Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
www.entomoljournal.com
JEZS 2022; 10(6): 189-195

Received: 15-08-2022
Accepted: 22-09-2022

Eberhard Zielke
Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, 1 Tsar Osvoboditel Blvd., 1000 Sofia, Bulgaria

Corresponding Author:
Eberhard Zielke
Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, 1 Tsar Osvoboditel Blvd., 1000 Sofia, Bulgaria

Further observations on Madagascan *Helina* species (Diptera: Muscidae)

Eberhard Zielke

DOI: https://doi.org/10.22271/j.ento.2022.v10.i6c.9118

Abstract
Two new species of the genus *Helina* Robineau-Desvoidy are described from Madagascar as *Helina chamelea* spec. nov. and *Helina losaca* spec. nov., marked either by conspicuous body colour or fairly strong head setae. In addition, a female of *Helina quadriseta* (Adams) hitherto known from several countries of the African mainland was found among the muscid material collected in Madagascar. In total, there are now fourteen *Helina* species occurring in Madagascar. Only two of them were not described from this zoogeographical sub region. The known *Helina* species from the country are compared in an updated identification key.

Keywords: *Helina*, new species, new first record, diagnosis, identification key, Madagascar

Introduction
New as well as known species of the genus *Helina* Robineau-Desvoidy, 1830 collected in Madagascar were already reported in a recent contribution in this journal [1]. Since then, four other new species of the genus were identified and a species hitherto known from Afrotropical mainland has now also been found on the Malagasy island. Two of the four new species were already described [2]. Two other species, marked by metallically shiny body colour or strong head setae and the species already known from the African mainland are presented now as a supplement to the previous contribution [1]. The expansion of knowledge about the Madagascan *Helina* fauna from nine to now fourteen species also required a revision of the existing identification key.

Materials and Methods
The origin of the muscid material and the methods of species identification have already been described in detail in articles on species of *Dichaetomyia* and *Helina* [1, 3]. Therefore, only key information is compiled below. The Muscidae studied were loaned by various entomological institutions to the Institute of Biodiversity and Ecosystem Research (IBER), Sofia for the current investigations. The unidentified muscid specimens were isolated from the in ethanol preserved remains of insect traps, stored in the Moravian Museum, Brno, CZ. The vials with the remains contained locality labels, the inscriptions of the locality labels are reproduced verbatim. When information about the collectors were not found or could not be deciphered, they are not mentioned in the descriptions.
The identification of the Muscidae is based on available keys to the Madagascan Muscidae [1, 4] and to Afrotropical species of *Helina* [5] respectively. In addition, the specimens were compared with the findings described by Pont [6] from the Comoros Archipelago, another island biotope in the Indian Ocean. However, no match was found. Morphological terminology follows McAlpine [7] but postpedicel is used [8] instead of “first flagellomere” as proposed by McAlpine. The lateral width of the postpedicel of antenna is called "depth" [1], and if not stated differently it refers to the greatest depth of the postpedicel. Information about the width of frons always refer to the shortest distance between the margins of the eyes. When the lengths of hairs or setae of the femur are compared with the depth of the femur, the depth, if not stated otherwise, always refers to the point of insertion of the hair or seta on the femur. Body length was measured in millimeters (mm). The specimens were studied using a Zeiss Stemi SV6 stereomicroscope and images were created by means of a Zeiss Discovery 8 stereomicroscope combined with an AxioCam ERc5s camera as already mentioned previously [1, 3].

The undetermined material identified for the paper in hand was compared with identified *Helina* specimens. The specimens including paratypes were kindly loaned for examination to IBER by the Entomological Departments of: Moravian Museum, Brno, CZ; California Academy of Sciences (= CAS), San Francisco, CA/USA, and the Museum für Naturkunde, Berlin, D.

Results

Helina chamelea spec. nov. (Figs 1 – 4)

Material Examined

Female holotype; the type specimen is missing fore and mid legs and a few of the long setae. However, identification of the species was not hampered, since the coloration of the body is very unique within the Afrotropical *Helina* species, and the lost setae were judged based on the remaining scars. The locality label of the holotype reads: "E. Madagascar, 989 m, Ranomafana N. P. FIT 1 S21°16'46"E47°25'15', 10-14.01.2017 leg. P. B."

Etymology

The epithet of the new *Helina* species "*chamelea*" is a feminine adjective referring, grammatically in a slightly modified form, to a chameleon. Depending on quality of light the female's abdomen is very differently coloured, thus, the fly being somehow reminiscent of a chameleon, which shows as well different body colors depending on the situation.

Description (female)

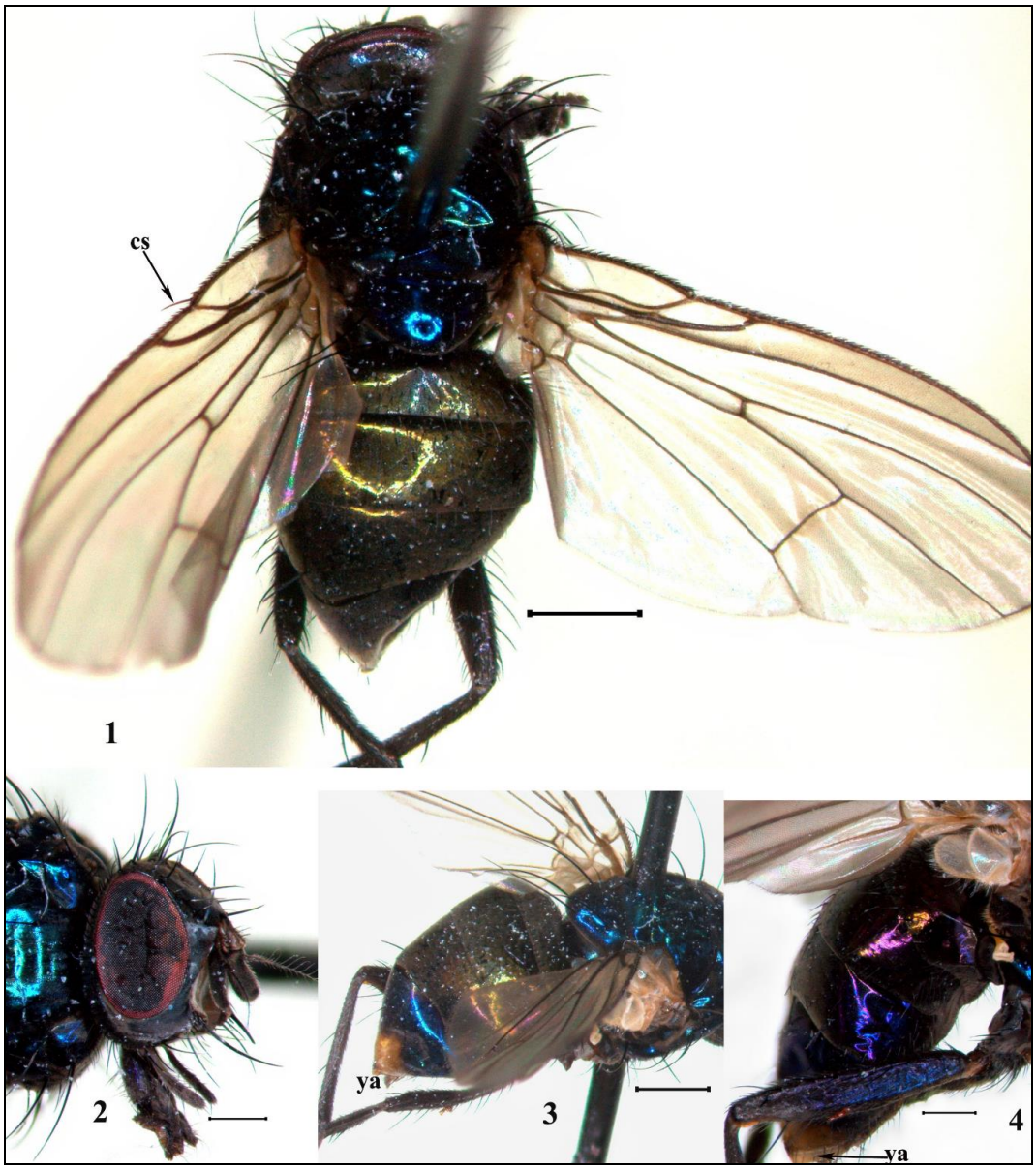
Head. Ground-colour blackish (Fig. 2). Dichoptic; eyes with very few very short hairs, facets of about equal size. Frons at level of vertex about 0.38 times as wide as maximal head width; slightly narrowing from margin of frons to level of anterior ocellus (4.8 times vs 4.4 times as wide as the distance between the outer margins of posterior ocelli). Fronto-orbital plate at middle of frons about 2.3 times as wide as anterior ocellus; the frontal triangle sharply narrowed shortly below the anterior ocellus, anterior tip of triangle reaching about the level of the second fronto-orbital seta. Parafacial at level of antenna basis about as wide as depth of postpedicel, at level where facial ridge and parafacial separate 0.3 times as wide as depth of postpedicel. Facial ridge at lower end almost as wide as parafacial at midway. In profile: upper mouth margin in line with profrons, genal depth below lowest eye margin about as wide as depth of postpedicel. In anterodorsal view frontal vitta matt black, fronto-orbital plate shiny black, ocellar triangle dark somewhat shiny; parafacial at basis of antenna dusted greyish-white or grey depending on angle of viewing, and below with a dark patch slightly shifting depending on incidence of light, below the patch a narrow area dusted greyish-white, the lower half of parafacial dusted dark grey. Pedicel brown, at certain point of viewing slightly shiny, postpedicel dark brown. Postpedicel about 2.3 times as long as deep and 1.5 times as long as pedicel. Arista brown, more than twice as long as length of postpedicel, longest hairs of arista almost as long as depth of postpedicel. Inner vertical seta about twice as long as outer vertical seta. Ocellar setae about as long as inner verticals. Anterior half of fronto-orbital plate with three or four long inclinate setae, the anterior one clearly longer than the upper setae, upper half of frons with two reclinate orbital setae, about of equal length and about half as long as the shorter fronto-orbital setae. No row of proclinate setulae between eye margin and fronto-orbital or orbital setae, only one or two small setulae on anterior surface of fronto-orbital plate. Parafacial and face bare. Lateral surface of gena bare, lower margin with black setae. Proboscis short, somewhat bulbous, prementum dark brown, depending on incidence of light sparsely dusted pale brownish or shiny bluish-violet, labella at least 1.5 times as long as widest depth of bulbous proboscis; palpus dark brown, slender, clearly longer than prementum.

Thorax. Mesonotum and lateral pleura dark greenish-blue, metallically shiny with a violet tinge and strongly reflecting in certain light conditions (Fig. 1) depending on angle of viewing blue, green or even violet dominating; at certain incidence of light in parts sparsely dusted greyish white. In dorsal view presutural part of mesonotum with two very narrow median stripe-like short patches, very faintly whitish dusted, the distance between the very short stripes about equal to the width of a stripe, the stripes not reaching the anterior pair of presutural dorsocentral setae. Another short but distinctly wider paramedian stripe dusted brownish white on each side between the anterior presutural dorsocentral setae, starting at the level of the anterior part of postpronotum and dilating towards and fading away behind the anterior presutural dorsocentral seta. Scutellum about concolorous with mesonotum, however violet more dominating. Pleura including the posterior meron and anepimeron shiny dark blue with violet reflections, in anterior view posterior pleura partly dusted pale brownish. Anterior spiracle ochre and very narrow, posterior spiracle dark brown and without setae on the lower margin. Mesonotum and pleura very sparsely covered with short dark hairs or setulae. Acrostichals 0+1, the posterior seta weak, almost hair-like and hardly one third as long as the posterior dorsocentral seta, the presutural acrostichal hairs vey sparsely and very small and weak in about two irregular median rows; dorsocentral setae 2 + 3, all strong and long, the anterior presutural dorsocentral seta about half as long as the posterior seta; posthumeral 1; presutural 1, distinctly longer than the long posthumeral one; postpronotal setae 2, the outer one almost twice as long as the inner one; notopleuron without setulae, anterior notopleural seta slightly longer than posterior one; prealar seta not recognizable; intra-alar seta 1; supra-alar setae 2; postalar setae 3. Prosternum not visible as covered by coxae, proepimeral area, anepimeron, katepimeron and meron bare. Katepisternal setae 2+2, the lower posterior seta closer to the posterior than to the anterior upper seta, the lower anterior seta distinctly shorter and weaker than the other katepisternals, but distinct; anepisternal setae 1+4, three posterior setae in the upper third and one in the lower third of anepisternum long and strong, several interstitial seta-like hairs about half as long as the setae. Scutellum with long apical and lateral setae and rather short basal setae but without preapical setae, disc with very few small setulae, lateral surface, and ventral surface completely bare.

Wing. Membrane hyaline with a brownish tinge, cross-veins not infuscate but with a slightly brownish shadow (Fig. 1). Tegula very small and brownish, basicosta well developed dark brown, wing veins brown. Costal spine longer than cross-vein r-m (Fig. 1). Radial node and veins ventrally and dorsally bare. Vein M straight, diverging from vein R4+5. Cross-vein r-m slightly beyond the point where vein R1 enters costa, distal cross-vein dm-cu almost straight and slightly oblique. Calypters whitish hyaline, margins white, at certain incidence of light with a weak yellowish tinge, lower calypter about 1.5 times as long as upper calypter. Haltere stem

yellow, knob white.

Legs. Coxae depending on incidence of light pale grey, grey, greyish-brown or brown. Hind coxa bare on the posterior surface. Fore and mid legs are missing. Hind legs with pulvilli and claws small, about half as long as the associated tarsal segment. Femur dark brown not blackish brown, or depending on incidence of light shiny violet with bluish reflections (Fig. 4), tibia and tarsi uniformly brown. Femur with a complete row of strong anterodorsal setae at most as long as depth of femur, and two strong anteroventral setae in apical fourth, pre-apically two well developed posterodorsal to almost dorsal setae. Hind tibia with two strong anterodorsals in middle third, longer than diameter of tibia and two anteroventrals about as long as diameter, no additional distinct posterodorsal seta.



Figs 1–4: *Helina chamelea* spec. nov., female holotype; 1) dorsal view, at least anterior tergites of abdomen largely brassy colored; 2) lateral view of head and dorsal view of anterior mesonotum, the latter glossy dark bluish with greenish reflections; 3) latero-dorsal view of abdomen; largely brassy, tergite 5 shiny blue with yellow apex; 4) lateral view of abdomen; glossy violet blue, femur shiny violet blue. (cs = fairly long costal spine, ya = consistent yellow apex of tergite 5). Scale bars; Figs: 1, 1 mm; 2–4, 0.5 mm.

Abdomen. Depending on conditions of light quickly changing ground-color (Figs.1, 3, 4) from uniformly shiny violet, or violet but syntergite in dorsolateral view brass to golden colored, to an almost complete brass or golden colored dorsal tergites, except tergite 5 (Fig. 3) that is predominantly metallically shiny bluish or at certain light conditions violet, the apical third however is constantly yellow. Ventral parts of tergites usually violet, however syntergite 1+2 and tergite 3 brass at certain light incidence. Tergites sparsely covered with setulae or hair-like setae, marginal setae rather small, tergite 5 with a few discals somewhat stronger. Sternites brown, sternite 1 bare.

Female genitalia not investigated.

Measurements. Length of body 6.3 mm; length of wing about 5.7 mm.

Diagnosis

Helina chamelea runs in van Emden's key to a group of Afrotropical *Helina* species that are marked by the lower katepisternal seta conspicuously more distant from the

anterior than from the posterior seta. However, no species of this group has metallically shiny body colour as it is the case with *H. chamelea*. Unfortunately, both front legs are missing in *H. chamelea*, therefore the species has to be checked in the revised Madagascan key for the two options "fore tibia with a median posterior seta" and "fore tibia without a posterior seta". There is no metallically colored species known so far from the group of species characterized as "fore tibia with a median posterior seta", in case *Helina chamelea* will have such a posterior median seta on fore tibia it would be clearly distinguishable from the other species of this group. In the group of species characterized as "fore tibia without a posterior seta", *Helina chamelea* will lead to couplet 7 with *Helina cyanea* (Stein) and *Helina fianara* Zielke. Both species are characterized by a more uniform, partly blue to almost black-blue body colour with or without metallically reflecting. Both species are not marked by a contrasting yellow apex of the last tergite. In contrast, depending on the condition of light in *Helina chamelea* the abdomen is colored brassy (under certain light almost golden) to violet or blue-violet, tergite 5 is predominantly blue with metallic sheen and the apical third of the tergite is contrastingly colored yellow.

***Helina losaca* spec. nov.** (Figs 5 – 8)

Material examined: Female holotype, the locality label of the specimen reads: "E. Madagascar, 989 m, Ranomafana N. P., FIT 1, S21°16'46"
E47°25'15", 10-14.01.2017 leg. P. B. "Apart from the left hind leg missing, the specimen is in a fairly good condition. The holotype will be stored in the Entomological Department of the Museum in Brno, CZ.

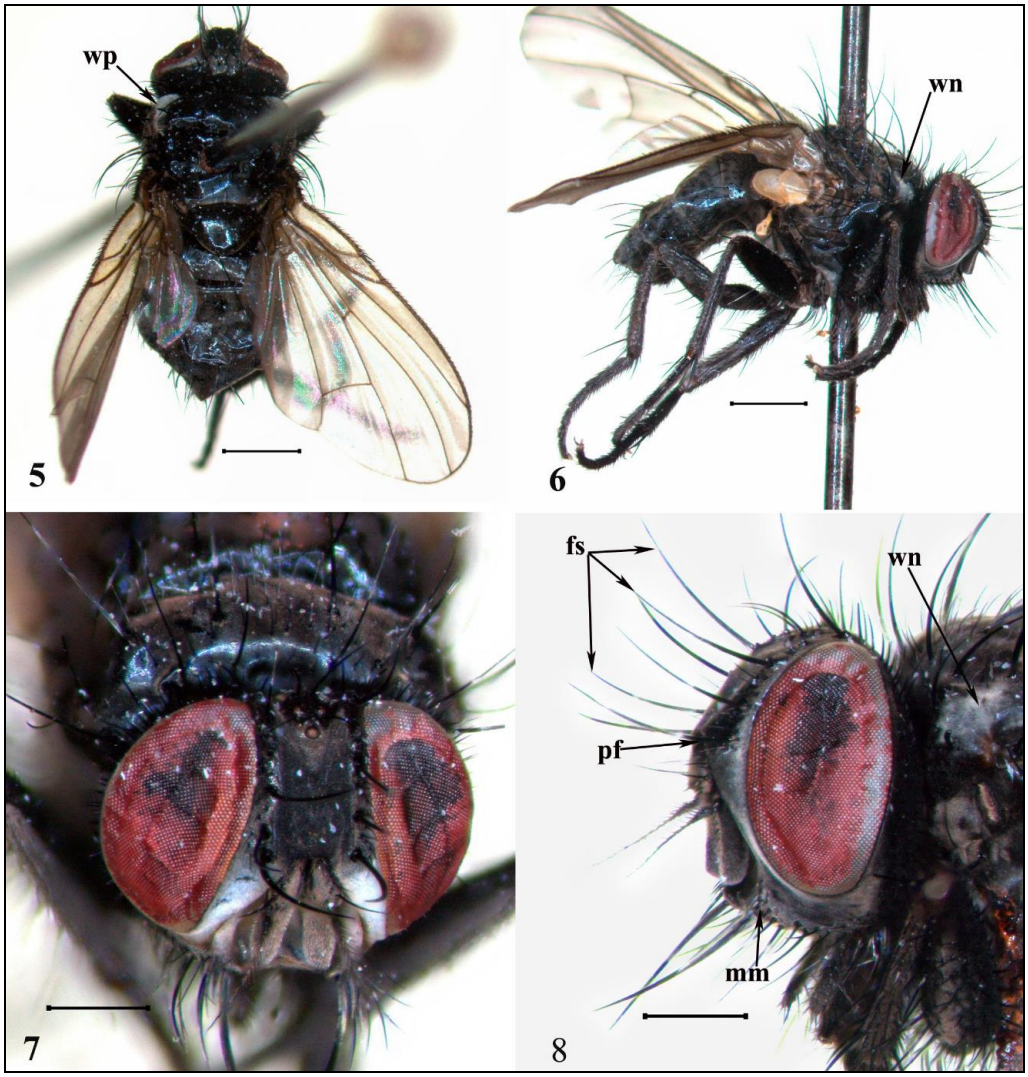
Etymology: The name of the new species "*losaca*" is an artificial feminine adjective and refers modified to the very "long setae of the head" (in Latin: longae saetae capitis"). Of each of the latter three words the first two initials are combined to the epithet *losaca*.

Description (female): Head. Ground-colour dark (Fig. 7), almost blackish, depending on incidence of light more or less dusted greyish. Dichoptic; eyes not very big, with very few microscopic hairs, facets of about equal size. Frons somewhat dilating from vertex to lunule. At level of vertex about one third as wide as maximal head width; at level of anterior ocellus about 3.8 times and at anterior margin of frons 4.6 times as wide as the distance between the outer margins of posterior ocelli. Fronto-orbital plate at middle of frons about twice as wide as diameter of anterior ocellus; frontal triangle short, anterior tip reaching not midway of frons but the level of third pair of fronto-orbital setae. Parafacial at level of antenna basis 1.5 times as wide as, and at the lower end barely one third as wide as depth of postpedicel. Facial ridge at lower end almost half as wide as depth of postpedicel. In profile: upper mouth margin distinctly behind profrons (Fig. 8); parafacial visible throughout its entire length; genal depth below lowest eye margin about 1.5 times as wide as depth of postpedicel. In anterior view frontal vitta matt blackish, fronto-orbital plate black, somewhat shiny, frontal triangle sparsely dusted dark brownish; parafacial almost uniformly densely dusted grey with a weak whitish shine and without a dark patch at level of antenna basis; face and facial ridge dusted as parafacial. Basal segments of antenna black, at certain incidence of light pedicel sparsely dusted dark grey, postpedicel dark with some greyish-brown pollinosity. Postpedicel 3.2 times as long as deep and about twice as long as pedicel, falling short of mouth margin by about its own depth. Arista brown, almost long as length of postpedicel, longest ventral hairs of arista at middle third of arista about half as long. Two thirds of fronto-orbital plate with three strong and equally long inclinate setae, the setae conspicuously longer (Fig. 8) than length of arista or maximal width of eye, on the right fronto-orbital plate an additional seta, even longer than the anterior ones, at level of anterior tip of frontal triangle, a few seta-like interstitial hairs between the setae; at level of anterior ocellus one stronger reclinate seta and shortly below another somewhat shorter reclinate one, both setae not half as long as the frontal setae. Ocellar seta and outer vertical seta about as long as orbital setae, inner vertical seta almost as long as frontal setae. An irregular row of numerous proclinate setulae between eye margin and fronto-orbital ad orbital setae Parafacial and face bare. Vibrissal setae clearly stronger and somewhat longer than the fronto-orbital setae, the longest surrounding peristomal setae barely half as long. Lateral surface of gena bare, lower margin with a row of small black setae and more ventrally with a row of long and strong bristle-like setae. Postorbital surface depending of incidence of light shiny black or dusted greyish, densely covered with dark short seta-like hairs. Proboscis short and bulbous, prementum brown, somewhat greyish dusted or shiny depending on conditions of light, labella about as long as widest depth of proboscis; palpus dark, filiform, about as long as prementum.

Thorax. Ground-colour black. In dorsal view mesonotum shiny dark brown to black without any pattern (Fig. 5), when viewed from anterior dusted pale brownish in parts; postpronotum contrastingly dusted white and notopleuron greyish-brown with whitish shine (Figs 5, 6, 8); prescutellar suture and the surface in front at certain viewing point somewhat whitish dusted. Scutellum concolorous with mesonotum but more matt. Pleura shiny black, at certain incidence of light with brownish or whitish grey pollinosity in parts. Anterior and posterior spiracle dark, posterior spiracle without dark setae at lower margin. Mesonotum, scutellum and pleura not densely haired, at most with some hair-like setae, clearly longer than setulae. The setae on mesonotum in general rather long and very strong. Acrostichals 0+1, the seta about one third as long as the posterior dorsocentral seta, the presutural acrostichal hairs in two median rows, the distance between the rows shorter than the length of the hairs and one or two irregular rows inside of the rows of presutural dorsocentrals; dorsocentral setae 2 + 3, the anterior presutural seta much shorter than the posterior presutural dorsocentral seta; postpronotal setae 2, the outer one distinctly longer than the inner weaker seta; posthumeral seta 1; presutural 1; notopleuron without setulae, anterior notopleural seta slightly longer than posterior one; prealar seta slightly longer than the ground hair; intra-alar setae 2 long ones, supra-alar setae 2; postalar setae 3. Prosternum, proepimeral area, anepimeron, meron and katepimeron bare. Katepisternal setae 2+2, the lower posterior one about equally distant to the posterior and to the anterior upper seta, the anterior lower seta very weak and close to the anterior upper seta; anepisternal setae 1+6 all rather strong and of varying length, only a few short interstitial hairs. Scutellum with long apical and lateral setae, basal seta distinctly shorter but clearly recognizable, scars of preapical setae barely visible, although no ground-hairs in the apical half, and only very sparse in basal half, lateral surface, and ventral surface without any hairs.

Wing. Membrane hyaline with a weak brownish tinge (Fig. 5), cross veins not infuscate. Tegula black, basicosta dark brown, veins brown. Costal spine clearly longer than cross-vein r-m. Radial node and veins ventrally and dorsally bare. Vein M straight, diverging from vein R4+5. Cross vein r-m slightly basad from the point where vein R1 enters costa, distal cross vein dm-cu slightly bent inwards and fairly straight. Calypters whitish matt at certain incidence of light with a weak yellowish tinge, margins yellowish-white, lower calypter almost twice as long as upper calypter. Stem of haltere yellow, head yellowish-white.

Legs predominantly dark brown to black (Fig. 6), tibiae at certain incidence of light only dark brown. Pulvilli and claws well developed, shorter than the tarsomeres they are inserted on. Hind coxa bare on the posterior surface. Fore femur with complete rows of strong posteroventrals and posterodorsals, all posterodorsal setae about as long as and the posteroventrals distinctly longer than depth of femur, in addition a row of posterior setae, about half as long s depth of femur. Fore tibia with two conspicuously strong median posterior seta, at least twice as long as diameter of tibia. Mid femur with a median bristle-like anterior seta longer than depth of femur; in addition an irregular row of short anteroventral seta-like hairs, almost half as long as depth of femur, and a complete row of posteroventral setae, of which the setae in basal half in general distinctly longer than those in apical half, three to four setae even longer than depth of femur, the posteroventrals in apical half about half as long as depth of femur, preapically two strong posterior to posterodorsal setae, anterodorsal seta not recognisable. Mid tibia with two strong posterior setae in middle third, distinctly longer than twice the diameter of tibia. Hind femur with a complete row of anterodorsal setae almost as long as depth of femur and with an almost complete row of anteroventral setae, strong and about as long as depth of femur, the most distal seta stronger and distinctly longer than depth of femur, in the basal half four posteroventral setae longer than depth of femur, pre-apically a well-developed posterodorsal seta. Hind tibia with two anterodorsals at least twice as long as diameter of tibia and two anteroventral setae longer than diameter of tibia; the preapical posterodorsal seta strikingly strong and longer than length of basal tarsomere segment, the preapical anterodorsal seta as well long but somewhat shorter the tarsal segment.



Figs 5 – 8: *Helina losaca* spec. nov., female holotype; 5) dorsal view, predominantly very dark shiny, postpronotum (wp) greyish-white marked; 6) lateral view; notopleuron (wn) whitish marked, 7) anterior view of frons; 8) lateral view of head with long fronto-orbital setae (fs) and the upper mouth margin (mm) clearly behind profrons (pf), whitish postpronotum and notopleuron (wn) distinct.
Scale bars; Figs: 5 – 6, 1 mm; 7–8, 0.5 mm.

Abdomen. Ground-colour uniformly dark, almost black and shiny without any pattern (Figs 5, 6) at certain incidence of light dusted dark greyish-brown in parts; lateral parts of tergites and sternites concolorous with dorsal surface of abdomen. Tergites covered with several dark seta-like hairs, all tergites with distinct marginal setae, significantly stronger and longer in tergites 4 and 5, tergites 3 and 4 laterally with some distinct discal setae, only tergite 5 with a complete row of long discals. Sternite 1 bare.

Female genitalia. The species is clearly distinguished from similar species of the genus by morphological characters, the identification does not depend on comparison of characters of genitalia. Therefore, it has been refrained from extracting the genitalia to avoid inflicting damage on the only hitherto available specimen of this new species.

Measurements. Body length about 4.5 mm; wing length about 4.3 mm. Male not known.

Diagnosis: The taxonomic features of *Helina losaca* spec. nov. lead in van Emden's key to couplet 51(52) with *Helina mediorufa* van Emden, 1951. Whereas the latter species is marked by cinereous-grey dusted head and abdomen, ferruginous thorax with pale golden dust and four darker ferruginous stripes and the legs are pale testaceous, the new species is apart from dusted greyish-white postpronotum and notopleuron, predominantly dark brown to blackish coloured without any of the markings described from *H. mediorufa*. Using the latest key to the Madagascan species [1] the new species leads to *Helina mantada* Zielke, 2021, which is a predominantly greyish-ochre coloured species with strikingly yellowish basal parts of the wing veins, easily to distinguish from the rather dark *Helina losaca* spec. nov.

***Helina quadriseta* (Adams, 1905)**

A significantly less spectacular-looking grey coloured *Helina* female could not be assigned to a species using either of the two identification tables for Madagascan species [1, 4]. In van Emden's key to the Afrotropical *Helina* species [5], on the other hand, the female clearly led to *Helina quadriseta* (Adams, 1905). The comparison of the specimen with the original description of the species [9] also showed a good agreement. The species is known from Cameroon, Ethiopia, Malawi, South Africa, Zimbabwe, but also from Saudi Arabia and Yemen. Only *Helina lucida* (Stein, 1913) has not been described from Madagascar and not three taxa, as recently erroneously stated in the introduction to the last contribution [1]. But *Helina quadriseta* is now the second species of the genus occurring in Madagascar, which is not from, but from outside of Madagascar.

Update of the latest key to the Madagascan *Helina* species [1]

1. Mesonotum with an *Anthomyia* pattern .....*H. lucida* (Stein)
- Mesonotum differently marked 2
2. Fore tibia with at least one median posterior seta…....3
- Fore tibia without a posterior median seta 7
3. Body not metallically blue, violet, green or brassy coloured 4
- Body metallically shiny violet to blue or bluish-green, at certain conditions of light large parts of abdomen brassy, tergite 5 predominantly shiny bluish with the apical third of tergite contrastingly yellow... *H. chamelea* spec. nov.*
4. Posterior lower sternopleural seta about equally distant from upper anterior and posterior setae 5
- Posterior lower sternopleural seta distinctly closer to the posterior than to the upper anterior upper seta …….....6
5. Predominantly greyish-ochre coloured species with strikingly yellowish basal parts of the wing veins; fore tibia with one distinct posterior seta .....*H. mantada* Zielke
- Predominantly dark brown to blackish species with greyish-white postpronotum and notopleuron, basal parts white postpronotum and notopleuron, basal parts of wing veins not strikingly yellow; fore tibia with two strong posterior setae .....*H. losaca* spec. nov.
6. Thorax densely greyish-white and rust-brown dusted; mid tibia with one posteroventral and two posterior setae.....*H. andasiba* Zielke
- Ground-colour predominantly shiny dark brown to black, under certain conditions of light partially slightly brownish dusted; mid tibia without a posteroventral seta..... *H.* fianara Zielke*
7. Trochanters, femora, and tibiae predominantly yellow..... *H. grisella* Couri, Pont & Penny
- Legs usually completely brownish or darker, at most apex of trochanters and/or small parts of femora yellow 8
8. Posterior lower sternopleural seta distinctly closer to the posterior than to the upper anterior seta 9
- Posterior lower sternopleural seta about equally distant from upper anterior and posterior setae .....*H. hesitancia* Zielke
9. Thorax and scutellum uniformly dark coloured.....10
- Scutellum predominantly yellowish.....14
10. Large parts of abdomen never purely brassy, tergite 5 without conspicuously yellow coloured apical third….11
- Depending on condition of light, abdomen violet or blue-violet to bluish-green, under certain light conditions large parts brassy to almost golden, tergite 5 predominantly blue with metallic sheen, the apical third of the tergite contrastingly yellow.....*H. chamelea* spec. nov.*
11. Mesonotum and abdomen distinctly greyish, greyish-white or greyish-yellow dusted with longitudinal brown stripes on the mesonotum, abdomen with stripes, patches or just uniformly dusted.....12
- Ground-color of thorax and abdomen uniformly predominantly dark, sparsely dusted or shiny depending on incidence of light, without distinct stripes on the mesonotum 13
12. Hind tibia with a posterodorsal seta in basal third and three anteroventral setae; thorax und abdomen grey dusted, mesonotum at least with two dark paramedian stripes between and along the presutural rows of dorsocentral setae; abdominal tergites 3 and 4 each with a pair of round brown spots, not reaching anterior or posterior margin of tergites .....*H. quadriseta* (Adams)
- Hind tibia without a posterodorsal seta in basal half and with two anteroventral setae; abdomen dusted uniformly greyish-white, marked by numerous dark small spots around the basis of setae, in male with a brown median longitudinal stripe widened in the two posterior tergites, female without specific pattern.....*H. amboa* Zielke
13. Ground-colour metallic dark bluish, at certain viewing angle more or less greyish-white to greyish-pale, brownish dusted; calypters and margins white, the latter with a

yellowish tinge..... *H. cyanea* (Stein)
- Ground-colour deeply dark brown to black, usually shiny, at certain incidence of light slightly brownish dusted; upper calypter hyaline transparent, margin whitish with a very narrow blackish frame, lower calypter yellowish brown transparent, margin darker yellowish brown.....*H. fianara* Zielke*

14. Abdomen metallically greenish-blue; anterior spiracle ellow; haltere yellow with very pale knob.....*H. flavomaculata* Couri, Pont & Penny
- Abdomen brown or grey, but not metallically green or blue; anterior spiracle brown and knob of haltere brown to dark brown.....15

15. Presutural part of mesonotum greyish-white dusted with a pair of dark paramedian stripes, postsutural part of mesonotum predominantly yellowish dusted without clear dark stripes; at least the area between costa and vein R4+5 of wing membrane strongly yellowish-brownish tinged; abdomen dark grey with dark dots at the basis of strong setae.....*H. ranoma* Zielke
- Mesonotum predominantly dark brown, somewhat shiny, with three grey dusted stripes; wing membrane clear; abdomen dark brown without a specific pattern…*H. carpiae* Couri, Pont & Penny

[* = since it is not yet known whether the fore tibiae of *H. fianara* and *H. chamelea* spec. nov. have a posterior median seta, both options, "with a posterior seta" and "without a posterior seta", must be considered in the identification key.]

Acknowledgements
I am very grateful to the colleagues of the Entomological Department of the Moravian Museum in Brno (Czech Republic), for getting access to the undetermined muscid material and to the colleagues of the entomological collection of the California Academy of Sciences, San Francisco and of the Museum für Naturkunde, Berlin, for providing several *Helina* species for comparison. My thanks are also due to Toshko Ljubomirov, responsible for the Zoological Collection of the Institute of Biodiversity and Ecosystem Research, Sofia, for supporting my work on the taxonomy of the Muscidae by giving me generous access to the Diptera collection of the Institute and for the facilities needed for the examination of the material.

References
1. Zielke E. Description of Four new *Helina* species from Madagascar (Diptera: Muscidae). Journal of Entomology and Zoology Studies. 2021;9(6):208 -219.
2. Zielke E. Faunistic and taxonomic notes on some Madagascan Muscidae (Diptera) and descriptions of three new species. Contributions to Entomology 2022;72(2):321-338.
3. Zielke E. Four new *Dichaetomyia* species from Madagascar (Diptera: Muscidae). Journal of Entomology and Zoology Studies. 2021;9(3):105-114.
4. Couri SC, Pont AC, Penny ND. Muscidae (Diptera) from Madagascar: Identification keys, descriptions of new species, and new records. Proceedings of the Californian Academy of Sciences. 2006;57:799-923.
5. Van Emden FI. Muscidae C. –Scatophaginae, Anthomyiinae, Lispinae, Fanniinae and Phaoniinae. Ruwenzori Expedition 1934–5. 1951;2:325-710.
6. Pont AC. Diptera Muscidae and Anthomyiidae from the Comoros Archipelago. Faune Entomologique de l'Archipel des Comores. Memoires du Muséum National D'Histoire Naturelle. N.S. Série A, Zoologie 1978;109:333-365.
7. McAlpine JF. Morphology and terminology-adults. In: McAlpine JF, Peterson BV, Shewell GE, Teskey HJ, Vockeroth JR, Wood DM (eds). Manual of Nearctic Diptera. Volume 1. Agriculture Canada Monograph. 1981;27:9-63.
8. Stuckenberg BR. Antennal evolution in the Brachycera (Diptera), with a reassessment of terminology relating to the flagellum. Studia Dipterologica. 1999;6:33-48.
9. Adams CF. Diptera africana, I. The Kansas University Science Bulletin. 1905;3(6):147-208.