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Unexpected diversity: ten new species of *Homadaula* Lower, 1899 from Africa and the Arabian Peninsula (Galacticoidea: Galacticidae)

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Abstract: The study of African material of the genus *Homadaula* obtained from collections of European lepidopterists and museum collections yielded the discovery of 10 unknown species, which are described herein as: *Homadaula aarviki* **sp. nov.**, *Homadaula agassizi* **sp. nov.,** *Homadaula arabica* **sp. nov.,** *Homadaula deprinsorum* **sp. nov.,** *Homadaula gabonensis* **sp. nov.,** *Homadaula larseni* **sp. nov.,** *Homadaula malawiensis* **sp. nov.,** *Homadaula peregovitsi* **sp. nov.,** *Homadaula saharaensis* **sp. nov.** and *Homadaula taraktica* **sp. nov.** Two species was left undescribed because only female individuals were available. The male and the female genitalia are illustrated and images of the moths are provided. New records of six previously described species are presented.

Key words: Taxonomy, faunistics, biogeography, Africa, Arabian Peninsula, new species descriptions, Acacia trees
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INTRODUCTION

Galacticidae is a small but poorly known family in the clade Apoditrysia. In molecular studies the family was recovered as the sister-group of Tortricidae (Regier et al. 2013, Heikkilä et al. 2015). The presence of the tortricoid type sternum II in adults was identified by Mey (2004) as a character that precludes assignment to Yponomeutoidea, where the group was included previously (Friese 1962). In Africa south of the Sahara, the family is represented by the genus *Homadaula* Lower, 1899 with four species (Mey 2004, 2011), and from the Arabian Peninsula with three species (Mey 2005). In recent years, new material of *Homadaula* was collected by European microlepidopterists in poorly researched areas in Central and East Africa. This material was made available to the author, who identified twelve hitherto unknown species, ten of which are described in this article. The abrupt detection of this large number of species appeared to be somewhat surprising, because the material available from most African countries has remained restricted or entirely absent over many years. The new species demonstrate an unexpected diversity of Galacticidae, with species occurring in a variety of different biomes and ecoregions in Africa.

The biology of *Homadaula* species in Africa was unknown until David Agassiz initiated a rearing program concentrating on larvae living on Acacia trees in Kenya (Agassiz & Harper 2009). Caterpillars from spinnings collected in trees of *Acacia xanthophloea* were successfully reared demonstrating Acacia trees as the hostplant of *Homadaula* for the first time. The emerging adults were prepared and preserved. The examination of the material revealed conspecifity with *Homadaula* spec., a species described from the female sex by Mey (2004) from Kenya. In the hope of getting more material including the missing males the species was not named at that time. Now, many more specimens from both sexes became available, and the species is described and named here as *H. agassizi* sp. nov. acknowledging the successful rearing project and the untiring activity of D. Agassiz in Kenya.

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METHODS AND MATERIALS

Adults examined in this study included non-type specimens from private collections and museums listed at the end of the chapter. Pinned specimens and their associated slide-mounted genitalia, and other features were examined with dissecting and compound microscopes. Dissection of the genitalia was performed largely according to the procedure described by Robinson (1976). The genitalia were embedded in Euparal. Chlorazol Black was used for staining female genitalia. The cleared abdomens of some specimens are on the corresponding pins in polyethylene vials with glycerol. Prior to embedding the cleared genitalia on microscope slides or into glycerol vials, they were drawn using a camera lucida attached to a Leica MZ12 compound microscope.

The terminology used in the descriptions of species largely follows Mey (2004, 2007). The treatment and sequence of species groups and species are arranged alphabetically.

Collections and abbreviation of depositories of type material:

Coll. Aarvik – Leif Aarvik, Oslo (Norway)
Coll. Agassiz – D. Agassiz, London (UK)
Coll. Larsen – Knud Larsen, Copenhagen/Dyssegaard (Denmark)
Coll. H. S. Staude – Hermann Staude, Magaliesburg (South Africa)
MfN – Museum für Naturkunde, Berlin, Germany
SMNK -Staatliches Museum für Naturkunde, Karlsruhe, Germany

RESULTS

TAXONOMIC REVIEW

Checklist of species of *Homadaula* from Africa and the Arabian Peninsula

The species of Galacticidae from the Western Palaearctic Region including North Africa was recently revised by Mey (2022). The genus *Galactica* Walsingham, 1911 was synonymised with *Homadaula* Lower, 1899. The species presented at the end of the checklist as *incertae sedis* were previously included in *Galactica* (see Mey 2004: 93) and therefore are transferred to *Homadaula*. The affiliation with this genus is, however, not proven and the correct placement of these *incertae sedis* species remains to be demonstrated.

A subdivision of the genus into species groups is difficult to propose. There are no clear dividing characters which would reflect different, evolutionary lines. The most aberrant species is *H. aarviki* sp. nov., which displays undivided valvae and an elongate phallus in the male genitalia. The striped forewings are another exceptional character of this species. In the female genitalia of the genus, segment VII, the henia and the bursa copulatrix with or without the bulla seminalis exhibit a variety and distribution of forms which does not allow a simple grouping of species. Since the male or female sex is unknown for a number of species, a subdivision of the genus into species groups appears to be premature for now.

Galacticidae
Homadaula Lower, 1899

Homadaula aarviki **sp. nov.** Kenya
Homadaula agassizi **sp. nov.** Ethiopia, Kenya
Homadaula albida Mey, 2004 Cameroon, Kenya, Namibia, RSA
Homadaula arabica **sp. nov.** Saudi Arabia
Homadaula calamitosa (Meyrick, 1930) Sudan, Kenya, Uganda, Tanzania, Zimbabwe
Homadaula caradjae (Walsingham, 1911) Algeria
Homadaula deprinsorum **sp. nov.** Kenya, Uganda
Homadaula gabonensis **sp. nov.** Gabon
Homadaula larseni **sp. nov.** Ghana
Homadaula malawiensis **sp. nov.** Malawi
Homadaula maritima Mey, 2005 Yemen
Homadaula montana Mey, 2005 Yemen
Homadaula peregovitsi **sp. nov.** Tanzania
Homadaula ravula Mey, 2004 Angola, Ethiopia, Kenya, Malawi, Madagascar, Namibia, RSA, Zimbabwe
Homadaula saharaensis **sp. nov.** Tunisia
Homadaula submontana Mey, 2005 Yemen, Tanzania
Homadaula taraktica **sp. nov.** Kenya, Tanzania, Zimbabwe
Homadaula watamomaritima Mey, 2005 Kenya, Zimbabwe
Homadaula wieseri Mey, 2011 Namibia, RSA
Homadaula spec. A Kenya
Homadaula spec. B Kenya

Incertae sedis:
Homadaula bootella (Turati, 1926) [*Calantica*] Libya
Homadaula inornata (Walsingham, 1900) [*Mieza*] Yemen (Socotra)
Homadaula variinotella (Chrétien, 1915) [*Psecadia*] Tunisia

New records of described *Homadaula* species

Homadaula albida Mey, 2004

Material: 1 ♂, **Namibia**, Kaokoveld, Purros Camp, 400 m, 18°44′05″S 12°56′31″E, 21.xii.2004, leg. H. S. Staude (coll. H.S. Staude); 1 ♂, Namibia, Waterberg National Park, 30.x–1.xi.2007, leg. V. Richter (MfN); 1 ♀, Namibia, Hoanib River, Khowareb, LF, 2.ii.2009, leg. W. Mey (MfN); 1 ♀, Namibia, Gamsberg, northern slope, 25.i.2007, leg. W. Mey & K. Ebert (MfN); 1 ♂, Namibia, Naukluft NP, campside, 29–31.i.2007, leg. W. Mey & K. Ebert (MfN); **RSA**, Mpumalanga, Sericea Farm, 28–30.xi.2004, LF (MfN); 3 ♂, 6 ♀, **Cameroon**, Garoua, Faro Nat. Park, 300 m, 8°23′36″N 12°49′29,3″E, 28.iv–9.v.2005, leg. Knut Larsen & Toke Zandersen (coll. K. Larsen, 1 ♂, 1 ♀, MfN); 3 ♀, **Kenya**, Central, Samburu, 3000 ft., 3–4.iv.2000, cleared abdomen in glycerol vial, leg. D. Agassiz (coll. Agassiz).

Remarks: The species was previously known only from Namibia and South Africa. The locality in Cameroon is situated in the dry Savannah zone in the north of the country offering similar ecological conditions as in southern Africa. From a biogeographical perspective, the record is interesting for its position north of the rainforest zone of West- and Central Africa, which might suggest the existence of savannah corridors across the equatorial rain forest belt in Western Africa in the past. The present distribution of tropical and subtropical rain forests in Central and West-Africa is a relatively young feature and has developed since the end of the last glaciation cycle about 18 000 years ago (Lönneberg 1929; Hamilton 1976). Before, rainforest areas existed as widely isolated patches and did not form a barrier that could prevent expansion of species from subtropical savannas and shrublands.

Homadaula calamitosa (Meyrick, 1930)
Material: 1 ♀, **Uganda**, Western, Budongo Forest, 3000 ft., 19.vii.2000, leg. D. Agassiz, genitalia in glycerol vial (coll. Agassiz); 8 ♀, **Zimbabwe**, Manicaland, Bvumba, 1360 m, 19°03′33″S 32°42′41″E, 3–5.xi.2016, leg. D. Agassiz & K. Larsen, genitalia slide Mey 48/21, (coll. Agassiz and MfN).

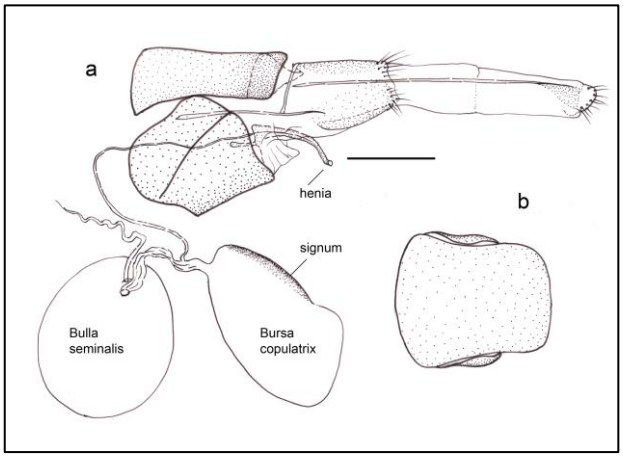

Figure 1 – *Homadaula calamitosa* Meyrick, 1930, female genitalia, a – lateral view, b -tergum VII, dorsal aspect¸ scale bar: 0.4 mm.

Female genitalia: (Fig. 1). Tergum VII densely covered by dark brown scales; henia very long, curved, emerging from sclerotised base of intersegmental pocket, bearing short process directed proximad; bulla seminalis present, bursa copulatrix with paired, linear signum on dorsal side close to origin of ductus bursae, ductus seminalis emerging from bulla seminalis.

Remarks: The males of *H. calamitosa* are still unknown. In the female genitalia, the short basal process of the intersegmental pocket is observed only in this species.

Homadaula ravula Mey, 2004

Material: 1 ♂, **Namibia**, Okahandja, 50 km north, Farm Erichsfelde, BIOTA observatory, 10–11.i.2007, leg. W. Mey, (MfN); 1 ♀, Namibia, Hoanib River, Khowareb, LF, 2.ii.2009, leg. W. Mey (MfN); 1 ♂ 2 ♀, **Zimbabwe**, Manicaland, Bvumba, 1360 m, 19°03′33″S 32°42′41″E, 3–5.xi.2016, genitalia slides Mey 43/21, leg. D. Agassiz & K. Larsen (coll. Agassiz, MfN); **Malawi**, 1 ♀, Mt. Mulanje, 1000 m, 9.xii.2002, leg. D. Agassiz, (coll. Agassiz); 1 ♂, **Kenya**, Eastern, Hunters Lodge, 930 m, 2°12′48″S 37°42′52″E, 24.xi.2010, leg. D. Agassiz & M. Ngugi; 1 ♀, same locality, 15.xi.2012, leg. D. Agassiz, Beavan & Heckford (coll. Agassiz); 1 ♂, Kenya, Rift Valley, Lake Baringo, 3000 ft., 18.x.1998; 1 ♂ 2 ♀, same locality, 23.i.1999, leg. D. Agassiz, ♂ genitalia slide DJLA 1347 (coll. Agassiz); 3 ♀, same locality, 14.xi.2005, 16.xi.2006, 4.v.2015, leg. D. Agassiz (coll. Agassiz); 1 ♂ 1 ♀, Kenya, Rift Valley, Marigat, 1000 m, 0°28′N 35°58′E, l. *Acacia tortilis*, em[erged]. 18.viii.2007, leg. D. Agassiz, genitalia in glycerol vial (coll. Agassiz); 1 ♂, **Ethiopia**, Region Oromia, road Bedele-Metu, 9 km NO Yayo, 8°22′12.42″N 35°53′41.08″E, 1425 m, 13.v.2015, leg. D. Stadie & S. Fiebig, genitalia in glycerol vial (MfN).

Biology: In the Rift Valley of Kenya, the species was bred from *Vachellia tortilis*.

Remarks: *H. ravula* is widely distributed in Africa. This is the first record of the species and of the family from Ethiopia (see Tujuba *et al.* 2019).

Homadaula submontana Mey, 2005

Material: 1 ♂, **Tanzania**, Sansibar, ex. coll. Staudinger, genitalia in glycerol (MfN)

Remarks: This species was described from South Yemen. The new record in Sansibar [= Zanzibar] shows that *Homadaula* species may have large ranges in Africa. Probably, the species also occurs in Kenya and Ethiopia. The *incertae sedis* species *Homadaula inornata* (Walsingham, 1900) was described from Socotra. It cannot be excluded that both names are synonyms and refer to one and the same species.

Homadaula watamomaritima Mey, 2005

Material: 1 ♀, **Kenya**, Coast, Mwabungu, s.l., 4°21′S 39°33′E, 22.xi.2004, leg. D. Agassiz, Genitalia slide Mey 52/21 (coll. Agassiz); 2 ♀, **Zimbabwe**, Manicaland, Bvumba, 1360 m, 19°03′33″S 32°42′41″E, 3–5.xi.2016, genitalia slide Mey 03/22, leg. D. Agassiz & K. Larsen (coll. Agassiz).

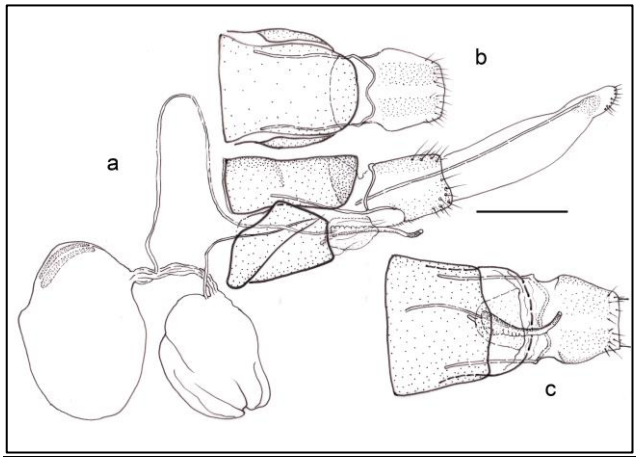

Figure 2 – *Homadaula watamomaritima* Mey, 2005, female genitalia, a – lateral view, b -tergum VII and VIII, dorsal aspect, c – ventral aspect, scale bar: 0.5 mm.

Remarks: The two female specimens are tentatively assigned to *H. watamomaritima*. The female genitalia are similar to *H. ravula* and *H. calamitosa*, but differ in some details (see Fig. 2). They are also quite different from *Homadaula* spec. A, which was also collected in the Coast Province of Kenya.

Homadaula wieseri Mey, 2011

Material: 1 ♀, **RSA**, Northern Cape, Kamieskroon, Farm Windhoek, 16.x.2008, leg. W. Mey, K. Ebert, L. Kühne, genitalia in glycerol vial (MfN).

Description of new species

***Homadaula aarviki* sp. nov.**
urn:lsid:zoobank.org:act:33836394-2349-4E5F-89D7-27BA6BA0B09E

Type material: Holotype ♂, **Kenya**, Rift Valley, Kajiado North Dist[rict]., Masai Lodge, 1660 m, 7.xii.2010, leg. D. Agassiz & L. Aarvik, D.J.I.A. slide 1349 (coll. Agassiz). Paratypes: 1 ♂, same locality, 1.xii.2010, leg. D. Agassiz & L. Aarvik, cleared abdomen in glycerol vial (coll. Agassiz).

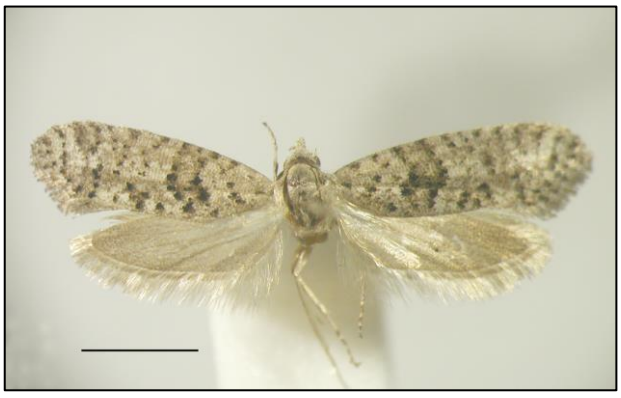

Figure 3 – *Homadaula aarviki* sp. nov., male holotype.

Description: Adult male (Fig. 3). Length of forewing 6 mm, wingspan 13.5 mm. Head with semierect white-tipped scales; labial palpi longer than eye diameter, porrect, with short ventral brush of brown, white-tipped scales. Antennae filiform, 0.5 of forewing length, short ciliated (0.3–0.4 of flagellomere diameter) on ventral side. Fore and middle legs grey, with some interspersed black scales,

hind femur and tibia yellow-brown. Forewings with grey-white tipped scales from base to termen, additional grey and black scales arranged in vertical lines, giving the wing a striped appearance, hindwings brown, translucent patch present, Cu1 and M3 with short stalk.

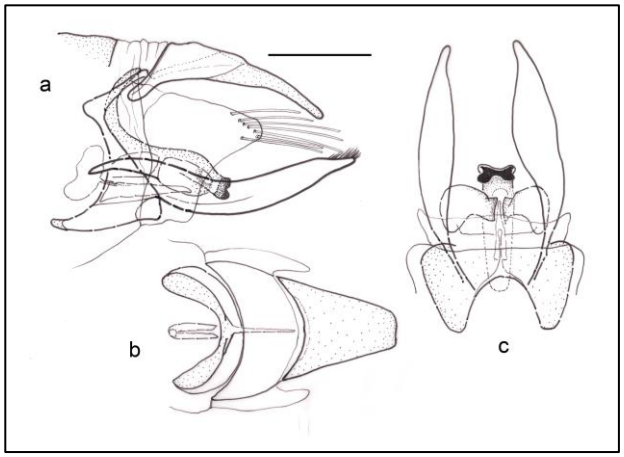

Figure 4 – Male genitalia of *Homadaula aarviki* sp. nov., a – lateral, b – dorsal, c – ventral.

Male genitalia: (Fig. 4). Pleural lobes of segment VIII large, triangular, protruding distad; tergal plate (= segment VIII) with membranous base and dark, apical part, truncate at apex. Segment IX forming ring-like structure with elongate base and narrow dorsal part; uncus a long, flat band, curved ventrad and terminating with ventrally attached gnathos in two, knob-like, black apices between valvae, a pair of lateral lobes in subapical position; valva band-like, slightly curved dorsad, without dorsal lobes.

Female: unknown.

Diagnosis: The species is unique in the genus by the architecture of the fused gnathos and uncus, and by the simple form of the valvae in the male genitalia. The striped forewing pattern separates *H. aarviki* sp. nov. from all other species in the genus.

Distribution: Kenya.

Etymology: The species is named in honour of Leif Aarvik (Oslo), succesful collector and specialist on African Tortricidae.

***Homadaula agassizi* sp. nov.**
urn:lsid:zoobank.org:act:0FB9270D-243A-4DA3-BF1B-C1437433E356

Type material: Holotype ♂, **Kenya**, Rift Valley, Turi, 8000 ft., 24.iii.2000, leg. D. J. I. Agassiz, D.J.I.A. slide 1348 (coll. Agassiz). Paratypes: (all leg. D. J. I. Agassiz): same locality, 1 ♂, 3 ♀, 7-24.i.2000, (coll. Agassiz), male genitalia Mey 40/21 (MfN); 2 ♀, 26.ii–20.v.20002, genitalia slide Mey 26/03 (MfN); 2 ♀, 23.v–14.vi.1999, (coll. Agassiz); 2 ♂, Kenya, Rift Valley, Naivasha, 6000 ft., 0°45′S 36°24′E, 4.xii.1999, D.J.I.A. slide 1280 (coll. Agassiz); 3 ♀, same locality, 2000 m, 14–20.iv.2003, (coll. Agassiz); 3 ♀, same locality, 4.xii.2006 and 5.xii.2011; 1 ♂, 3 ♀, same locality, 16–17.xi.2012, leg. Agassiz, Beavan, Heckord & Ngugi (coll. Agassiz); 2 ♀, Kenya, Western, Kesogon, 6500 ft., 2.vi.1999 (coll. Agassiz); 1 ♀, Lake Naivasha, 1900 m, 0°47′S 36°24′E, larva from *Acacia xanthophloea*, em. 11.xii.2003, genitalia slide Mey 40/21 (MfN); 1 ♀with exuvia, Kenya, Rift Valley, Hell`s Gate N.P., 1945 m, 0°55′S 36°20′E, l[arva] in spinning, em. 21.xii.2003 (coll. Agassiz); 2 ♀, Kenya, Rift Valley, Gilgit, 2100 m, 0°37′S 36°22′E, 22.xii.2008, leg. D. Agassiz, L. Aarvik & A. J. Kingston, D.J.I.A. slide 1345 (coll. Agassiz); Kenya, Rift Valley, Gilgit1 ♂, Kenya, Central, Naro Moru, 1945 m, 0°09′13″S 37°00′42″E, 3–5.xii.2015, leg. D. Agassiz & K. Larsen (coll. Agassiz); 2 ♀, Kenya, Eastern, Hunters Lodge, 930 m, 4.xi.2010, 2°12′48″S 37°42′52″E, leg. D. Agassiz & M. Ngugi, male genitalia in glycerol; 1 ♀, Kenya, Central, Castle Forest Lodge, 2000 m, 0°22′51″S 36°18′35″E, 20.xi.2009 (coll. Agassiz). 1 ♀, **Ethiopia**, Addis Abbaba, 13.viii. 1979, Nr. 3830, leg. P. Angenstein, cleared abdomen in glycerol vial (MfN).

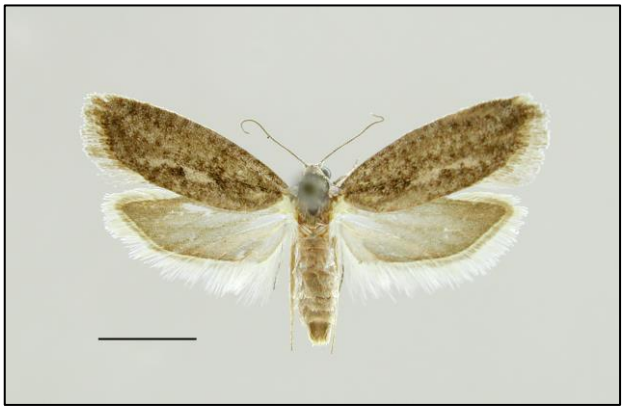

Figure 5 – *Homadaula agassizi* sp. nov., female paratype, Ethiopia.

Description: Adult (Fig. 5). Length of forewing 6-8 mm, wingspan 14–17 mm. Head with semierect grey-tipped scales; labial palpi as long as eye diameter, porrect, with short brush of brown scales on tip of second segment, surrounding third segment. Antennae filiform, 0.5 of forewing length, short ciliated (0.3–0.4 of flagellomere diameter) on ventral side. Fore and middle legs grey, hind femur and tibia yellow-brown. Forewings brown, with grey-white tipped, brown scales in central and apical part, indistinct darker spots all over the surface, plical fold with some grey-white scales, often framed by black scales before and afterwards, hindwings brown, pale brown basally, translucent patch present, Cu1 and M3 with short stalk, female with two frenular bristles.

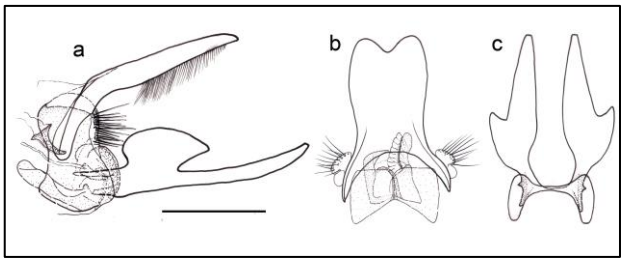

Figure 6 – Male genitalia of *Homadaula agassizi* sp. nov., a – lateral, b – dorsal, c – ventral, scale bar: 0.5 mm.

Male genitalia: (Fig. 6). Pleural lobes of segment VIII short, with long, lamellar scales, tergal plate (= segment VIII) broad and elongate, rounded at apical corners and roundly excised in the middle. Segment IX forming broad, compact, ring-like structure, vinculum with narrow bridge between bases of valvae; uncus absent, gnathos arms (or derived socii) bulbous, sclerotised apically; anellus with

elongate basal part and large, distal part in form of a gear wheel; valva long, straight, with dorsal lobe. Phallus short, dagger-like.

Female genitalia: Henia very long, with scerotised, curved stab emerging from membranous base, bulla seminalis present, bursa copulatrix with pair of oval signum on dorsal side close to origin of ductus bursae, and with additional, singular oval signum on opposite side of bursa.

Diagnosis: The species is unique in the genus by bearing three signa in the bursa and the composite henia of the female genitalia. The form of the valvae and the tergal plate in the male genitalia distinguish the species from congeners. The brown forewings with some grey-white scales in the plical folds seems to be a diagnostic, external character. The species is most similar to *H. calamitosa* and *H. watamomaritima*.

Biology: The species was reared from *Vachellia xanthophloea*. Specimens were collected at the lights from January to June and from November to December, which points to the development of at least two generations per year.

Distribution: Kenya, Ethiopia.

Etymology: The species is named in honour of David Agassiz (London), acknowledging the successful rearing project and his untiring activity on research of Microlepidoptera.

***Homadaula arabica* sp. nov.**
urn:lsid:zoobank.org:act:61A0C1F3-BC52-4782-8FB5-541D96A2B61A

Type material: Holotype ♀, Saudi Arabia, Wadi Maraba, 142 km N of Jizan, 350 m, 13.iv. 1979, leg. [H. G.] Amsel,genitalia slide Mey 39/21, 40/21 (SMNK).

Description: Adult female (Fig. 7). Length of forewing 5.5 mm, wingspan 11.5 mm. Head and thorax white; labial palpi white, as long as eye diameter, up-curved, with short brush of white scales on tip of second segment, surrounding third segment. Antennae filiform, 0.5 of forewing length, short ciliated (0.3–0.4 of flagellomere diameter) on ventral side, dorsal side with white scales at base, scale with long pecten.Tarsus of fore and middle legs grey, hind legs white. Forewings white, with single black scales widely interspersed on wing surface, hindwings white, translucent patch absent, Cu1 and M3 with short stalk, two frenular bristles.

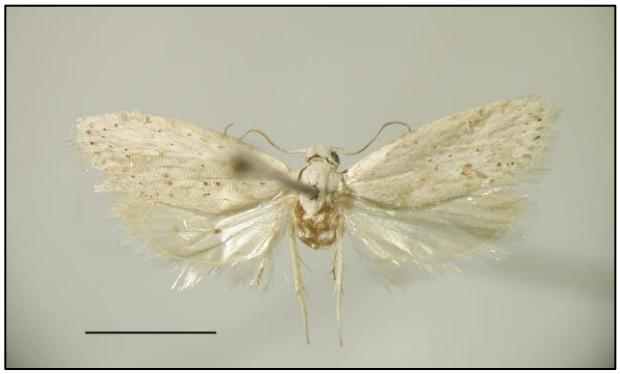

Figure 7 – *Homadaula arabica* sp. nov., female holotype

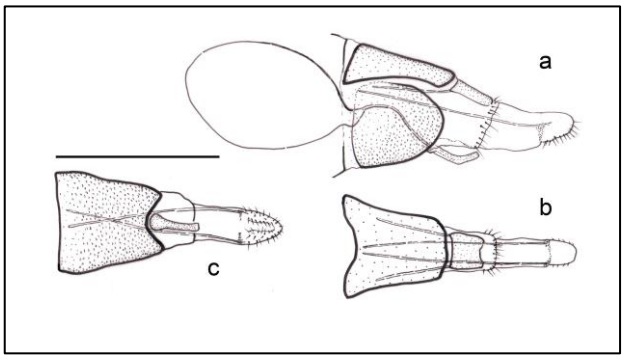

Figure 8 – Female genitalia of *Homadaula arabica* sp. nov., a – lateral, b – dorsal, c – ventral, scale bar: 0.5 mm.

Female genitalia: (Fig. 8). Tergum VII slightly excised on anterior margin, sternum VII with rough surface, broadly rounded apically. Segment IX and X (= oviscapt) shorter than segments VIII and IX. Henia long, tubular, with broader base situated on intersegmental membrane. Bulla seminalis absent, bursa copulatrix without signa but with short, sclerotised dorsal rim from origin of ductus bursae to middle of bursa.

Male: unknown.

Diagnosis: The species differs from other species described from Yemen by the absent bulla seminalis and the absent signa in the bursa in the female genitalia. The white forewings with scattered black scales is an additional character separating *H. arabica* sp. nov. from other species of the genus. The missing translucent patch in the hindwings of *H. arabica* is a character shared with the described species from Yemen. Therefore, the species could be placed together with these species in a separate group.

Distribution: Southern Saudi Arabia.

Etymology: The species epithet is the female adjective of Arabia.

***Homadaula deprinsorum* sp. nov.**
urn:lsid:zoobank.org:act:9F10555E-3C9A-40B4-9099-396CF1DB64B7

Type material: Holotype ♂, **Kenya**, Kakamega Forest, 1575 m, 00°19′N 034°52′E, 31.iii.2003, leg. J. & W. De Prins (coll. K. Larsen). ′Paratypes. 1 ♂, same data as holotype, genitalia slide Mey 34/21 (MfN), 1 ♂, same locality, 1.iv.2003 (coll. K. Larsen); 2 ♂ 1 ♀, **Uganda**, Western, Budongo Forest, 3000 ft., 19.vii.2000, leg. D. Agassiz, genitalia slide Mey 51/21 (coll. Agassiz, MfN); 3 ♂, 1 ♀, Uganda, Western, Budongo Forest, 1°48′32″N 31°32′44″E, 1100 m, 13–16.iii.2013, leg. D. Agassiz & M. Ngugi, ♀ genitalia slide Mey 46/21 (MfN); ♂, Uganda, Western, 27 km north of Masindi, Budongo Forest, 1°55′58″N 31°42′40″E, 965 m, 30.x.2014, leg. D. Agassiz, K. Larsen & M. Ochse (coll. Agassiz).

Description: Adult (Fig. 9). Length of forewing 6.5–7 mm, wingspan 13.5–15.5 mm. Head with semierect white-tipped scales; labial palpi longer than eye diameter, ascending, with short terminal brush of brown, white-tipped scales. Antennae filiform, 0.5 of forewing length, short ciliated (0.3–0.4 of flagellomere diameter) on ventral side. Fore and middle legs grey, with some interspersed

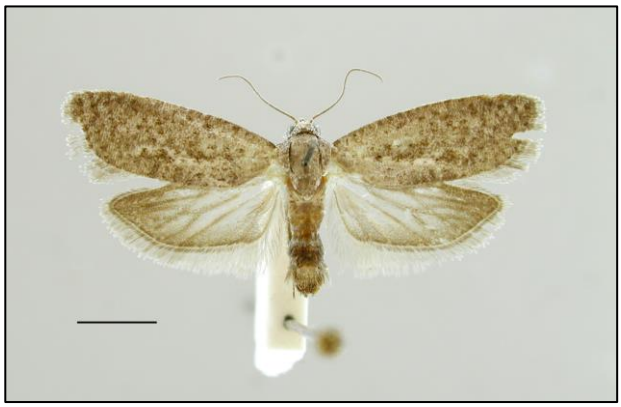

Figure 9 - *Homadaula deprinsorum* sp. nov., male paratype.

black scales, hind femur and tibia yellow-brown. Forewings with grey-white tipped scales from base to termen, additional grey and black scales arranged in indistinct streaks on costal magin and in small spots, giving the wing a spotted appearance, hindwings brown, translucent patch present, Cu1 and M3 with long stalk, female with two and male with one frenular bristles.

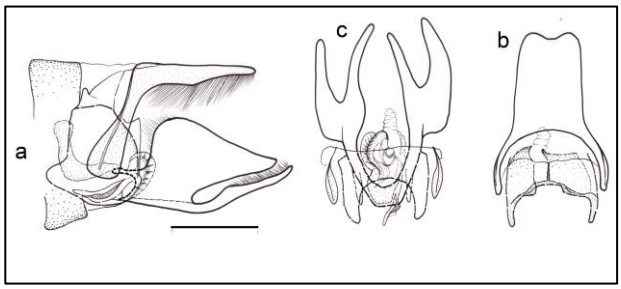

Figure 10 – Male genitalia of *Homadaula deprinsorum* sp. nov., a – lateral, b – dorsal, c – ventral, scale bar: 0.5 mm.

Male genitalia: (Fig. 10). Pleural lobes of segment VIII short and flat, with long, lamellar scales, tergal plate (= segment VIII) broad and elongate, rounded at apical corners and slightly emarginated in the middle. Segment IX forming broad, compact, ring-like structure, vinculum with narrow bridge between fused bases of valvae; uncus absent, gnathos arms (or derived socii) bulbous, sclerotised apically and encompassing anal tube; anellus with elongate basal part and large, distal part in form of a gear wheel; valva long, straight, with large, triangular dorsal lobe, valva in ventral view like the pincer of a scorpion. Phallus angled in lateral view, dagger-like.

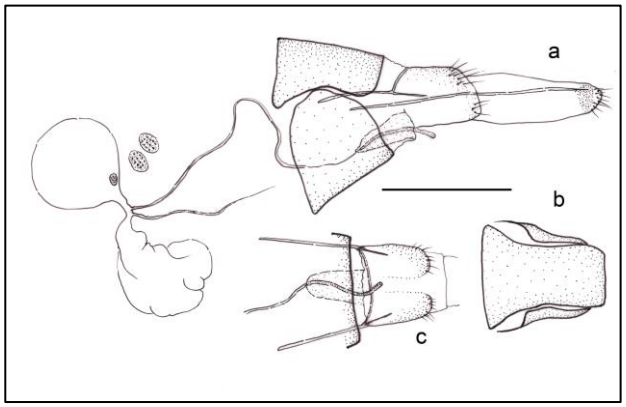

Figure 11 – Female genitalia of *Homadaula deprinsorum* sp. nov., a – lateral, b – dorsal, c – ventral, scale bar: 0.5 mm.

Female genitalia: (Fig. 11). Henia long and slender, sinuously bent in ventral view, originating at base of pocket of inter-segmental membrane, bulla seminalis present, bursa copulatrix with pair of rounded signa on dorsal side close to origin of long ductus bursae.

Diagnosis: The large, triangularly formed dorsal lobes of the valvae of the new species are unique in the genus. Other distinguishing characters are the long, lateral lobes originating from the base of the tergal plate reaching ventrally the valval apodemes in lateral view. In the female genitalia, the form of the henia enclosed in a membranous pocket is a species-specific character. Externally, the forewings of the new species have a spotted appearance against a grey to brown background colour. The new species resembles *H. agassizi* sp. nov. and *H. watamomaritima*.

Distribution: Kenya, Uganda

Etymology: The species is named in honour of Jurate and Willy de Prins (Antwerp), founders of the famous webportal of "Afromoths" (www.afromoths.net).

***Homadaula gabonensis* sp. nov.**
urn:lsid:zoobank.org:act:A9B498B1-AE2F-4EBD-9885-37A1E1179ABA

Type material: Holotype ♂, **Gabon**, Ogooue, Ivindo, Ipassa, Makokou, 530 m, 0°30′43″N 12°48′13″E, 14–24.iii.2015, leg. K. Larsen (coll. Agassiz).
Paratypes: 3 ♂, 2 ♀, same data as holotype, leg. Knut Larsen, ♂ genitalia slide Mey 49/21, (coll. Agassiz, 1 ♂ MfN).

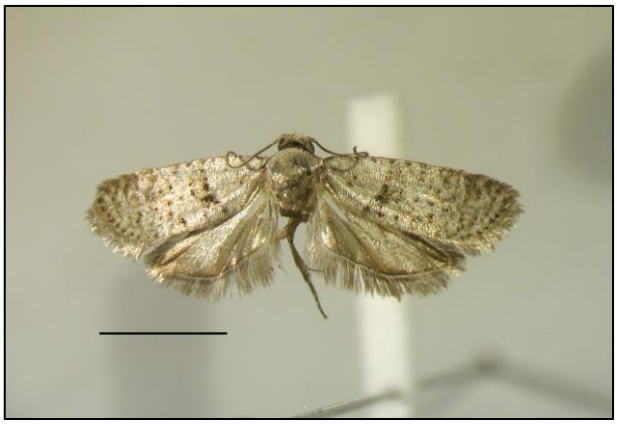

Figure 12 – *Homadaula gabonensis* sp. nov., male paratype.

Description: Adult male (Fig. 12). Length of forewing 3.5–5 mm, wingspan 9–11.5 mm. Head with smooth pale-tipped grey scales; labial palpi dark brown, as long as eye diameter, straight and ascending. Antennae filiform, 0.5 of forewing length, dark brown, short ciliated (0.3–0.4 of flagellomere diameter) on ventral side. Fore and middle legs grey, hind femur and tibia pale brown. Forewings with grey-white scales from base to termen, brown scales along costa and anal fields, erect black scales scattered and arranged as pre-medial, vertical line; hindwings brown, veins darker scaled, translucent patch present, Cu1 and M3 with long stalk.

Male genitalia: (Fig. 13). Pleural lobes of segment VIII short and flat, with long, lamellar scales, tergal plate (= segment VIII) broad and elongate, rounded at apical

corners and slightly concave in the middle. Segment IX forming broad, compact, ring-like structure, vinculum with narrow bridge between bases of valvae; uncus absent, gnathos arms (or derived socii) bulbous, sclerotised apically and encompassing anal tube; anellus with short basal part and larger, distal part forming a small gear wheel-like structure, anellus with pair of thin appendages; valva long, straight, with large, rounded dorsal lobe. Phallus short, dagger-like, fused with anellus, bulbus ejaculatorius large.

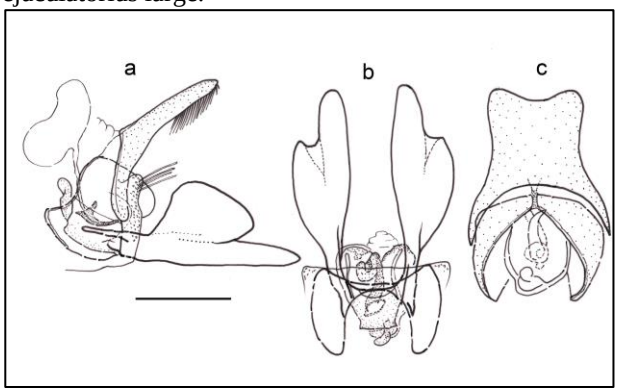

Figure 13 – Male genitalia of *Homadaula gabonensis* sp. nov., a – lateral, b – ventral, c –dorsal, scale bar: 0.5 mm.

Female genitalia: not examined

Diagnosis: The new species is similar to *H. deprinsorum* sp. nov. and *H. agassizi* sp. nov. by the architecture of the fused anellus-phallus complex, and by the form of the valva in the male genitalia. The erected, black scales on different positions in the forewings represent a scarcely observed character in the genus and separates *H. gabonensis* sp. nov. from other species of the genus.

Distribution: Gabon

Etymology: The new species is named after the name of the country where the type series was collected.

***Homadaula larseni* sp. nov.**
urn:lsid:zoobank.org:act: B33904B1-10D4-41A4-BD1F-F827DB9878CB

Type material: Holotype ♂, **Ghana**, Ashanti, Bobiri 240 m, 4 km N Kubeasi, 9–12.iii.2010, leg. Knut Larsen & Wojciech Kubasik (coll. K. Larsen). Paratypes: 1 ♂, 2 ♀, same data as holotype, genitalia slides Mey 32/21, 33/21; 2 ♀, same locality, 8–11.ii.2008, leg. Knut Larsen (coll. K. Larsen, 1 ♂, 1 ♀, MfN).

Figure 14 – *Homadaula larseni* sp. nov., female paratype.

Description: Adult (Fig. 14). Length of forewing 5–6.5 mm, wingspan 11–16.5 mm. Head and thorax brown, with white-grey-tipped scales; labial palpi straight, as long as eye diameter, slightly ascending, basal segment white; proboscis long, light brown. Antennae filiform, 0.5 of forewing length, short ciliated (0.2 of flagellomere diameter) on ventral side. Fore and middle legs grey, tarsomeres ringed apically, hind femur and tibia yellow-brown. Forewing brown, with some white-grey tipped scales in apical part, darker scales forming indistinct streaks on costal magin and small spots on wing surface, hindwings brown, darker apically and along veins, translucent patch present, Cu1 and M3 with long stalk, male with one frenular bristle and female with three bristles.

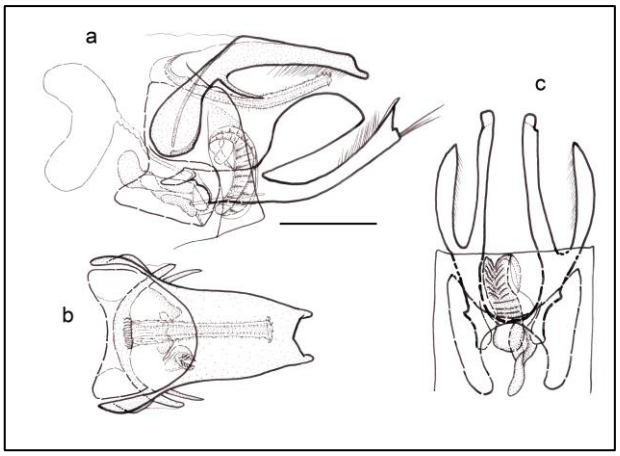

Figure 15 – Male genitalia of *Homadaula larseni* sp. nov., a – lateral, b – dorsal, c – ventral, scale bar: 0.5 mm.

Male genitalia: (Fig. 15). Pleural lobes of segment VIII short and flat, with long, lamellar scales, tergal plate (= segment VIII) slightly excised on apex between rounded, lateral corners, ventral side with long bristles, on base small acute process present on lateral side; segment IX compact, ring-like structure, vinculum with narrow bridge between bases of valvae; uncus a long, tube-like rod, with small denticules on lateral and apical sides, gnathos arms (or derived socii) bulbous, asymmetrical, sclerotised apically and encompassing anal tube; anellus with elongate basal part and large, distal part in form of a large gear wheel-like structure, pair of appendices of anellus absent; valva long, with large, dorsal lobe and slightly longer ventral lobe, curved dorsad, valva deeply split in ventral view, tips of ventral lobes pointed at apex and with subapical bump equipped with some long bristles in lateral view. Phallus short, dagger-like, reniform bulla seminalis present.

Female genitalia: (Fig. 16). Sternum VII shorter than tergum VII; henia long, sclerotised, curved sinus-like, originating from right side out of a shallow pocket in inter-segmental membrane; in central position one rounded bud with small papillae on its surface, another bud on distal end of pocket; bulla seminalis absent, bursa copulatrix with pair of weak, rod-like signa, bulla seminalis close to origin of short ductus bursae.

Diagnosis: In the male genitalia, the new species resembles *H. ravula* Mey, 2004. There are only some small details, which separate the two species: apical corners of tergal

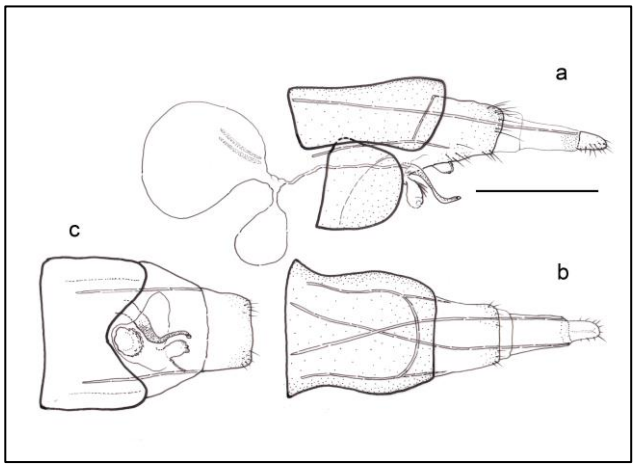

Figure 16 – Female genitalia of *Homadaula larseni* sp. nov., a – lateral, b – dorsal, c – ventral

plate slightly produced and rounded in *H. larseni*, acute in *H. ravula*. The complicated anellus-phallus complex of the new species has a gear wheel-like process on its distal margin. The phallus-anellus complex is larger and more compact than in *H. ravula*. In the females, the genital differences are more pronounced. The shape of the henia and the presence of two, papillated bud-like outgrows in the intersegmental pocket form a unique and bizarre configuration in females of *Homadaula*.

Etymology: The species is named in honour of Knud Larsen (Cobenhagen), passionate collector and researcher of African Microlepidoptera.

***Homadaula malawiensis* sp. nov.**
urn:lsid:zoobank.org:act:15959A61-244F-4D42-8EF8-692A31F9D615

Type material: Holotype ♂, **Malawi**, Mt. Mulanje, 1000 m, 15°58′N 35°39′E, 8.xii.2002, leg. D. Agassiz, genitalia in glycerol vial (coll. Agassiz).

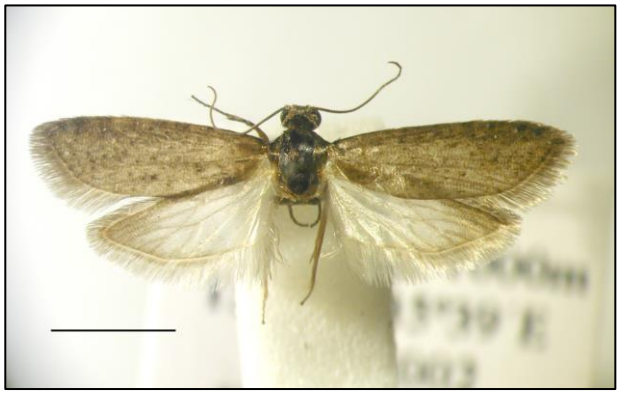

Figure 17 - *Homadaula malawiensis* sp. nov., male holotype.

Description: Male (Fig. 17). Forewing length 6.5 mm, wing span 14.5 mm. Head with semi-erected scales, grey, with pale tips; labial palpi short, basal segment white, terminal segments brown; antenna ciliate on ventral and lateral sides. Thorax grey-brown dorsally. Fore-wings ground colour grey-brown, with some small, dark scales, dispersed over the wing surface; hind-wings white-grey in basal half, becoming darker towards apex, fringes pale grey. M3 and Cu1a with a long stalk, M2 connected with Cu1a by short cross-vein.

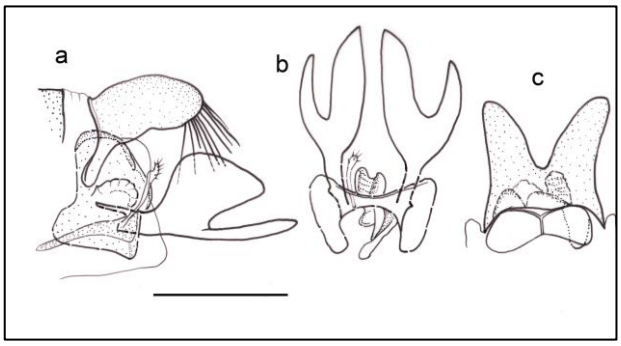

Figure 18 – Male genitalia of *Homadaula malawiensis* sp. nov., a – lateral, b – ventral, c – dorsal, scale bar: 0.5 mm.

Male genitalia: (Fig. 18). Pleural lobes of segment VIII short and flat, , with long, lamellar scales, tergal plate (= segment VIII) split to half of its length in dorsal view, forming two elongate, slightly diverging lobes separated by an nearly triangular emargination, ventral side of lobes with long, black bristles; segment IX compact, ring-like, vinculum with narrow bridge between bases of valvae; uncus absent, gnathos arms (or derived socii) bulbous, asymmetrical, sclerotised apically and encompassing anal tube; anellus with elongate basal part and large, distal part in form of a small gear wheel-like structure, appendage of anellus only on left side present; valva long, with large, triangular dorsal lobe and longer ventral lobe, valva in ventral view like the pincer of a scorpion, tips of ventral lobes acute. Phallus short, dagger-like, bulla seminalis not observed.

Female: unknown.

Diagnosis: In the male genitalia, the deeply divided tergal plate together with the form of the valvae are diagnostic for the species. Externally, the brown forewings of the new species are similar to *H. taraktica* sp. nov. and *H. peregovitsi* sp. nov. The species are closely related to each other and can only be separated by examination of the male genitalia.

Remarks: The new species occurs sympatrically with *H. ravula* on Mt. Mulanje (Mey 2004).

Etymology: The species is named after the name of the country where the holotype was collected.

***Homadaula peregovitsi* sp. nov.**
urn:lsid:zoobank.org:act:C3F7FE92-BBCC-498D-A3F9-E4933BA40456

Type material: Holotype ♂, **Tanzania**, Tanga, Mazumbai, 1520 m, 21.i.1985, leg. L. Peregovits, cleared abdomen in glycerol vial (coll. K. Larsen).

Description: Male (Fig. 19). Forewing length 6 mm, wing span 14.5 mm. Head with semi-erected scales, grey, with pale tips; labial palpi short, basal segment white, terminal segments brown; antenna ciliate on ventral and dorsal sides. Thorax grey-brown dorsally. Fore-wings ground colour grey, with indistinct white patches and some smaller, dark spots; hind-wings white in basal half, becoming darker towards apex and along terminal veins, fringes on anal margins white and longer than apical fringes. Accessory cell in forewing long (Fig. 20), hindwing M3 and Cu1a with long stalk, M2 connected with

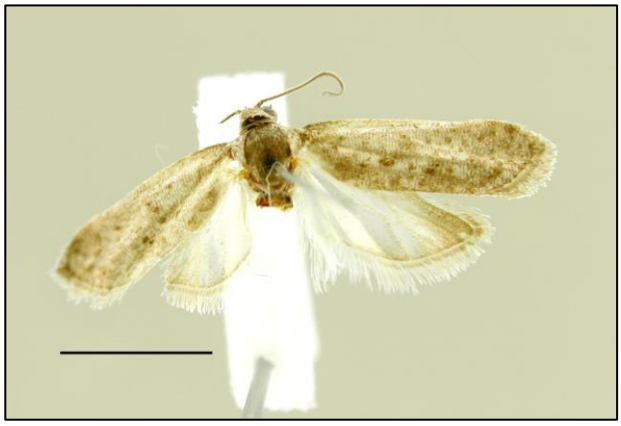

Figure 19 – *Homadaula peregovitsi* sp. nov., male holotype.

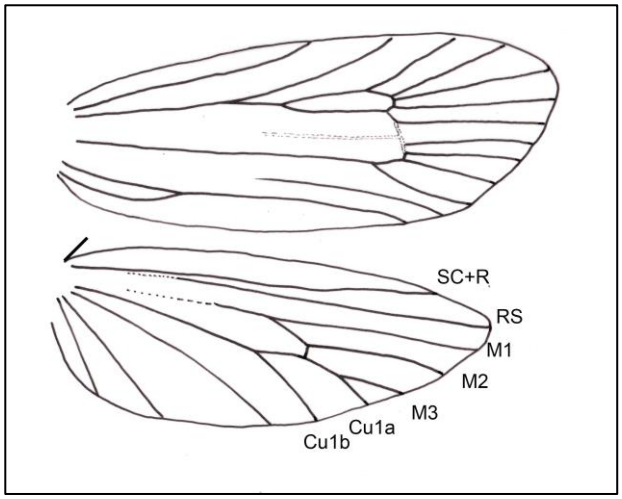

Figure 20 – Wing venation of *Homadaula peregovitsi* sp. nov., male holotype

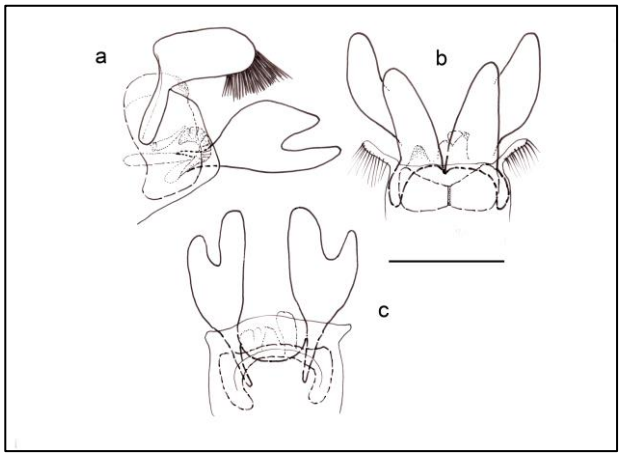

Figure 21 – Male genitalia of *Homadaula peregovitsi* sp. nov., a – lateral, b – dorsal, c – ventral, scale bar: 0.5 mm.

with Cu1a by short vein. Right hind-wing malformed and shortened.

Male genitalia: (Fig. 21). Pleural lobes of segment VIII short and flat, folded laterally, with long, lamellar scales, tergal plate (= segment VIII) deeply split towards its base in dorsal view, forming two elongate, slightly diverging lobes, ventral side of lobes with long, black bristles; segment IX compact, ring-like, vinculum with narrow bridge between bases of valvae; uncus absent, gnathos arms (or derived socii) bulbous, asymmetrical, sclerotised apically and encompassing anal tube; anellus with elongate basal part and large, distal part in form of a small gear wheel-like structure, pair of appendices of anellus present; valva long, with large, triangular dorsal lobe, valva in ventral view like the pincer of a scorpion, tips of ventral lobes rounded. Phallus short, dagger-like, bulla seminalis not observed.

Female: unknown.

Diagnosis: In the male genitalia, the completely divided tergal plate from tip to base together with the form of the valvae are diagnostic for the species. Externally, the brown forewings of the new species are similar to *H. malawiensis* sp. nov. and *H. taraktica* sp. nov. The species can only be separated by examination of the male genitalia.

Etymology: The species is named after the Hungarian lepidopterist László Peregovits, the collector of the new species.

***Homadaula saharaensis* sp. nov.**
urn: lsid:zoobank.org:act:027170F8-35E4-4932-B052-CA43D1EA2D74

Type material: Holotype ♂, **Tunisia**, "Mauretania, Tunesia-Sud, Oase Tozeur, 1-4.x.1980, leg. M & W. Glaser" [printed on white card], [33°55′N 08°08′E], genitalia slide Mey 38/21(SMNK). Paratypes: 1 ♀, same data as holotype (SMNK)

Figure 22 – *Homadaula saharaensis* sp. nov., male holotype.

Description: Male (Fig. 22). Forewing length 4 mm, wing span 9.5 mm. Head with appressed, white scales, collar cream-white; labial palpi white, as long as eye diameter; antenna ciliate on ventral and lateral sides. Thorax creme-white dorsally. Legs white, tarsomeres black with white apices, femora white, with subapically black spot. Forewings ground colour crème-white, with some, semi-erected black scales, arranged in a subterminal streak, surrounded by pale yellow scales; oblique costal streak in the middle of costa length, termen with black spots on end of veins, fringes white; hind-wings white, translucent patch small, fringes white. M3 and Cu1a with short stalk, M2 separated from Cu1a by long vein (= stem of M3).

Male genitalia: (Fig. 23). Pleural lobes of segment VIII short laterally, elongated ventrally forming a membranous flap covering the bases of valvae in ventral view, tergal plate (= segment VIII) with central area membranous, lateral sides sclerotized, confluent apically and terminating

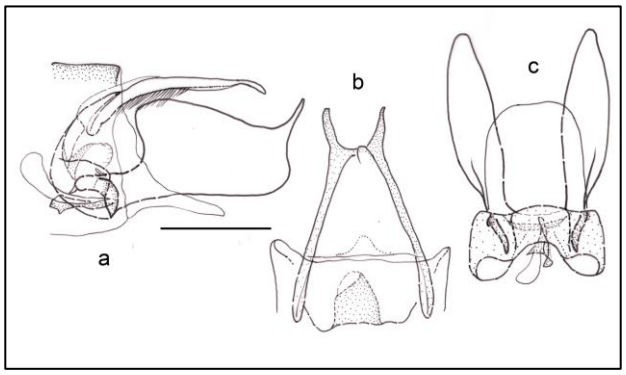

Figure 23 – Male genitalia of *Homadaula saharaensis* sp. nov., a – lateral, b – dorsal, c – ventral, scale bar: 0.5 mm.

into bifid fork in dorsal view, ventral base of tergal plate with short, recurved bristles; segment IX compact, ring-like, vinculum with broad bridge between bases of valvae; uncus absent, gnathos arms (or derived socii) bulbous, asymmetrical, sclerotised apically and encompassing anal tube; anellus small, basal part elongate, appendages of anellus absent; valva long, with short and slender base and large, nearly rectangular apical lobe, dorsal apex extended into acute process directed dorso-caudad, valva in ventral view undivided and apically rounded. Phallus long, curved from a broader base, dagger-like, bulla seminalis not observed.

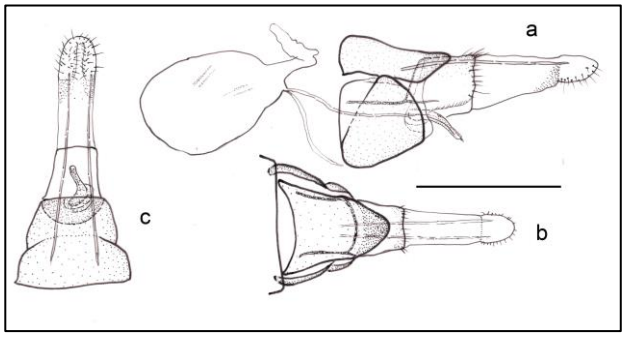

Figure 24 – Female genitalia of *Homadaula saharaensis* sp. nov., a – lateral, b – dorsal, c – ventral, scale bar: 0.5 mm.

Female genitalia: (Fig. 24). Tergum VII elongate, distal margin triangular, rounded at apex; henia long and slender, basally broad, slightly curved in ventral view, originating at base of broad pocket within inter-segmental membrane, bulla seminalis present, bursa copulatrix with two pair of indistinct, linear signa, not close to origin of ductus bursae.

Diagnosis: The cream-white colour of the forewings, the erected black scales in subterminal and costal streaks and the row of black spots on termen make the new species unmistakable. In the male genitalia, the new species is unique within the genus by the largely membranous tergal plate and the broad, undivided valva, with a terminal, acute process.

Remarks: The species had to be included in the present taxonomic treatment of the Palaearctic species of Mey (2022). The locality label says "Mauretania" as country of origin, and this country name was the reason to retain the species for its inclusion in the present account. Later, a closer examination of the label data disclosed the famous oasis Tozeur in southern Tunisia as the collecting site of

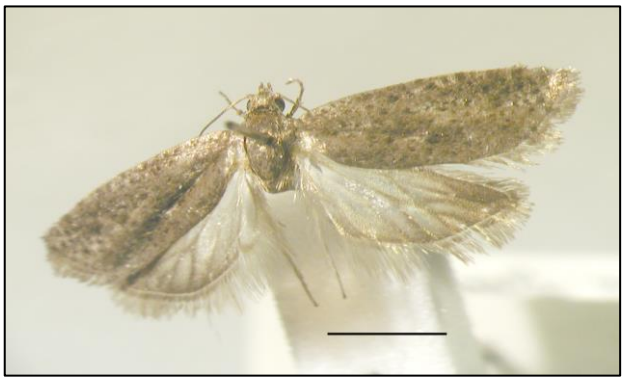

Figure 25 – *Homadaula taraktica* sp. nov., male paratype.

the two specimens. The country name Mauretania [i.e.,Mauritania] is misleading. The new species, in fact, belongs to the West Palearctic Region. There are no similar species, which relegates *H. saharaensis* sp. nov. into an isolated position within *Homadaula* both in the Palaearctic and in the Afrotropical Region.

Etymology: The specific epithet refers to the Sahara Desert, where the new species was collected.

***Homadaula taraktica* sp. nov.**
urn:lsid:zoobank.org:act:450C8F55-311A-4BCD-B371-FBD278ECB13A

Type material: Holotype ♂, **Kenya**, Central, Castle Forest Lodge, 2060 m, 0°22′51″N 36°18′35″E, 27.x.2016, leg. D. Agassiz & K. Larsen, genitalia slide Mey 47/21, (coll. Agassiz). Paratypes: 2 ♀, same locality, 20.xi.2009, leg. D. Agassiz, genitalia slide DJLA 1279 (coll. Agassiz), genitalia slide Mey 04/22 (MfN); 2 ♀, Kenya, Central, Thika, 6000 ft., 3.xii.1999, leg. D. Agassiz, genitalia slide Mey 50/21 (coll. Agassiz); 1 ♂, **Tanzania**, Tanga Region, Lushoto District, 1600 m, Mazumbai Forest Reserve, 17–18.xi.1995, leg. S. McKamey et al., coll. ZMUC Denmark (coll. Agassiz); 1 ♀, same locality, 30.xi–7.xii.1995, leg. S. McKamey et al., coll. ZMUC Denmark (coll. Agassiz); 1 ♂, 2 ♀, **Zimbabwe**, Manicaland, Bvumba, 1360 m, 19°03′33″S 32°42′41″E, 3–5.xi.2016, leg. D. Agassiz & K. Larsen, genitalia slide Mey 44/21, (coll. Agassiz, MfN).

Description: Adult (Fig. 25). Length of forewing 6-7 mm, wingspan 13.5–16 mm. Head and thorax brown, with grey-tipped scales; labial palpi straight, longer as eye diameter, ascending, proboscis long, light brown. Antennae filiform, 0.5 of forewing length, short ciliated (0.3–0.4) on ventral side. Fore and middle legs grey, with some darker scales, hind femur and tibia yellow-brown. Forewing brown, with some grey-tipped scales in apical part and in plical fold, darker scales forming indistinct streaks on costal magin and small spots on wing surface, hindwings brown, darker apically and along veins, translucent patch present, Cu1 and M3 with long stalk, female with three and male with one frenular bristles.

Male genitalia: (Fig. 26). Pleural lobes of segment VIII short and flat, with long, lamellar scales, tergal plate (= segment VIII) deeply divided in dorsal view, broad and apically rounded in lateral view, ventral apices with long thick bristles; segment IX compact, ring-like structure, vinculum with narrow bridge between bases of valvae; uncus absent, gnathos arms (or derived socii) bulbous,

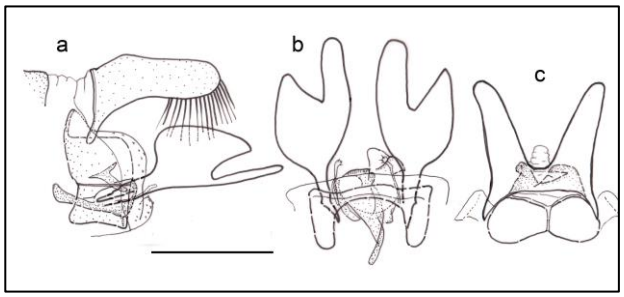

Figure 26 – Male genitalia of *Homadaula taraktica* sp. nov., a – lateral, b – dorsal, c – ventral, scale bar: 0.5 mm.

sclerotised apically and encompassing anal tube; anellus with elongate basal part and large, distal part in form of a small gear wheel-like structure, pair of appendices of anellus present; valva long, with large, triangular dorsal lobe, valva in ventral view like the pincer of a scorpion, tips of ventral lobes rounded. Phallus short with enlarged circular base, dagger-like.

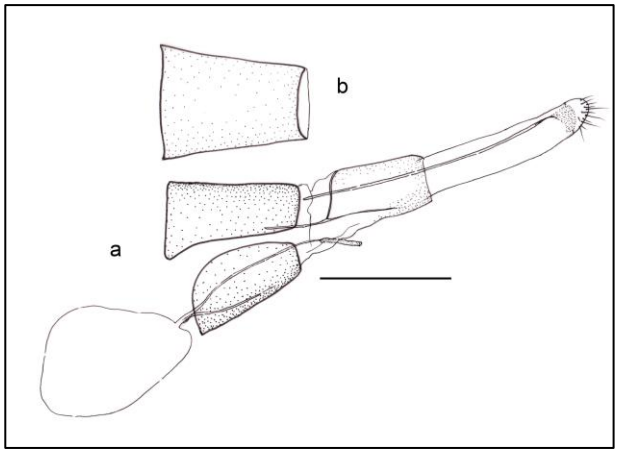

Figure 27 – Female genitalia of *Homadaula taraktica* sp. nov., a – lateral, b – dorsal side of tergum VII.

Female genitalia: (Fig. 27). Sternum VII without lateral, oblique suture; henia short and straight, originating from inter-segmental membrane, bulla seminalis absent, bursa copulatrix without signa, ductus seminalis from base of short ductus bursae.

Diagnosis: The deeply divided tergal plate together with the apically rounded ventral lobes of the valvae are diagnostic for the species. The male genitalia of the new species are similar to *H. malawiensis* sp. nov. and *H. peregovitsi* sp. nov. The species can only be separated by examination of the male genitalia.

Distribution: Kenya, Tanzania, Zimbabwe

Etymology: The specific epithet is derived from the Greek "taraktikos", confusing, with reference to the complicated architecture of the anellus-phallus complex in the male genitalia.

Homadaula spec. A

Material: 1 ♀, **Kenya**, Coastal, Rukinga Est., 490 m, 3°42′20″S 36°46′35″E, 23.xi.2010, leg. D. Agassiz & M. Ngugi, genitalia slide Mey 45/21 (MfN); 3 ♀, same locality, 8.xii.2011, leg. D. Agassiz & M. Ngugi, genitalia slide Mey 53/21 (coll. Agassiz).

Remarks: The species differs from all other African *Homadaula* species by the dark brown hindwings together with the small size of the adults displaying a maximal wingspan of only 9 mm (Fig. 28). The membranous, short henia in the female genitalia is another separating character (Fig. 29). The species is certainly undescribed, but should be described later at a time when the currently missing male is available.

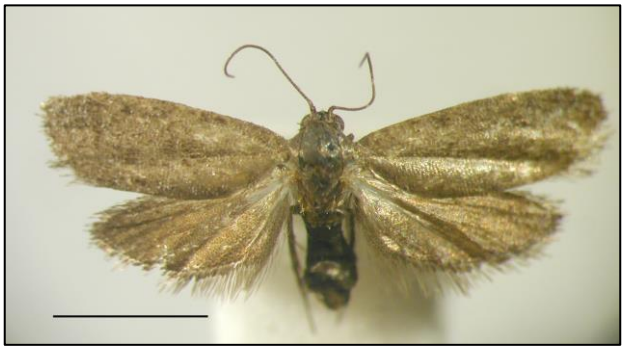

Figure 28 – Female of *Homadaula* spec. A.

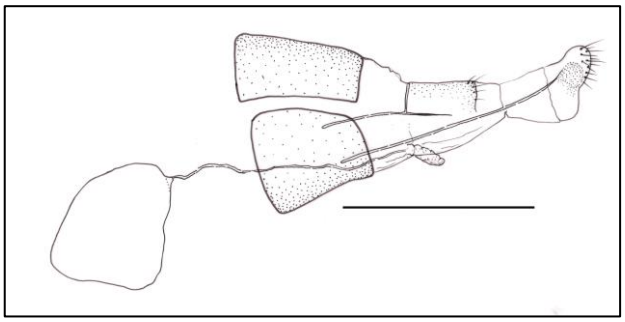

Figure 29 – Female genitalia of *Homadaula* spec. A, lateral aspect.

Homadaula spec. B

Material: 1 ♀, **Kenya**, Western, Kesogona, 6500 ft., 2.vi.1999, leg. D. Agassiz, genitalia in glycerol vial (coll. Agassiz).

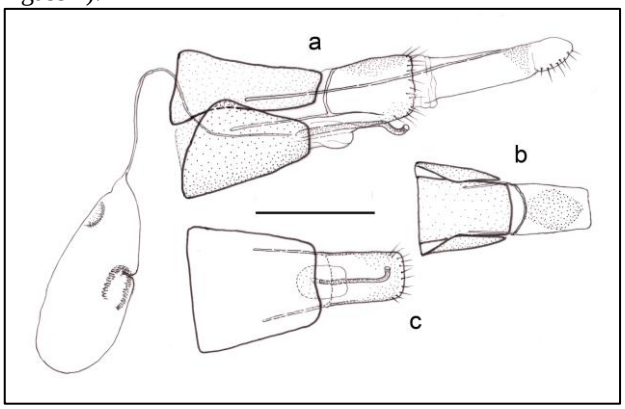

Figure 30 – Female genitalia of *Homadaula* spec. B, a - lateral aspect, b – dorsal side of tergum VII and VIII, c – ventral side, scale bar: 0.5 mm.

Remarks: In the female genitalia (Fig. 30), the long, straight henia with curved apex and the presence of two signa in the bursa copulatrix are unique characters of the species. The forewings resemble the wings of *H. agassizi* sp. nov.

CONCLUDING REMARKS

Despite the many new species descriptions provided in this article, the inventory of the genus is still incomplete. The discovery of Acacia trees of the genera *Vachellia* as host plants of *Homadaula* provides additional evidence to the well-known biology of the Mimosa Webworm *H. anisocentra* (introduced from Asia to USA) that the genus in one of a large group of taxa utilising Mimosoideae as larval hosts. The almost universal availability of this large and diverse food resource in Africa may be reflected in the radiation of *Homadaula*, now recognised as a species-rich genus distributed throughout Africa including so far unexplored areas. This includes species for which only one sex is yet known; two unnamed species from the female sex only. Descriptions of these are postponed until the corresponding males are identified.

Figure 31 – Brandberg Mt. on the edge of the Namib Desert, Namibia, view from north-east. Locality of *H. albida*. (photo: Mey)

Figure 32 – Mulanje Mt., Malawi, view from north-west. Locality of *H. malawiensis* sp. nov. and *H. ravula* (photo: Mey)

Species of *Homadaula* are present in all biomes and in a variety of ecoregions. They occur from the edge of deserts (Fig. 31) and in subtropical savannas (Fig. 32), shrublands and moist tropical broadleaf forests (Fig. 33). In a number of localities from different biomes, the sympatric occurrence of two to four species was observed. The correct association of sexes is a serious problem in these cases. The external similarity of males and females is a helpful character, which however fails, when specimens are worn or imperfectly preserved. This provides a good justification for a future DNA barcoding study.

Figure 33 – Bvumba Mts., Zimbabwe, locality of *H. calamitosa*, *H. ravula*, *H. taraktica* **sp. nov**., and *H. watamomaritima* (photo: D. Agassiz)

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