to functional ecology. *Abstracts of the XVIIth European Congress of Lepidopterology, Luxembourg 9–13 May, 2011*, 9.

van Nieukerken, E.J., Kaila, L., Kitching, I.J., Kristensen, N.P., Lees, D.C., Minet, J., Mitter, C., Mutanen, M., Regier, J.C., Simonsen, T.J., Wahlberg, N., Yen, S.-H., Zahiri, R., Adamski, D., Baixeras, J., Bartsch, D., Bengtsson, B.Å., Brown, J.W., Bucheli, S.R., Davis, D.R., De Prins, J., De Prins, W., Epstein, M.E., Gentili-Poole, P., Gielis, C., Hättenschwiler, P., Hausmann, A., Holloway, J.D., Kallies, A., Karsholt, O., Kawahara, A.Y., Koster, S., Kozlov, M.V., Lafontaine, J.D., Lamas, G., Landry, J.-F., Lee, S., Nuss, M., Park, K.-T., Penz, C., Rota, J., Schmidt, B.C., Schintlmeister, A., Sohn, J.-C., Solis, M.A., Tarmann, G.M., Warren, A.D., Weller, S., Yakovlev, R.V., Zolotuhin, V.V. & Zwick, A. (2011). Order Lepidoptera Linnaeus, 1758. *In*: Zhang, Z.Q. (Ed.), Animal biodiversity : An outline of higher-level classification and survey of taxonomic richness. *Zootaxa,* 3148, 212-221.

Verhegghen, A., Mayaux, P., de Wasseige, C. & Defourny, P. (2012). Mapping Congo Basin vegetation types from 300m and 1km multi-sensor time series for carbon stocks and forest areas estimation. *Biogeosciences*, 9, 5061–5079.

Walker, F. (1854). Euchromia diptera. *In: List of the specimens of Lepidopterous insects in the collection of the British Museum. Part I. – Lepidoptera Heterocera.* Printed by Order of the Trustees of the British Museum (Natural History), London, p. 264.

Walker, F. (1855). Genus 45. Teragra. *In: List of the specimens of Lepidopterous insects in the collection of the British Museum. Part V. – Lepidoptera Heterocera.* Printed by Order of the Trustees of the British Museum (Natural History), London, pp. 1064–1065.

White, F. (1979). The Guineo-Congolian Region and its relationships to other phytochoria. *Bulletin du Jardin Botanique National de Belgique*, 49, 11–45.

White, F. (1983). *The Vegetation of Africa : a Descriptive Memoir to Accompany the Unesco/AETFAT/UNSO Vegetation Map of Africa.* Natural Resources Research XX. Unesco, Paris, 356 pp.

White, L.J.T. (2001). The African rain forest. Climate and vegetation. *In:* Weber, W., White, L.J.T., Vedder, A. & Naughton-Treves, L. (Eds.), *African rain forest ecology and conservation : an interdisciplinary perspective.* Yale University Press, New Haven and London, pp. 3–29.

Wieringa, J.J. & Poorter, L. (2004). Biodiversity hotspots in West Africa; patterns and causes. *In:* Poorter, L., Bongers, F., Kouamé, F.N'. & Hawthorne, W.D. (Eds.), *Biodiversity of West African forests : an ecological atlas of woody plant species.* CABI Publishing, Cambridge, MA, United States of America, pp. 61–72.

16A

17A

18A

19A

20A

21A

Figure 16A. *Moyencharia mineti* **sp. nov.,** male, holotype, Chad, Moyen-Chari Region, Canton de Gondey.

Figure 17A. *Moyencharia mineti* **sp. nov.,** female, paratype, Chad, Moyen-Chari Region, Canton de Gondey.

Figure 18A. *Moyencharia joeli* **sp. nov.,** male, holotype, Nigeria, Kaduna State, Kaduna town.

Figure 19A. *Moyencharia winteri* **sp. nov.,** female, holotype, Republic of South Sudan, Western Equatoria State, Tambura.

Figure 20A. *Moyencharia winteri* **sp. nov.,** female, paratype, Democratic Republic of the Congo, Orientale Province, Moto.

Figure 21A . *Moyencharia herhausi* **sp. nov.,** male, holotype, Burkina Faso, Hauts-Bassins Region, Bobo Dioulasso.

22A

23A

24A

25A

26A

27A

Figure 22A. *Moyencharia sommerlattei* **sp. nov.,** male, holotype, Republic of Guinea, locality unknown.

Figure 23A. *Moyencharia ochreicosta* **(Gaede, 1929),** male, holotype, Ghana, Volta Region, Kete-Krachi (formerly Kete-Kratje).

Figure 24A. *Moyencharia ochreicosta* **(Gaede, 1929),** female, Burkina Faso, Hauts-Bassins Region, Kourignon (near Nbié).

Figure 25A. *Moyencharia ochreicosta* **(Gaede, 1929),** male, Burkina Faso, Hauts-Bassins Region, Kourignon (near Nbié).

Figure 26A. *Moyencharia ochreicosta* **(Gaede, 1929),** male, Nigeria, Niger State, Zungeru.

Figure 27A . *Moyencharia ochreicosta* **(Gaede, 1929),** „f. *fuscoradiata* det. M. Gaede," male, Ghana, Northern Region, Gambaga.

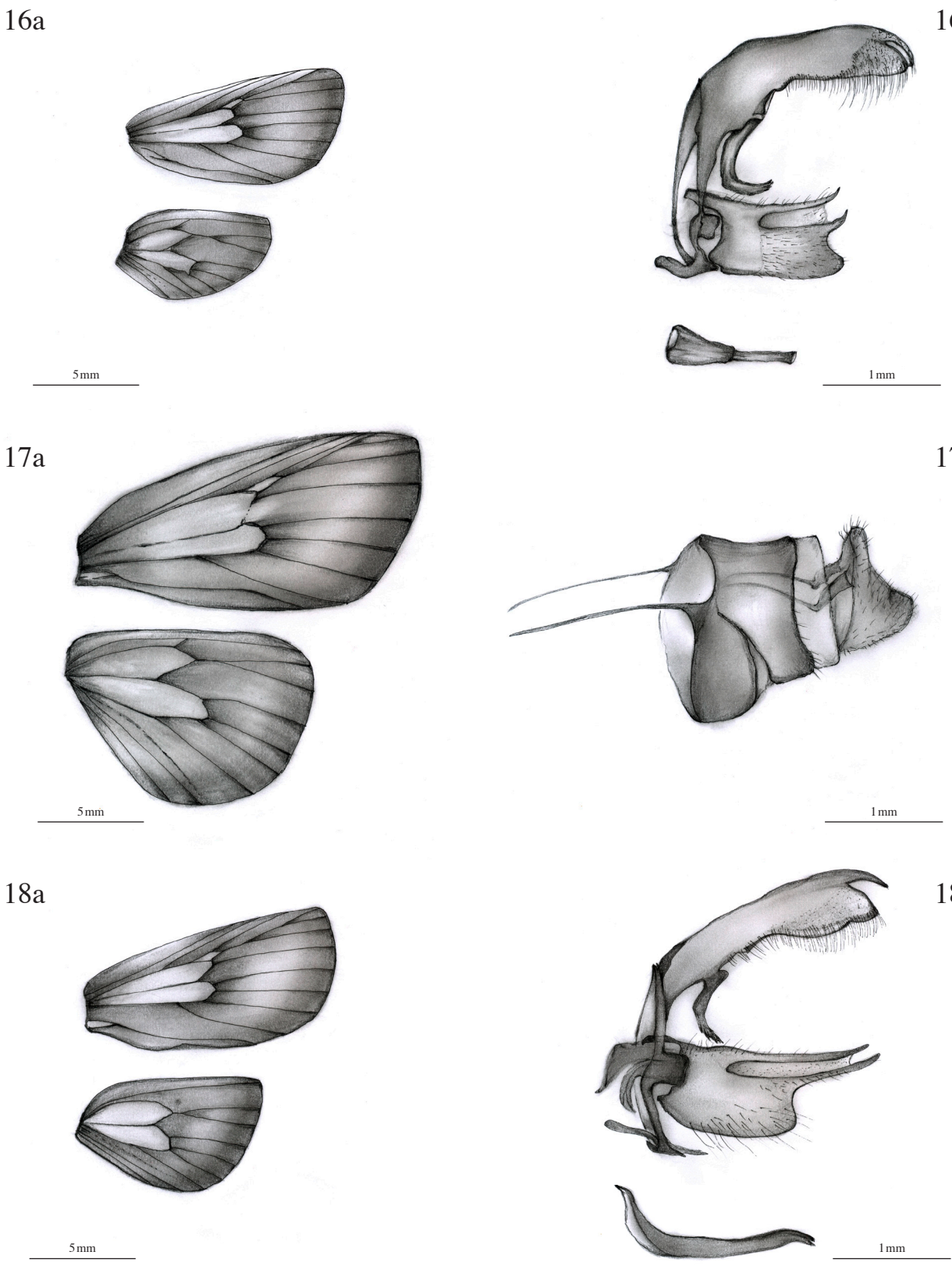
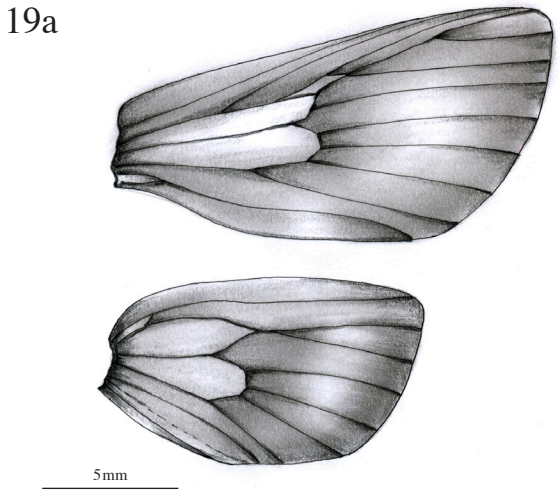
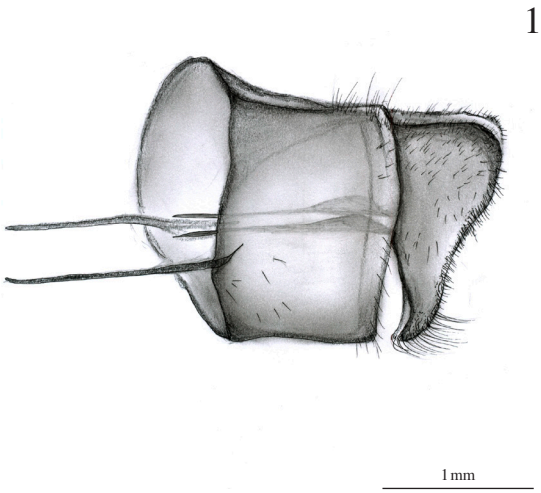
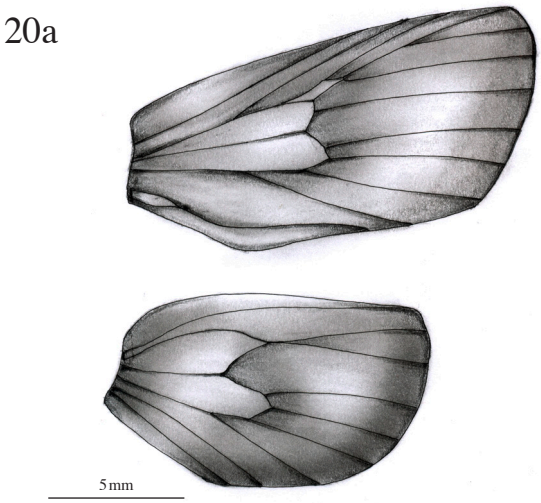


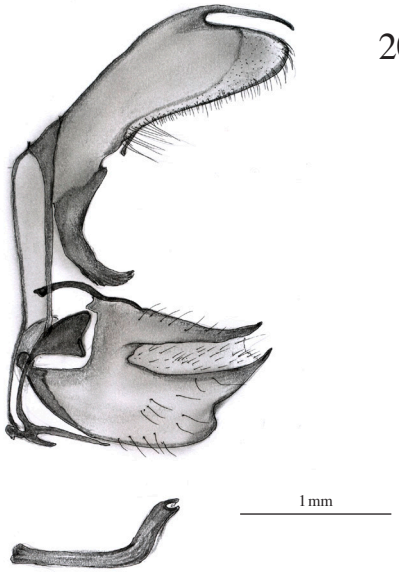
Figure 16a. Wing venation of: *Moyencharia mineti* **sp. nov.,** male, holotype. 17a. *Moyencharia mineti* **sp. nov.,** female, paratype. 18a. *Moyencharia joeli* **sp. nov.,** male, holotype.

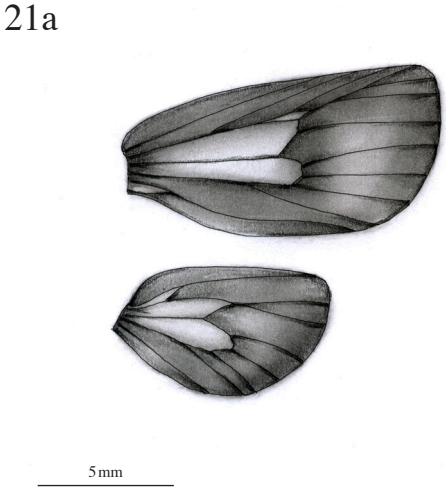
Figure 16b. Genitalia of: *Moyencharia mineti* **sp. nov.,** male, holotype. 17b. *Moyencharia mineti* **sp. nov.,** female, paratype. 18b. *Moyencharia joeli* **sp. nov.,** male, holotype.











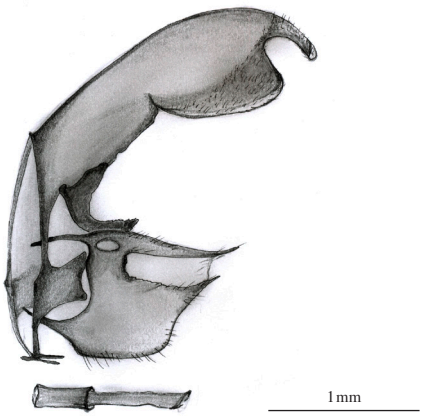
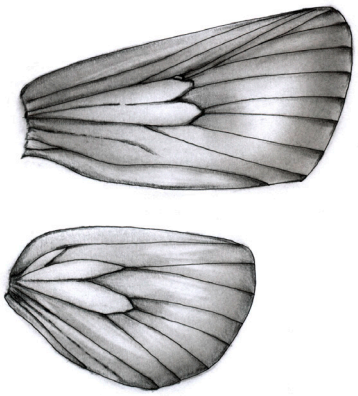


Figure 19a. Wing venation of: *Moyencharia winteri* **sp. nov.,** female, holotype. 20a. *Moyencharia herhausi* **sp. nov.,** male, holotype. 21a. *Moyencharia sommerlattei* **sp. nov.,** male, holotype.

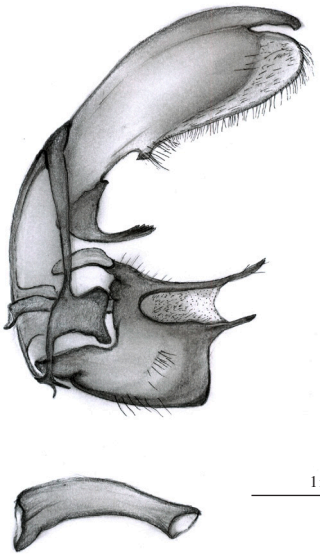
Figure 19b. Genitalia of: *Moyencharia winteri* **sp. nov.,** female, holotype. 20b. *Moyencharia herhausi* **sp. nov.,** male, holotype. 21b. *Moyencharia sommerlattei* **sp. nov.,** male, holotype.

22a



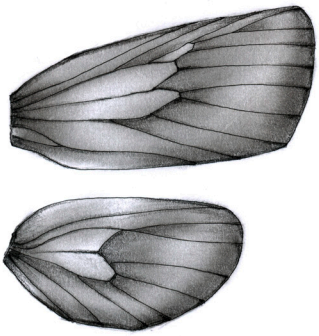
5mm

22b



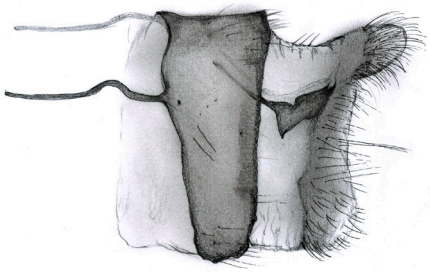
1mm

23a



5mm

23b

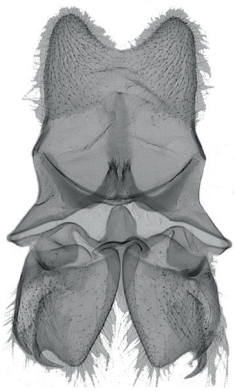


1mm

Figure 22a. Wing venation of: *Moyencharia ochreicosta* **(Gaede, 1929)**, male. 23a. *Moyencharia ochreicosta* **(Gaede, 1929)**, female.

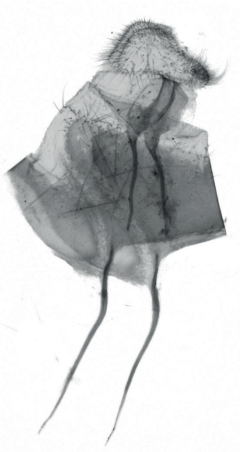
Figure 22b. Genitalia of: *Moyencharia ochreicosta* **(Gaede, 1929)**, male. 23b. *Moyencharia ochreicosta* **(Gaede, 1929)**, female.

24a



1 mm

24b

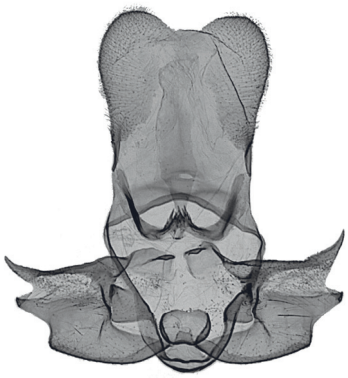


1 mm

24c

1 mm

24d

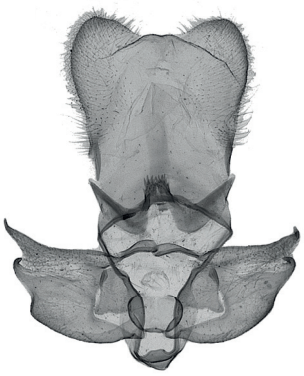


1 mm

24e

1 mm

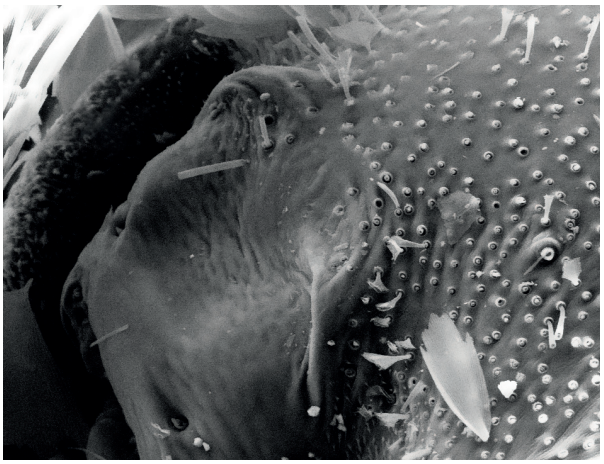
24f



1 mm

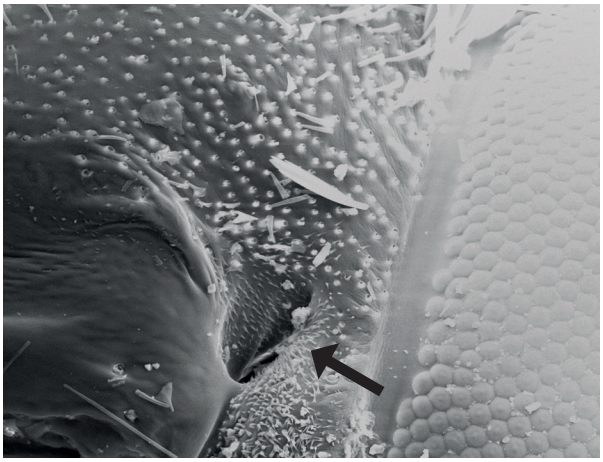
Figure 24a. Genitalia (ventral view) of: *Moyencharia mineti* **sp. nov.,** male, holotype. 24b. *Moyencharia mineti* **sp. nov.,** female, paratype. 24c. *Moyencharia joeli* **sp. nov.,** male, holotype (the uncus is broken towards the tips). 24d. *Moyencharia herhausi* **sp. nov.,** male, holotype. 24e. *Moyencharia sommerlattei* **sp. nov.,** male, holotype. 24f. *Moyencharia ochreicosta* **(Gaede, 1929),** male (genitalia identical with holotype).

25



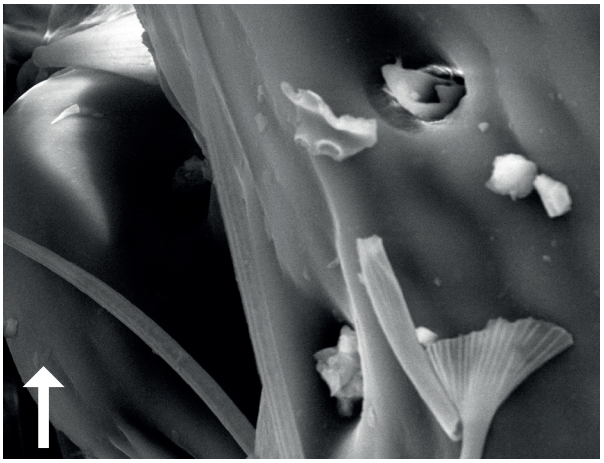
100μm

26



100μm

27



20μm

28

80μm

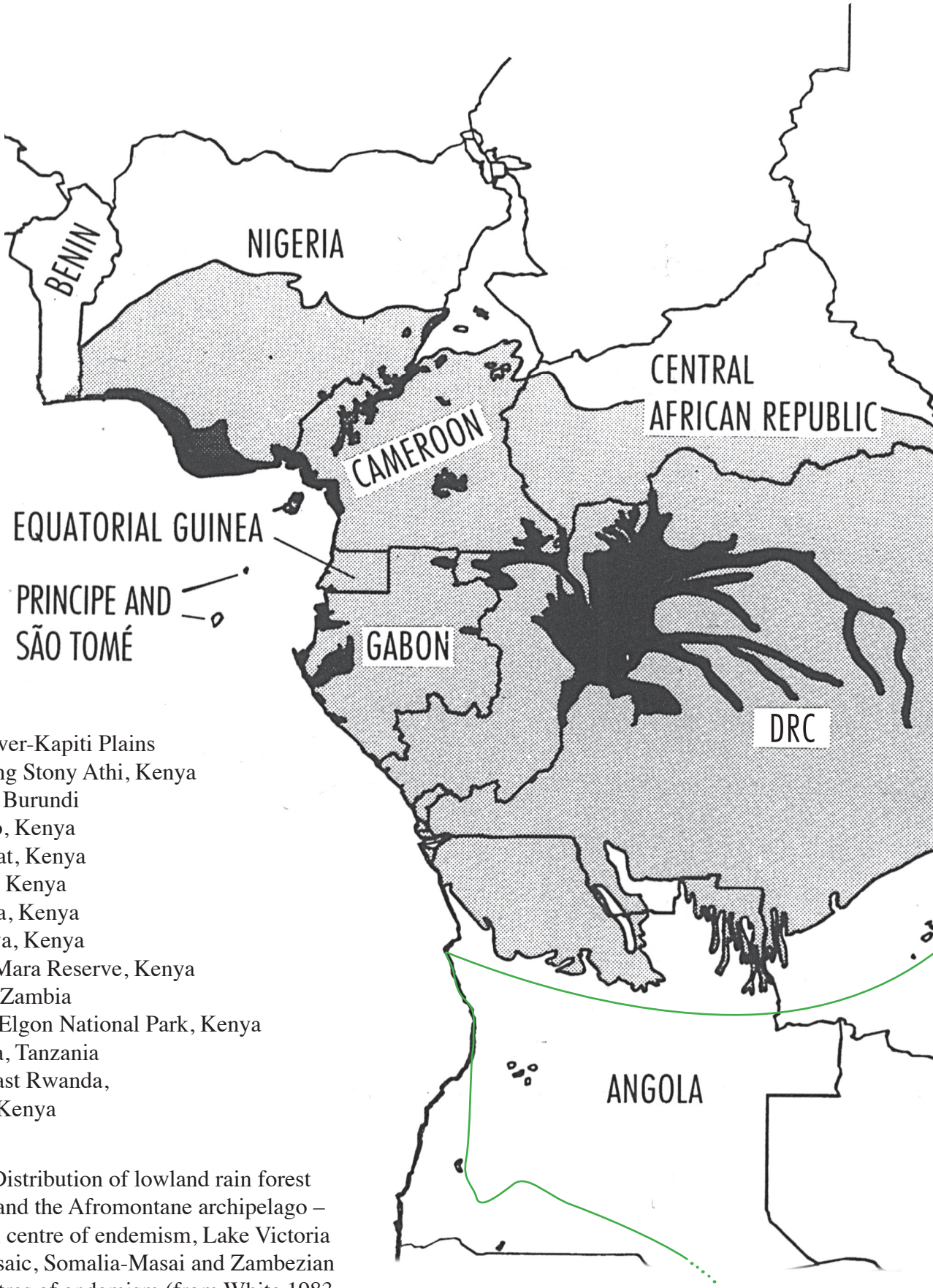
29

200μm

30

100μm

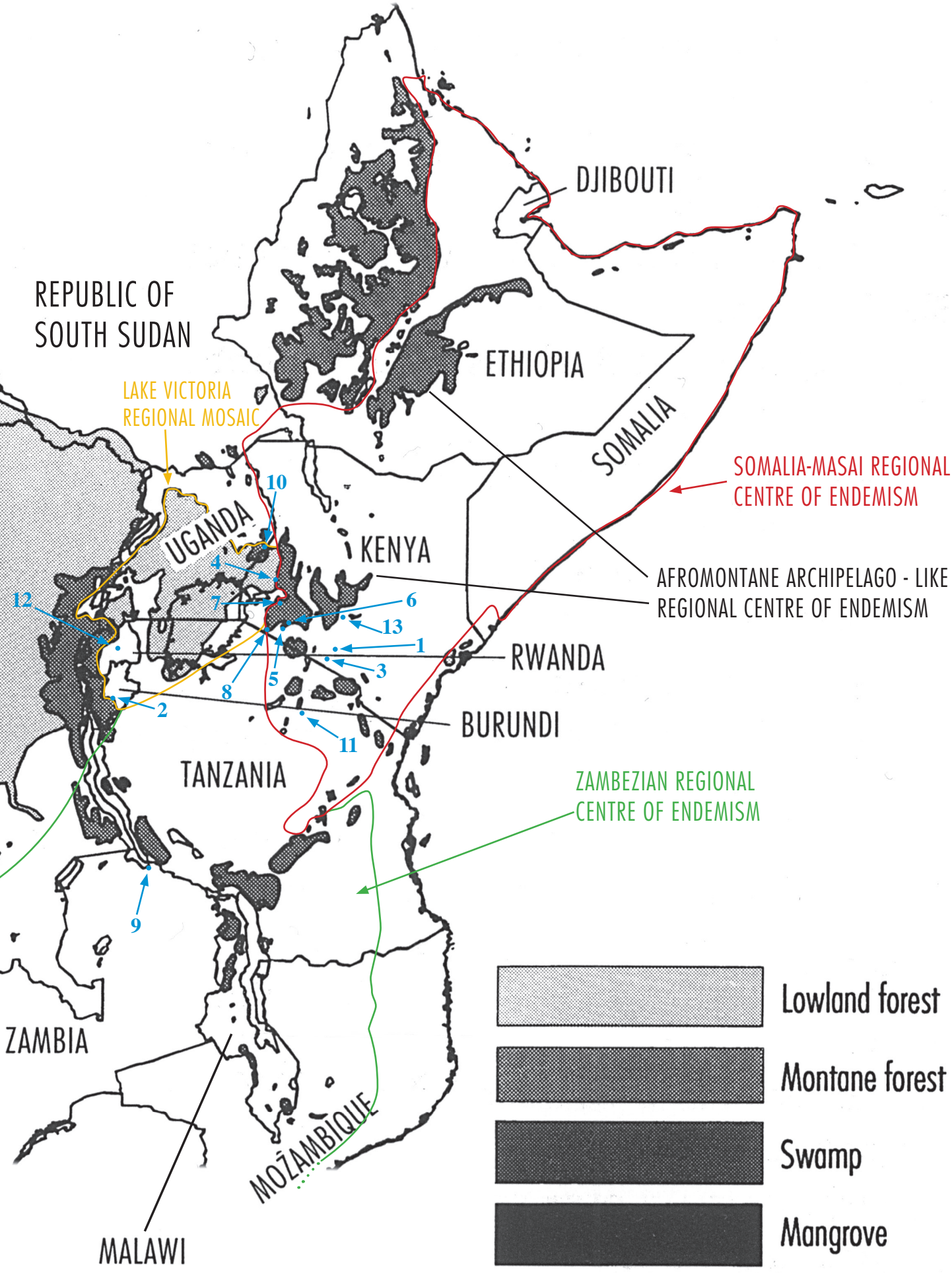
Figures 25-30. Details of *Moyencharia mineti* **sp. nov.**, female, paratype.
25. Head of ♀, the frontoclypeus has neither projections nor pits (lateral view).
26. Head of ♀, frontoclypeal structure with an oval shaped, small, rather flat pit (*cf.* arrow) behind the labial palpus (the latter is absent on the picture).
27. Head of ♀, the large lip-like structure on the lower frontoclypeus is remarkable (*cf.* arrow).
28. Head of ♀, antenna with rather bipectinate structure (lateral view).
29. Head of ♀, the densely scaled antenna shaft and branches (dorsal view).
30. Head of ♀, antenna branches (lateral view).

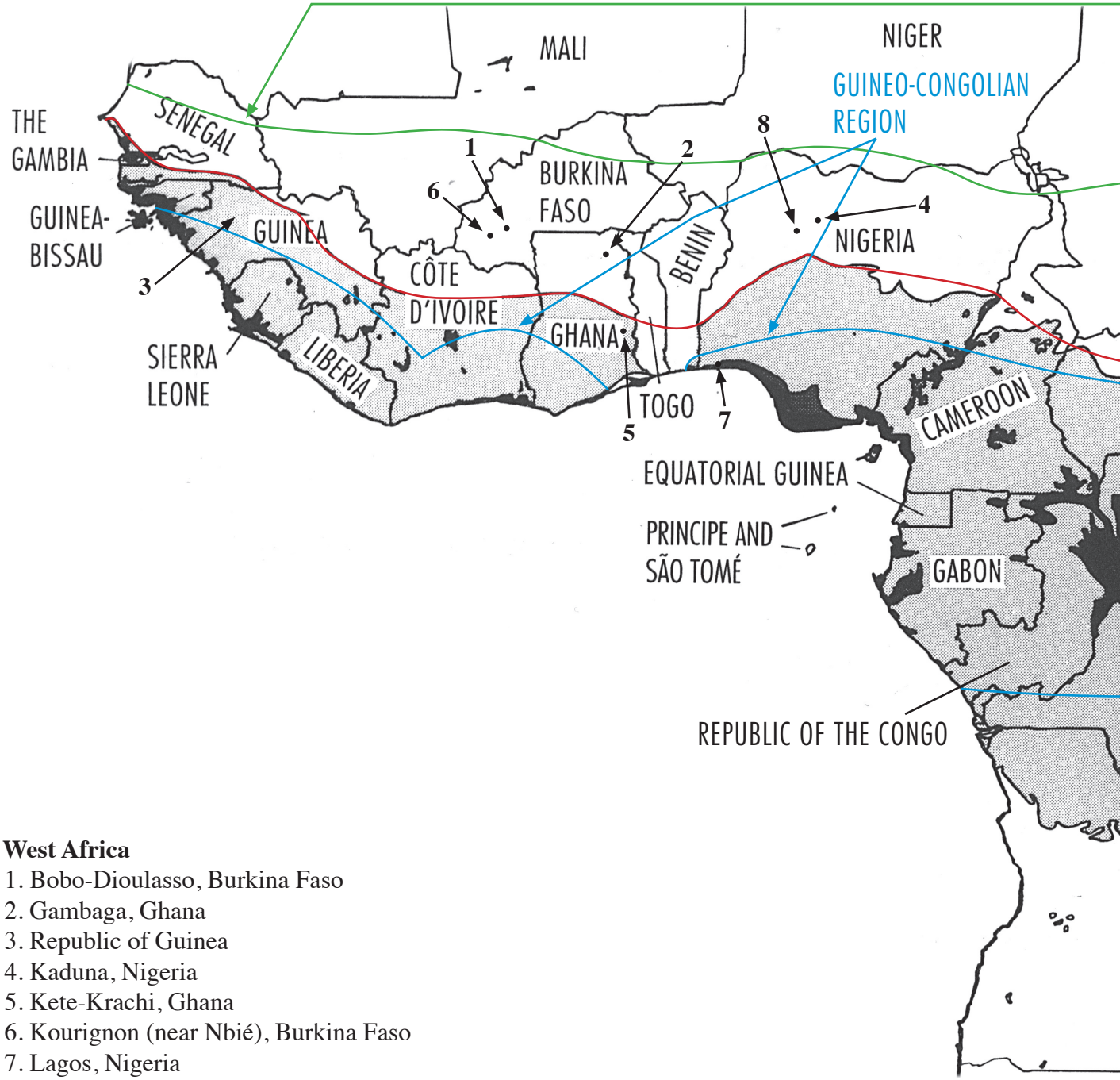


East Africa

1. Athi River-Kapiti Plains including Stony Athi, Kenya
2. Gitega, Burundi
3. Kajiado, Kenya
4. Kaptagat, Kenya
5. Lemek, Kenya
6. Lumbua, Kenya
7. Lumbwa, Kenya
8. Masai Mara Reserve, Kenya
9. Mbala, Zambia
10. Mount Elgon National Park, Kenya
11. Naitolia, Tanzania
12. Northeast Rwanda,
13. Thika, Kenya

Figure 31. Distribution of lowland rain forest (light grey) and the Afromontane archipelago – like regional centre of endemism, Lake Victoria regional mosaic, Somalia-Masai and Zambezian regional centres of endemism (from White 1983 and Sayer *et al*. 1992).
The numbers indicate the collecting sites of *Mountelgonia* **g. nov..**


DJIBOUTI
REPUBLIC OF
SOUTH SUDAN
ETHIOPIA
LAKE VICTORIA
REGIONAL MOSAIC
SOMALIA
SOMALIA-MASAI REGIONAL
CENTRE OF ENDEMISM
UGANDA
KENYA
AFROMONTANE ARCHIPELAGO - LIKE
REGIONAL CENTRE OF ENDEMISM
RWANDA
BURUNDI
TANZANIA
ZAMBEZIAN REGIONAL
CENTRE OF ENDEMISM
ZAMBIA
MOZAMBIQUE
MALAWI
Lowland forest
Montane forest
Swamp
Mangrove



I. West Africa

1. Bobo-Dioulasso, Burkina Faso
2. Gambaga, Ghana
3. Republic of Guinea
4. Kaduna, Nigeria
5. Kete-Krachi, Ghana
6. Kourignon (near Nbié), Burkina Faso
7. Lagos, Nigeria
8. Zungeru, Nigeria

II. North-Central Africa

9. Makoga, Canton de Gondey, Chad
10. Moto, Democratic Republic of the Congo (DRC)
11. Tambura, Republic of South Sudan

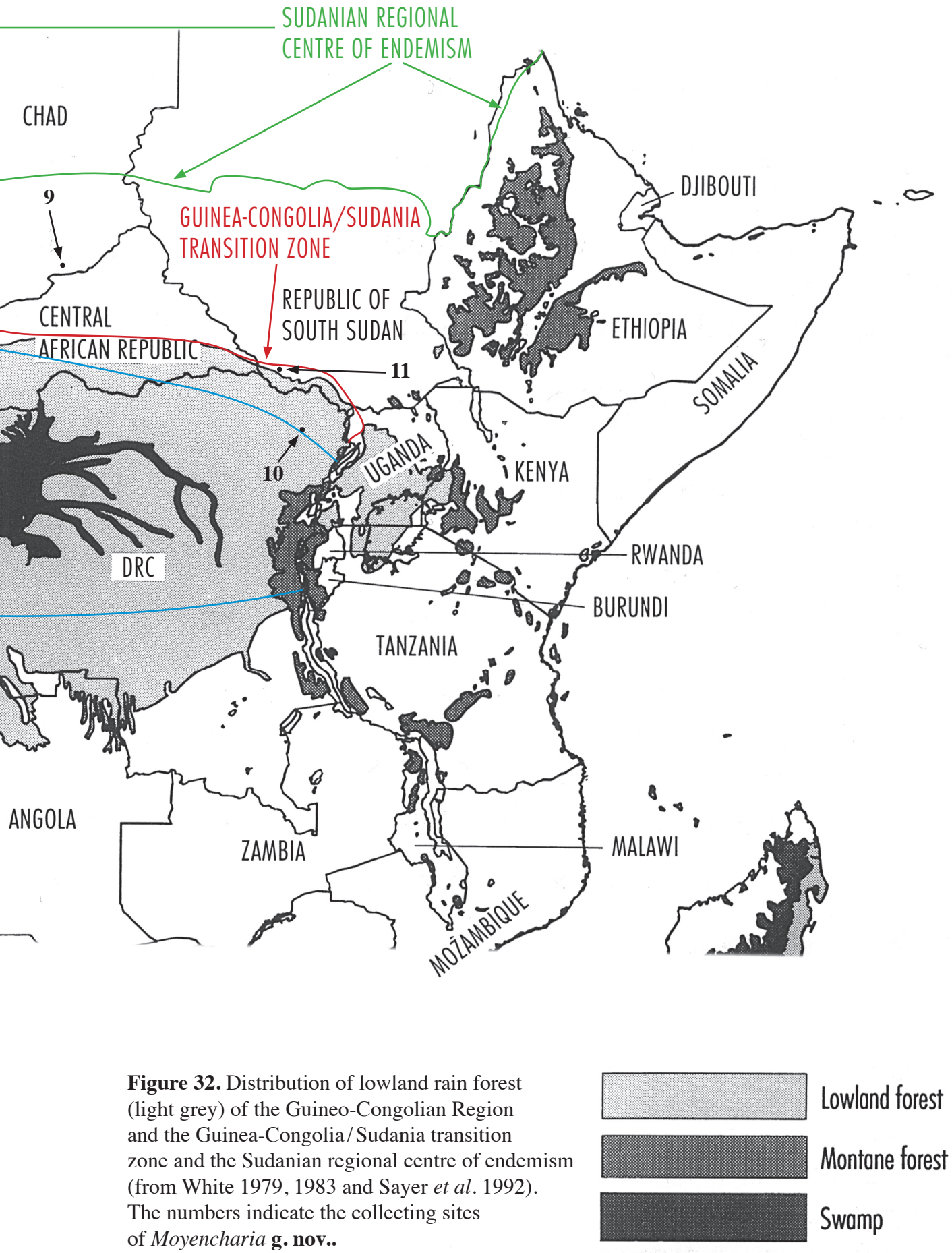


Figure 32. Distribution of lowland rain forest (light grey) of the Guineo-Congolian Region and the Guinea-Congolia/Sudania transition zone and the Sudanian regional centre of endemism (from White 1979, 1983 and Sayer *et al*. 1992). The numbers indicate the collecting sites of *Moyencharia* **g. nov.**.