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Descriptions of new *Coenosia* species from Madagascar (Diptera: Muscidae)

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Abstract
Examination of unidentified Muscidae collected in Madagascar between 2011 and 2017 revealed seven *Coenosia* species that are new to science. Two species, *Coenosia abdomaltoa* spec. nov. and *Coenosia ambrea* spec. nov. belong to the *C. humilis* species group sensu van Emden, three others, *Coenosia bohita* spec. nov., *Coenosia mafascia* spec. nov. and *Coenosia ranoma* spec. nov., are members of the *semifumosa*-group, and *Coenosia exima* spec. nov. and *Coenosia madaxenia* spec. nov. were assigned to the *strigipes* species-group. The new taxa are described and the key features for distinguishing them from similar species from the respective species group are listed.

Keywords: Afrotropical region, Madagascar, Muscidae, new species, descriptions, differentiation

Introduction
Species of the genus *Coenosia* Meigen, 1826 occur in almost all zoogeographic regions, albeit with varying diversity and abundance. In total 117 species and subspecies were listed in 1980 from the Afrotropical region [1], however, the number has since increased to approximately a few more than 130 species. This makes *Coenosia* one of the most species-rich genus in the Afrotropical region. However, it is surprising that the occurrence of *Coenosia* in Madagascar, which is known as a hotspot of species evolution [2, 3], seemed until recently to be limited to only seven species [4], although the authors conducting the study examined more than 100 *Coenosia* specimens, which came from more than 30 different locations distributed throughout the country. When unidentified muscids from Madagascar were studied at the IBER also several *Coenosia* specimens were found among the material. Some of which differed very clearly from one another and it soon became obvious that they belong to significantly more than the seven different species listed previously [4]. Three *Coenosia* species were already described very recently as new to science [5]. In the meantime, further specimens have been identified that neither corresponded to the characteristics of the available identification keys for the genus nor to the descriptions of taxa published by various authors that are not yet included in any key. Another seven new species from Madagascar, *Coenosia abdomaltoa* spec. nov., *Coenosia ambrea* spec. nov, *Coenosia bohita* spec. nov. *Coenosia exima* spec. nov., *Coenosia madaxenia* spec. nov., *Coenosia mafascia* spec. nov., and *Coenosia ranoma* spec. nov., are now described below in alphabetical order.

Materials and Methods
As already mentioned in previous articles [6, 7], the unidentified muscid material was isolated from remains of insect traps preserved in high percent ethanol. The material was kindly provided by the Moravian Museum, Brno, CZ to the Institute of Biodiversity and Ecosystem Research (IBER), Sofia, BG for screening for Muscidae. Many of the flies found were destroyed or had lost body parts crucial to identification. But some specimens, apart from lost setae, were only slightly or not at all damaged and suitable for further processing and identification. These flies were cleaned in 75% ethanol before being transferred to a solution of 30% ethanol for soaking and then mounted on a pin or a minute and marked with a locality label. In order to reduce shrinkage, the samples were dried slowly in a container at constant humidity. Added acetic acid evaporated and prevented fungal infestation. However, the process of slowly drying was only partially successful, many of the small specimens showed in spite the slow drying more or less some shrinkage.

Van Emden's approach [8] of dividing the genus into species groups and creating an identification key for each group largely enabled the identification of the indeterminate *Coenosia* specimens. In addition articles with descriptions of *Coenosia* species from the Afrotropical Region were consulted which were published after 1940 [9-17]. The new species were also checked against the keys of the earlier authors [18-20], but none of the new species matched satisfactorily the descriptions of any species listed in these keys or in the publications of the authors mentioned before. Some of the new *Coenosia* species were also compared with the type material of similar species when visiting the Muscidae collection of the Museum für Naturkunde, Berlin in 2024.

Morphological terminology follows McAlpine (1981) [21], but postpedicel (Stuckenberg, 1999) [22] is used instead of "first flagellomere" as proposed by McAlpine. The fronto-orbital setae are called frontal setae. The width of the postpedicel seen from the lateral side is called "depth" and the greatest depth of the postpedicel is always used for comparisons and ratio calculations. The length of postpedicel is measured from the most anterior margin of pedicel till the apex of postpedicel. Unless otherwise stated, information on the width of the forehead always refers to the shortest distance between the margins of the eyes. The anterior width of frons is measured directly at the upper margin of lunule. Only the post sutural intra-alar setae are called as such and the so-called intra-alar setae of the presutural part of mesonotum are referred to as posthumeral and presutural setae. Rather strong but short and usually distinctly curved setae are called bristles, for example the preapical bristles of the mid femur. When the length of setae or hairs of the femur is compared to the depth of femur, the depth always refers to the point of insertion of the seta or hair. Body length is measured in millimetres (mm).

External morphological features of the specimens were studied using a Zeiss Stemi SV6 stereomicroscope and images were created by means of combination of a Zeiss Discovery 8 stereomicroscope and an AxioCam ERc5s camera. Helicon Focus 6 and Adobe Photoshop CS2 were applied for further processing of the images.

The described *Coenosia* species were studied in 2022 to 2024. The holotypes of the new species will be returned to the Moravian Museum upon completion of the study.

***Coenosia abdomaltoa* spec. nov. (Figs 1-6)**

Material examined

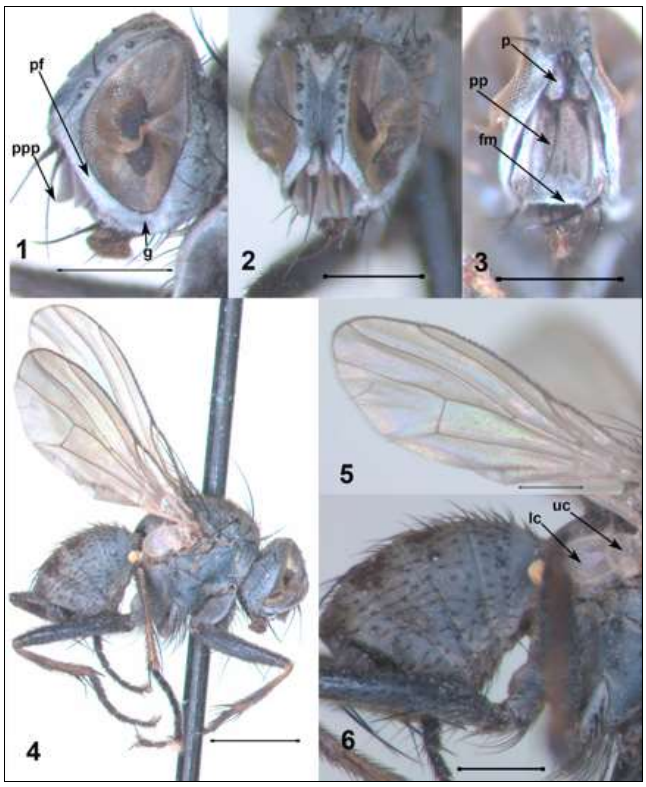
♂ Holotype; locality label reads: "Madagascar-CE 1.130 m Ranomafana NP Vohiparara pasture, sweeping, S21°14'26" E47°23'40.2" 14.xi.2010, local collectors". The holotype is in fairly good condition, apart from the fact that the left fore and mid leg and several large setae have been lost. The holotype will be returned to the Moravian Museum, Brno after completion of the study.

Etymology

The epithet "*abdomaltoa*" is a female adjective composed and somewhat modified of the two words "abdomen" and "alto" (= high in Latin), referring to the noticeably elevated apical half of the abdomen, which is not conspicuous from the dorsal point of view.

Description (male)

Head. Ground-colour uniformly densely dusted grey (Fig. 1). Dichoptic; eye practically bare, facets of about equal size. Frons at base of antennae about three quarters as wide as maximum width of an eye, slightly dilating to vertex; fairly broad frontal triangle reaching midlength of frons (Fig. 2). Fronto-facial stripe in upper half of head slightly narrowing to basis of antennae and in lower half strongly dilating downwards to mouth margin, face shorter than frons. In antero-dorsal view ground-colour of frontal vitta blackish, somewhat dusted greyish-white, fronto-orbital plate, however,



Figs 1-6: *Coenosia abdomaltoa* spec. nov., male holotype: (1) head, lateral view, parafacial (pf), gena (g), postpedicel ending in a point (ppp); (2)anterodorsal view of frons; (3) anterior view on antennae, pedicel (p) dusted densely whitish-grey, postpedicel (pp) about four times as long as deep, facial margin (fm) not reached by the antennae; (4) lateral view of male; (5) ventral surface of right wing, membrane with greyish-brown tinge; (6) abdomen, almost pyramid-shaped, apical twice as high as at middle of syntergite 1+2, lower calypter (lc) distinctly longer than upper calypter (uc) but not wider. Scale bars: Figs 1-3 & 5-6, 0.5 mm; Fig. 4, 1 mm.

predominantly greyish-white; depending on viewing angle pedicel and postpedicel darker grey or more dusted greyish-white; parafacial, facial ridge, face, peristomal area, anterior and lateral surface of gena densely dusted greyish-white. In profile (Fig. 1); profrons conspicuously protruding by about the length of postpedicel; parafacial broadly visible throughout its length; antenna is long but falling short to facial margin by slightly more than the depth of the postpedicel; level of facial margin slightly below the level of the lower eye margin; depth of gena below lowest eye margin clearly wider than depth of postpedicel. Fronto-orbital plate in anterior half with four inclinate fronto-orbital setae, the anterior seta not much longer than the upper setae. At level below anterior ocellus on each side one strong scar each belonging to the lost reclinate seta; ocellar seta conspicuously short, not reaching the anterior tip of the frontal triangle in the middle of frons. Vertical setae are lost. Postpedicel slightly more than four times as long as its depth (Fig. 3) and slightly more than twice as long as pedicel, postpedicel apically

tapering to a conspicuous upwardly curved tip (Fig. 1); arista barely twice as long as length of postpedicel, dilated at basal part, the longest dorsal hairs of arista about half as long as depth of postpedicel, ventral hairs clearly shorter. Parafacial at basis of antenna slightly wider than depth of postpedicel, somewhat tapering in upper quarter and practically parallel-sided throughout its length about three quarters as wide as depth of postpedicel. Prementum of proboscis glossy dark brown, labella brown slightly longer than depth of proboscis; palpus dark brown.

Thorax. Uniformly densely dusted grey (Fig. 4), mesonotum and scutellum at certain viewing angle with a weak brownish tinge but without distinct dark stripes. Metanotum densely dusted greyish apart from a glossy dark basal band. The presutural acrostichal setulae in two paramedian rows the distance between the rows shorter than the length of the setulae, in addition a rudimentary row of setulae each along inside of the row of presutural dorsocentral setae, only the two paramedian rows continued in postsutural part of mesonotum. Dorsocentrals 1+3; postpronotal setae 2, the inner seta almost as long as the outer seta, posthumeral seta 1, presutural seta 1, almost three times as long as posthumeral seta; notopleuron without setulae, notopleural setae 2, the anterior one almost twice as long as the posterior seta; prealar seta absent; intra-alar seta 2; supra alar setae 2, post-alar setae 2 visible. Katepisternals in triangle, the lower seta is somewhat closer to the anterior seta than to the posterior one, the surface in the triangle is bare. Anepisternal setae 1 anterior and a posterior row of three strong seta in the upper part and a distinctly stronger seta somewhat more downwards; proepisternal seta strong and below a slightly shorter seta; proepimeral seta strong, the shorter lower proepimeral set a curved downwards. Scutellum with a pair each of long and strong apical and lateral setae, surface of scutellum with a few setulae, lateral surface bare.

Wings. Membrane hyaline with a brownish tinge (Figs 4 & 5), veins partly yellowish-brownish or brown, cross-veins and surrounding membrane not infuscate, tegula grey, basicosta more yellowish; costa reaching apex of vein M, costal spine barely distinguishable from adjacent bristles; cross-vein r-m clearly beyond the point where vein R1 enters costa. Vein A1 distinctly shorter than half the distance from its base to the wing margin. Calypters (Figs 4 & 5) whitish, margin and fringe whitish at certain incidence of light with a weak yellowish tinge, lower calypter about twice as long as and strongly projecting beyond upper calypter, but not wider than upper calypter and the sides subparallel in middle part. Stem of haltere yellowish, at basis brown, knob yellow.

Legs. All coxae, trochanters and femora dark and densely dusted grey, apical tips of femora yellow, tibiae yellow, at certain viewing angles partially slightly infuscate, tarsi contrasting dark brown to blackish (Fig. 4). Fore femur with a few short posterodorsal setae, a complete row of about seven posteroventral setae distinctly longer than the diameter of femur and which alternate with small setae; fore tibia with a long median postero-ventral seta at least half as long as length of tibia. Mid femur in basal half of ventral surface with three hair-like setae longer than depth of femur and with distinct scars of two anteroventrals, in apical fourth or third about five posteroventral seta-like hairs at most half as long as depth of femur, two distinct scars of posterior to posterodorsal preapical setae. Mid tibia slightly beyond middle with a strong anterior seta almost half as long as tibia (Fig. 4) and at about the same level a strong posterior seta, only slightly shorter than the anterior one. Hind femur with a row of about five strong scars of anterodorsal setae, the most basal seta of the row is present, slightly longer than depth of femur, in basal two thirds three long seta-like posteroventral hairs, longer than depth of femur, the longest one at the middle third at least 1.5 times as long as depth of femur, the anteroventral surface in basal half with two long setae, the more basal one almost opposite to the posteroventral seta and about as long and hair-like, the more median anteroventral seta strong, long, seta-like and also opposite to the corresponding posteroventral seta. Hind tibia slightly but distinctly curved, with a strong median anterodorsal seta, clearly longer than half the length of tibia, at the same level slightly below a strong anterior seta but not reaching half the length of tibia, preapically a posterodorsal, dorsal and anterodorsal seta, the posterodorsal seta the longest and strongest and the dorsal seta the shortest one, the anterodorsal one almost as long as the median anterodorsal seta.

Abdomen. In dorsal view slender and tapering to the posterior end; in lateral view, however, the height of the abdominal tergites increases significantly in each additional tergite and ends with a strikingly elevated apical tergite that is about twice as high (Fig. 6) as the mean height of syntergite 1+2. Ground-colour densely dusted pale greyish, tergites 3 and 4 each with a pair of conspicuous brown rounded lateral patch adjacent to posterior margin of tergite but not reaching the anterior margin (Figs 4 & 6), in addition tergites 3 to 5 with a median brown longitudinal stripe, in tergite 5 only visible at certain viewing angles. Syntergite 1+2 without any distinct brown pattern. All tergites laterally with a strikingly long and strong discal seta each, tergites 4 and 5 with two paramedian dorsal setae, all setae each longer than the length of the tergite, the base of strong setae surrounded by a dark brown spot each, the surface of tergites covered with semi-erect black seta-like short hairs, the marginal setae hair-like and, if at all, not much longer than the clothing hair of the tergites. Sternites concolourous with tergites.

Male genitalia. *Coenosia abdomaltoa* spec. nov. is clearly distinguished from the other known taxa of the genus by several taxonomic characters, the hypopygium is not needed for identification purposes. Therefore, it was deemed wiser not to extract the genitalia, to avoid inflicting damage on the hitherto only available specimen of the species.

Measurements: Body length 3.7 mm, length of wings 3.4 mm.

Female: Not known.

Diagnosis

The taxonomic features of the new species lead in van Emden's keys [8] to the *Coenosia humilis* species-group and there to *Coenosia inanis* Stein, 1913. The taxonomic features listed by van Emden for the identification of *C. inanis* largely match also *Coenosia abdomaltoa* spec. nov. and do not indicate any striking peculiarities of the species. However, unlike *C. inanis*, the new species does not have an additional preapical antero-subdorsal seta on the fore tibia between the dorsal and anterodorsal setae, and further differences emerged when comparing the male of *Coenosia abdomaltoa* spec. nov. with Stein's description [18] of the male syntypes of *C. inanis*. According to Stein, the frons of *C. inanis* is about as wide as an eye above the antennae and significantly wider than an eye at the vertex, and the lower part of the face is “somewhat

receding". In the new species, on the other hand, the frons is only three quarters as wide as an eye above the base of the antenna and about equally as wide as an eye at the vertex, and the face is not "somewhat" but distinctly receding, the facial margin is even almost as distant from profrons as the length (not the depth!) of the postpedicel. The abdomen of *C. inani*s is according to Stein "quite strong, cylindrical, highly arched, and weakly compressed at the back." However, the abdomen of *Coenosia abdomaltoa* is in lateral view not cylindrical but almost pyramid-shaped, the height of the abdomen increases continuously with each tergite from syntergite 1+2 and has doubled up to the apical tergite. The wings of *C. inanis* are almost "as clear as glass" and in *Coenosia abdomaltoa* spec. nov. They are weakly but distinctly brownish tinged. Van Emden [8] does not address the shape of the abdomen, and Stein [18] as well as van Emden do also not report from *C. inanis* a postpedicel that is more than four times as long as its depth and ends in a point, although both authors usually declare such characteristic features in the descriptions and characterizations of other *Coenosia* species. This triggers the assumption that the antenna probably did not show this combination of features. Unfortunately, the type material of *C. inanis* which was stored in the Hungarian National History Museum, Budapest, has been destroyed by fire [23], comparisons of *Coenosia abdomaltoa* spec. nov. With type material of *C. inanis* are therefore not possible and remain limited to the descriptions.

***Coenosia ambrea* spec. nov. (Figs 7-11)**

Material examined

♀ Holotype, locality label reads: "MDA/ Jan. 2016/YPT N. Madagascar Montagne d'Ambre NP 1040 m; Yellow Pan Trap, S12°312'37"E49°10'15", 13.-18.i.2016 P. Banar lgt." The female is lacking the left fore and mid leg and few setae, but in general the specimen is in good condition.

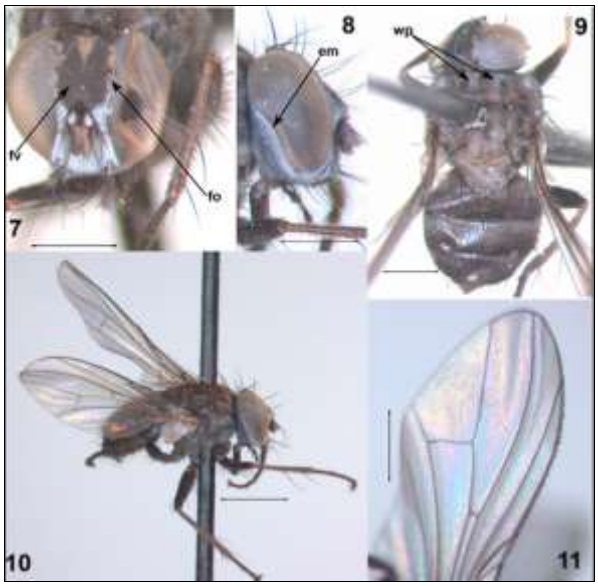
Etymology

The epithet "*ambrea*" is a feminine adjective and refers to the mountain where the specimen was collected.

Description (female)

Head. Upper half predominantly dark, lower half grey. Eye practically bare. Frons longer than face, broad, in frontal view (Fig. 7) dilating towards vertex, above lunule about as wide as and at vertex about 1.3 times as wide as maximum width of an eye. Frontal vitta matt, dark brown almost black. Frontal triangle yellowish-brown to rusty-brown. Fronto-orbital plate in lower half dusted whitish-grey, in upper part more brownish-grey (Fig. 7); parafacial, face and gena whitish-grey, occiput greyish. Fronto-orbital plate narrow, at midlength barely as wide as diameter of anterior ocellus. Frontal triangle distinct, anterior tip reaching the level of upper inclinate frontal seta. In profile; eye in upper half wider than in lower half, posterior margin distinctly indented (Fig. 8); facial margin almost in line with profrons; parafacial visible throughout its length; antenna falling short of facial margin by three quarters of postpedicel's length; gena below lowest eye-margin about as wide as depth of postpedicel; facial margin slightly above lowest eye-margin. One very long vertical seta; ocellar seta about as long as the reclinate orbital seta; three inclinate frontal setae, the middle one only about half as long. Antenna predominantly dark brown; pedicel strikingly dusted whitish, postpedicel brownish, about 2.5 times as long as deep and twice as long as pedicel, the anterior tip predominantly rounded, at certain viewing angle, however, with an outwardly directed blunt tip. Arista pubescent in basal third, the longest hairs barely as long as dilated base of arista. Parafacial at base of antenna about 1.5 times as wide as depth of postpedicel, strongly narrowing in upper part and downwards almost parallel throughout its entire length, about half as wide as depth of postpedicel. Vibrissal setae strong, about as long as vertical seta and about twice as long as the neighbouring peristomal setae. Prementum of proboscis dark brown, glossy. Palpus dark brown, slender, apically dilated about twice as wide as at midlength, almost as long as prementum.

Thorax. Lateral pleura including postpronotum almost uniformly grey (Figs 9 & 10), mesonotum and dorsal surface of scutellum predominantly brownish, not dark brown, the lateral sides of scutellum grey and contrasting at certain viewing angle with the brown dorsal surface. Dorsal surface of mesonotum at certain incidence of light partially dusted greyish but without distinct and well defined longitudinal dark stripes; however, in posterodorsal view the anterior surface of presutural part of mesonotum with a pair of paramedian whitish-grey patches between the dorsocentral rows, reaching the presutural dorsocentral seta and depending on viewing angle a trace of a narrow but incomplete dark brown stripe along each row of dorsocentral setae (Fig. 9). Acrostichal setulae distinct and fairly long, in two rows reaching the scutellar suture. Dorsocentrals 1+3; postpronotal setae 2, the outer long and strong the inner one about one fourth as long; posthumeral seta not very long, presutural seta much longer; notopleural setae 2, almost equally long; intraalars 2, the anterior one rather short; proepisternal setae 2; proepimeral setae 2, the lower smaller one curved downwards. Anterior katepisternal seta shorter than the lower one, surface of the equilateral katepisternal triangle with one distinct seta-like hair and 1 setula; scutellum with a pair of long apical and sub-basal lateral setae each; disc with 2 pairs of distinct setulae.



Figs 7-11: *Coenosia ambrea* spec. nov., female holotype: (7) head, anterior view, frons dilating towards vertex, frontal vitta (fv) dark brown to blackish, fronto-orbital plate (fo) narrow, brownish in upper half and dusted greyish in lower part; (8) head, profile, posterior eye margin somewhat emarginate (em); (9) dorsal view, anterior part of presutural mesonotum with two whitish-grey patches (wp), mesonotum predominantly brownish and depending on incidence of light partially dusted greyish, at the present viewing angle with traces of narrow but incomplete dark brown stripes, abdomen predominantly brownish with a weakly demarcated greyish triangular shaped lateral patch on each side of tergite 3; (10) lateral view, mesonotum mainly brownish; (11) left wing, membrane with a greyish tinge which is depending on light incidence usually also somewhat brownish as shown in Fig. 10. Scale bars: Figs 7-9 & 11, 0.5 mm; Fig. 10, 1 mm.

Wing. Membrane with a very weak smoky tinge (Fig. 11); veins brown and bare except for costa; costal spine inconspicuous; cross-vein r-m slightly beyond the point where R1 enters costa; cross-vein dm-cu almost straight; vein A1+CuA2 does not reach midway of the distance between its base and the wing margin. Calypters whitish transparent (Fig. 10), margin white with a weak yellowish tinge at certain incidence of light; lower calypter long, projecting beyond upper one by at least the length of upper one, but only somewhat wider than the upper calypter and well rounded. Haltere with knob and stem yellow.

Legs. Coxae dark, predominantly densely dusted greyish; trochanters glossy reddish brown; femora in general dark and depending on viewing angle shiny or densely dusted greyish, mid and hind femora with a very narrow, somewhat yellowish base; knees yellow; tibiae yellow to yellowish-brown (Figs 9 & 10), depending on incidence of light strongly or less infuscate; tarsi dark yellowish, predominantly infuscate, tarsomeres not modified. Fore femur with two long posterodorsal setae in about middle third, a complete row of long posterior setae, and a row of six long posteroventrals alternating with distinctly shorter setae. Fore tibia with a long sub median posterior seta. Mid femur in basal two thirds with a row of four strong anterior setae and three long hair-like posteroventrals, the two basal anterior setae about as long as depth of femur, the two more apical ones distinctly longer than depth of femur and also longer than the posteroventrals, of which the two distal hairs are distinctly longer than depth of femur; one anterior and two strong and fairly long curved posterior preapical bristles. Mid tibia with one long anterodorsal and one shorter posterior seta in middle third. Hind femur with a complete row of anterodorsal setae about as long as depth of femur; a row of six anteroventral setae of increasing length, the basal seta about half as long and the apical setae about as long as depth of femur; the basal three quarters of posteroventral surface with a row of four setae, the basal seta about as long as depth of femur and the three subsequent setae distinctly longer than depth of femur, the most distal seta the longest one; one posterodorsal preapical bristle. Hind tibia without posterodorsal or anteroventral setae but with a long anterodorsal and an anterior seta, the latter less than half as long as the anterodorsal seta, almost at the same level as but marginally based of the anterodorsal one; a strong dorsal and anterodorsal preapical bristle each.

Abdomen. Depending on the lighting conditions, either largely greyish, somewhat shiny, tergites 1+2 to 4 each on the posterior margin with a brown band that, depending on viewing angle, may cover the entire posterior dorsal surface of the tergite; or the dorsal surface of the abdomen is predominantly brownish with a small grey triangular patch on the anterior lateral side of tergite 3 and sometimes also on tergite 4 (Fig. 9). Even slight changes in the viewing angle lead to changes in the grey-brown combination. Tergite 5 at certain viewing angles shiny grey with a weak trace of a median brownish longitudinal stripe. Ventral surfaces of tergites and sternites uniformly greyish. Tergite 3 with several long lateral hair-like marginal setae; tergites 4 with a complete dense row of long hair-like marginals, the central dorsal ones only slightly shorter; tergite 5 with a row of marginals and a row of discals, all hair-like.

Female genitalia. Not investigated.

Measurements. Length of body, 2.6 mm. Length of wing, 2.8 mm.

Male: Not known.

Remarks and Diagnosis

Coenosia ambrea spec. nov. belongs despite the wide frons to the *humilis*-species-group sensu van Emden [8] and leads in the corresponding identification key to *Coenosia curvinervis* (van Emden, 1940). The latter species, of which so far only the female holotype from Zimbabwe appears to be known, is marked according to the key and the original species description [8] by taxonomic features such as: subparallel frons, slightly narrowed from the reclinate orbital seta to the vertex and about three quarters as wide as an eye; fronto-orbital plate about a third as wide as frontal vitta; postpedicel almost three times as long as deep; gena barely as wide as depth of postpedicel; thorax predominantly grey, mesonotum at least with a conspicuous narrow dark brown median vitta. Couri & Pont (2016) [24] studied the holotype of *C. curvinervis* without describing the specimen in detail but the authors also mention the mesonotum with the narrow median vitta that extends to the tip of scutellum, the abdomen densely dusted grey, tergites 3 and 4 and base of tergite 5 with a brown median vitta, and tergites 1+2 to 4 with a pair of large roundish brown patches predominantly in the posterior half. On the other hand, *Coenosia ambrea* spec. nov. differs from the above mentioned features in following respects: the frons clearly dilates from above lunule (about as wide as an eye) towards vertex (1.3 times as wide as an eye); fronto-orbital plate at midlength of frons about as wide as anterior ocellus (about a ninth as wide as the frontal vitta); postpedicel about 2.5 times as long as deep; gena below lowest eye margin at least as wide as depth of postpedicel. Thorax with the mesonotum predominantly brown and without a conspicuous median dark brown vitta. Abdomen depending on lighting conditions in dorsal view shining greyish and/or brownish, but without a distinct median vitta and roundish brown spots.

***Coenosia bohita* spec. nov. (Figs 12-16)**

Material examined

♀ Holotype, locality label reads: "Madagascar Ambohitantely Spec. Res. 1530 m; 19.iv.2011 loc. coll." The female is in good condition except that some large setae are missing. When the specimen was mounted on the staging pin the right mid leg fell off. The leg was transferred to a gelatin capsule which was attached to the pin.

Etymology

The name of the species "*bohita*" is a feminine adjective and refers somewhat shortened to the area where the specimen was collected.

Description (female)

Head. Upper half predominantly dark, lower half greyish (Figs 12-14). Eye practically bare. Frons slightly longer than face, almost parallel-sided, in anterodorsal view above lunule barely as wide as and at vertex slightly wider than the maximum width of an eye. Frontal vitta matt dark brown to blackish, at certain incidence of light sparsely dusted greyish. Fronto-orbital plate at midlength about one and a half times as wide as anterior ocellus (Fig. 13). Fronto-orbital plate in lower two thirds pale grey, in upper part more dark grey; depending on incidence of light parafacial pale grey or dark grey, face and gena dark or more or less densely dusted greyish; occiput greyish. Frontal triangle not clearly demarcated, a trace of the anterior part at certain viewing angle suggests that the tip reaches midlength of frons, the upper rusty brown part surrounds ocellar tubercle, the lower

part of the triangle is matt blackish, as is the frontal vitta. In profile (Fig. 12); facial margin distinctly behind the anterior point of profrons; parafacial visible throughout its length; antenna falling short of facial margin by about twice its own depth (Fig. 14); gena below lowest eye-margin about two thirds as wide as depth of postpedicel; facial margin slightly below the level of lowest eye margin. One strong and very long vertical seta; ocellar seta about half as long as frons; three inclinate frontal setae, the middle one somewhat weaker and shorter; one reclinate orbital seta. Antenna dark brown; pedicel more densely dusted greyish than postpedicel; the latter about 2.8 times as long as deep and about twice as long as pedicel, the anterior tip is not rounded, but ends in an outwardly directed distinct point. Arista dark brown and pubescent up to apex, in basal third the longest hairs about twice as long as the dilated base of arista. Parafacial at basis of antenna almost as wide as depth of postpedicel, tapering downwards in the upper part and almost parallel-sided throughout the remaining length (Fig. 14), barely one third as wide as depth of postpedicel. Vibrissal seta strong. Prementum of proboscis brown, glossy. Palpus dark brown, slender, apically dilated about twice as wide as at midlength, almost as long as prementum.

Thorax. Lateral pleura including postpronotum and notopleuron dark grey with a bluish tinge (Fig. 15), depending on incidence of light more or less dusted greyish. In dorsal view mesonotum in anterior half of presutural part dark, sparsely dusted greyish and with one median and two paramedian dark stripes, the median stripe reaching the transversal suture, the paramedian ones the presutural dorsocentral seta; the posterior part of presutural mesonotum, postsutural part of mesonotum and scutellum including lateral surfaces dusted brown, not dark brown, and without any pattern. Acrostichal setulae distinct, in two rows reaching the transverse suture. Dorsocentrals 1+3; postpronotal setae 2, the outer one long and strong, the inner set a distinctly shorter and hair-like; posthumeral seta long, presutural seta clearly longer; notopleural setae 2, anterior seta somewhat longer; intraalar setae 2, the anterior rather short; proepisternal setae 2, both fairly long, the lower one more hair-like; proepimeral setae 2, the lower smaller one curved downwards. Anterior katepisternal seta weaker than lower one, the surface of the equilateral katepisternal triangle with a few relatively long seta-like hairs; scutellum with a pair of long apical and sub-basal lateral setae each; disc covered with several setulae.

Wing. Membrane predominantly clear, with a weak greyish tinge. Veins brown, tegula and basicosta dark brown. Veins bare except for costa; costal spine inconspicuous. Cross-vein r-m slightly behind the point where R1 enters costa; cross-vein dm-cu almost straight and slightly shorter than the distance between apex of vein CuA1 and the point where the cross-vein enters the vein. Vein A1+CuA2 does not reach midlength of the distance between its base and the wing margin. Calypters whitish translucent, margins white with weak yellowish tinge; lower calypter at least twice as long as but not much wider than upper calypter, distinctly projecting beyond the upper one, mid part subparallel and rounded apically. Haltere with knob and stem yellow.

Legs. Coxae dark, predominantly dusted densely greyish; trochanters glossy black; femora dark and depending on viewing angle shiny or sparsely dusted greyish-brown; tibiae predominantly dark brown and shiny; tarsi mainly dark brown. Pulvilli and claws about as long as the associated tarsomere. Fore femur with a row each of posterodorsal setae, and of strong posterior setae, the setae about as long as or somewhat longer than depth of femur; an irregular row of posteroventrals, the majority of setae not much longer than the posterior setae apart from at least two strikingly long setae in middle third; basal half of femur with a row of anteroventral setae almost one third as long as depth of femur. Fore tibia with a submedian posterior seta about half as long as length of tibia. Mid femur with a row of anteroventral setae, at most one third as long as depth of femur and a row of posteroventrals, varying in length, the longest one in middle third of femur almost twice as long as depth of femur, most of the other setae about as long as or somewhat longer than depth of femur. Mid tibia in middle third with one long anterodorsal and one posterior seta, about one third as long as the anterodorsal seta. Hind femur with a complete row of about six anterodorsal setae, somewhat longer than depth of femur, in particular the apical ones strikingly long; a row of anteroventrals barely half as long as depth of femur but with a seta each at distal part of basal third and basal part of apical third of femur, about as long as depth of femur; two long posteroventral setae somewhat longer than depth of femur in basal two thirds of femur; one posterodorsal preapical bristle. Hind tibia without posterodorsal or anteroventral setae; but with a very long anterodorsal and an anterior seta, both setae at the same level, the anterior seta somewhat shorter than the anterodorsal one, a strong dorsal and an anterodorsal preapical seta each.

Abdomen. Ground-colour grey and shiny, at certain dorsal viewing angle all tergites with a median narrow dark brown longitudinal stripe and tergites syntergite 1+2 up to tergite 4 with large transverse dark brown patches not well demarcated (Fig. 16), at certain viewing angle the patches fusing with the median stripe thus the posterior part of tergite being more or less uniformly dark brownish; in ventrolateral view only the posterior part of syntergite 1+2 brownish, tergite 3 with traces of brown in posterior half and tergites 4 and 5 greyish without any brown pattern. Ventral surfaces of tergites and sternites uniformly greyish. Marginal setae of all tergites weakly developed, tergites 4 and 5 with complete rows of distinct discal setae (Fig. 16).

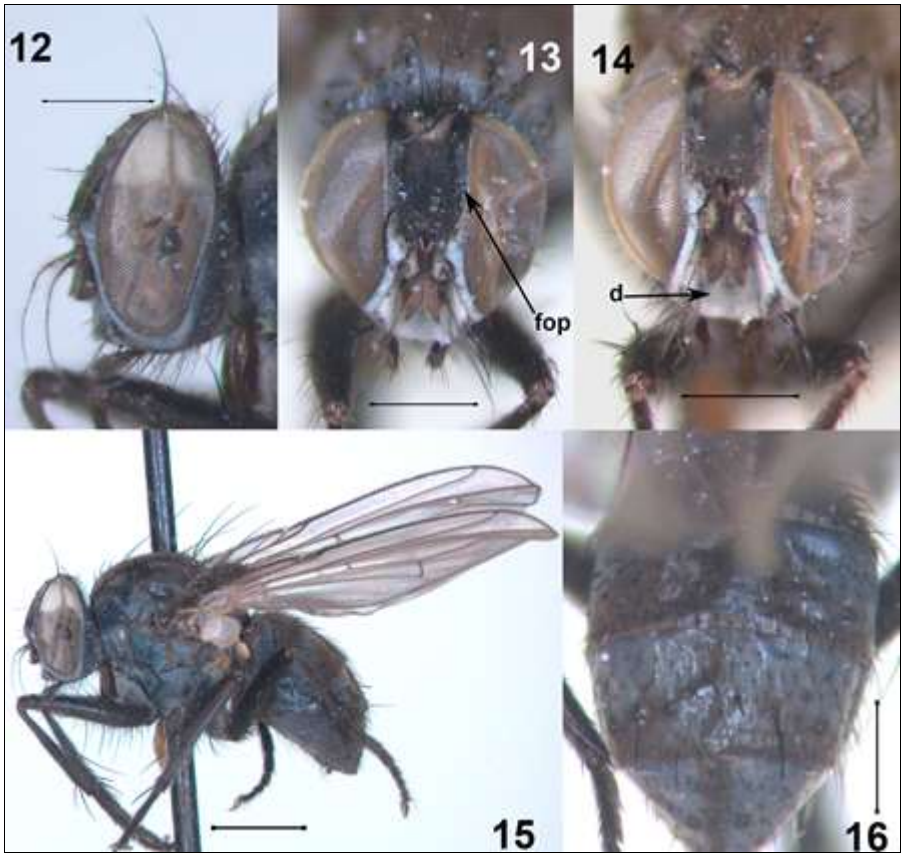
Measurements. Length of body, 4.2 mm. Length of wing, 4 mm.

Male: Not known.

Diagnosis

The new species belongs to the *semifumosa*-group sensu van Emden [8]. Using the identification key for this group [8] *Coenosia bohita* spec. nov. ends up between *Coenosia megalocalyptra* (van Emden, 1940) and *Coenosia tripunctiventris* (Malloch, 1922). Similarities between the new species and *C. megalocalyptra* are that the frons is slightly dilated to vertex, the fronto-orbital plates are pale dusted; and the lower calypter of the female is about 2.5 times as long as the upper calypter, however, in contrast to *C. megalocalyptra* the lower calypter in *Coenosia bohita* spec. nov. is not considerably widened from its base to the midlength, it is rather subparallel and not wider than upper calypter. The new species also differs from *C. megalocalyptra* by the length of the aristal hairs that are distinctly longer than the diameter of the dilated base of arista, and the predominantly brownish coloured mesonotum, whereas according to the description by van Emden [25] the thorax of *C. megalocalyptra* is

predominantly dusted greyish-white with three dark longitudinal stripes. *Coenosia bohita* spec. nov. has in common with *C. tripunctiventris* that the lower calypter is subparallel in basal half, the parafacial is less than half as wide as and the gena is narrower than the depth of postpedicel, and the aristal hairs are distinctly wider than the basis of arista. The latter results in that in *C. tripunctiventris* the arista, including pubescence, is as wide as or wider than the depth of the postpedicel. However, this is not the case with *Coenosia bohita* spec. nov. The arista hairs on the upper surface are almost half the length of the postpedicel depth, but the opposite ventral hairs are significantly shorter, thus the overall width of the arista, including pubescence, is only slightly longer than half of the depth. In addition, the frons of the new species is about as wide as the maximum width of an eye, and the dark pattern of the abdomen is poorly defined and fuses with the median stripe when the viewing angle changes slightly. Whereas the frons of *C. tripunctiventris* is at most three-quarters as wide as the maximum width of an eye and the well-defined abdominal spots do not fuse with the median vitta.



Figs 12-16: *Coenosia bohita* spec. nov., female holotype: (12) head, profile; (13) head, anterodorsal view, frontal vitta almost black, fronto-orbital plate (fop) dark greyish to brownish and very narrow; (14) head, anterior view, the distance (d) between tip of antenna and facial margin is about twice the depth of postpedicel; (15) lateral view; (16) abdomen, dorsal view, tergites with a poorly shaped brownish median vitta and fused apical brown markings along the posterior margin. Scale bars: Figs 12-14 & 16, 0.5 mm; Fig. 15, 1 mm.

***Coenosia exima* spec. nov. (Figs 17-23)**

Material examined

♀ Holotype, locality label reads: "NE Madagascar Ankarafansika N. P. ~ 100 m; 22.-24.vi.2011 loc. coll." Apart from some missing setae the female is in good condition.

Etymology

The epithet "*exima*" is a feminine adjective composed of the first syllable of *exigua* a *Coenosia* species similar to the new species and Madagascar, the country where the holotype was found.

Description (female)

Head. Predominantly whitish-grey (Fig. 17). Eye practically bare. Frons slightly longer than face, almost parallel-sided, in frontal view about as wide as maximum width of an eye. Fronto-orbital plate at midlength at least one third as wide as frontal vitta at that point (Fig. 17). Frontal triangle long and slender, reaching anterior margin of frons. Frontal vitta matt blackish, sparsely dusted greyish. Fronto-orbital plate and frontal triangle densely dusted whitish-grey, contrasting to the predominantly dark frontal vitta. Parafacial, face and gena depending on incidence of light whitish-grey or dark, occiput whitish-grey. In profile (Fig. 19); facial margin slightly behind the anterior point of profrons; parafacial barely visible in middle third of its length; antenna falling short of facial margin by almost postpedicel's length; gena below lowest eye-margin about as wide as depth of postpedicel; facial margin above the level of lowest eye-margin. Only one strong and long vertical seta; ocellar seta strong but barely as long as width of frons; three inclinate frontal setae, the middle one half as long as the neighbouring setae; one proclinate orbital seta. Antenna with basal segments brown, pedicel dusted strikingly whitish; postpedicel twice as long as pedicel and three times as long as deep, in basal half somewhat brownish and the distal part yellow (Fig. 18), the anterior tip is not rounded, but ends in an outwardly directed acute point (Fig. 19). Arista yellowish-brown, basal half pubescent, the longest

hairs barely as long as the diameter of the dilated base of arista. Parafacial at basis of antenna somewhat wider than depth of postpedicel, tapering downwards in upper part of parafacial and then practically parallel-sided throughout its entire length, about one third as wide as depth of postpedicel. Vibrissal seta about as long as vertical seta but stronger. Prementum of proboscis brown, not dark brown, and glossy (Fig. 19). Palpus bright yellow (Fig. 19), very slender not significantly dilated apically, almost as long as prementum.

Thorax. Ground-colour dark, including scutellum uniformly densely dusted grey; mesonotum without any distinct dark pattern, only at certain viewing angle with a weak brownish median stripe, not well developed, and with traces of a pair of paramedian stripes (Fig 22). Acrostichal setulae distinct, in two rows reaching transverse suture. Dorsocentrals 1+3; postpronotal setae 2, the outer seta strong, the inner one much weaker; posthumeral seta 1, long; presutural seta 1, longer than posthumeral seta; notopleural setae 2, about equally strong; intra-alar setae 2, the anterior rather short; proepisternal setae 2 and proepimeral setae 2, the setae almost hair-like and short, the lower smaller proepimeral seta curved downwards; anterior katepisternal seta weaker than the lower one, the surface of the equilateral katepisternal triangle bare; scutellum with a pair of long apical and sub-basal lateral setae each, the disc without setulae.

Wing. Membrane with a weak yellowish tinge; veins brown, tegula dark yellow, basicosta pale yellow. Veins bare except for costa; costal spine somewhat stronger than adjacent bristles but inconspicuous. Cross-vein r-m at the point where R1 enters costa; cross-vein dm-cu straight and somewhat shorter than the distance between apex of vein CuA1 to the point where the cross-vein enters the vein. Vein A1+CuA2 very short, not reaching halfway from its base to wing-margin. Upper calypter small, hyaline, lower calypter whitish translucent, margins white, lower calypter strongly projecting and almost circular, the diameter about twice as long as width of upper calypter (Fig. 21). Haltere with knob and stem whitish-yellow.

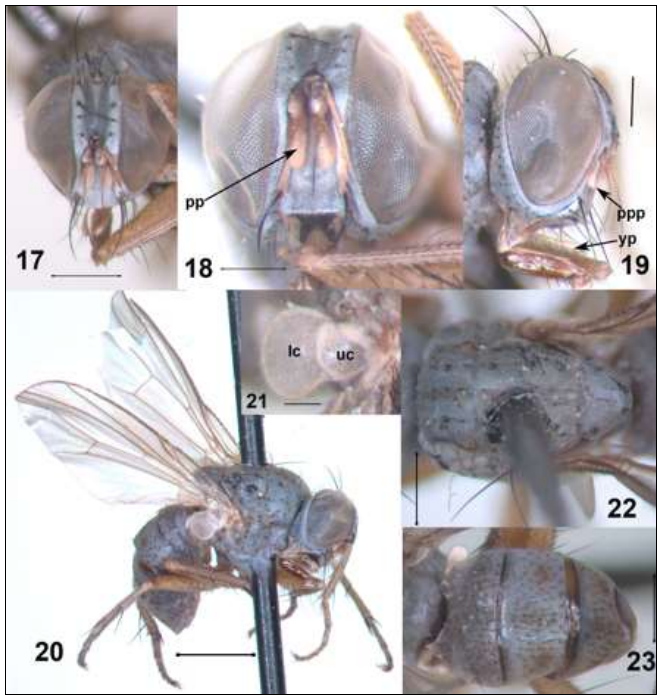
Legs. Completely including coxae and trochanters yellow, tibiae pale yellow (Fig. 20). Fore femur in apical two thirds with a row of dorsocentrals about half as long as depth of femur; with a row of about five posteroventrals, distinctly longer than depth of femur, each one alternating with a seta at most as long as depth of femur; anteroventral surface with several short spine-like setae in basal half. Fore tibia with a long submedian posterior seta about half as long as length of tibia. Mid femur with a row of three strong anterior setae, the two distal setae longer than depth of femur; a complete row of short anteroventral setae, at most one third as long as depth of femur; in basal two thirds a row of four posteroventrals, longer than depth of femur and alternating with short setae about as long as the anteroventrals; apical third with a comb-like row of short but distinct posteroventrals; two preapical bristles on the posterior surface. Mid tibia in middle third with one long anterodorsal and one not even half as long posterior seta. Hind femur with a complete row of five or six anterodorsal setae, about half as long as depth of femur; two long anteroventral setae in apical quarter and about four or five almost spine-like setae of varying length but not longer than half the depth of femur in basal two thirds of femur; two long posteroventral setae somewhat longer than depth of femur in basal two thirds and two somewhat shorter posteroventrals in apical quarter; one preapical posterodorsal bristle. Hind tibia with a long anterodorsal and a somewhat shorter anterior seta and a strong dorsal and anterodorsal preapical seta each; without posterodorsal or anteroventral setae. Abdomen. Ground-colour grey and shiny; in dorsal view without a distinct median stripe, in certain lateral view tergites in basal half with a faint poorly demarcated brownish stripe; tergites 3 to 4 at certain incidence of light each with a pair of small paramedian round pale brown patches (Fig. 23), the diameter of which about a quarter of the length of the corresponding tergite. All setae and setulae with a small dark spot around their base on the surface of the tergites. Ventral surfaces of tergites and sternites uniformly greyish.

Marginal setae of all tergites weakly developed, tergites 4 and 5 with complete rows of distinct discal setae.

Female genitalia**.** Not investigated.

Measurements. Length of body, 4.1 mm. Length of wing, 3.6 mm.

Male. Not known.



Figs 17-23: *Coenosia exima* spec. nov., female holotype: (17) head, anterior view; (18) head, anterior view on face, postpedicel (pp) predominantly yellowish, basal part brownish, the distance between tip of antenna and facial margin is approximately twice the depth of postpedicel, facial margin slightly above level of lowest eye margin; (19) head, profile, postpedicel (ppp) ending in a point, palpus yellow (yp); (20) lateral view, legs predominantly yellowish; (21) calypters, lower calypter (lc) almost circular, distinctly longer and wider than upper calypter (uc); (21) thorax, dorsal view, mesonotum only at certain viewing angle with a weak brownish median stripe, not well developed, and with traces of a pair of paramedian stripes; (23) abdomen, dorsal view, predominantly greyish, only at certain viewing angle tergites with very faint stripe and with a pair of faint and small paramedian round brown patches. Scale bars: Figs 17 & 22-23, 0.5 mm; Figs 18-19 & 21, 0.25 mm; Fig. 20, 1 mm.

Diagnosis

The female of the new species turned out to be a member of the *C. strigipes* species group sensu van Emden [8]. It leads in the corresponding identification key [8] to *Coenosia exigua* Stein, 1910. Couri & Pont [26] also characterized the species and agree with Stein's description regarding the body coloration, the body length of 2.5 mm and the clearly pronounced longitudinal median stripe on the mesonotum. Since the male paralectotype of *C. exigua* is largely

destroyed, the characterization by Couri & Pont [26] is based on a male from Taiwan, which Pont & Werner [27] identified as *C. exigua*. This may be why the recent characterization by the authors differs distinctly in some taxonomic characteristics from Stein's description of the holotype, which originated from the Seychelles. The frons in the Asian specimen is as wide as an eye, the postpedicel and palpi of the male are brown, and all tergites of the abdomen have a pair of brown spots each. In contrast, in the original description, the postpedicel and palpi of the male are yellow, the frons is at most ¾ as wide as an eye and the last tergite has no dark spot. According to the identification key [8] the lower calypter is normal in *C. exigua*, i.e. subparallel in the middle and projecting beyond the upper calypter by twice the length of the latter. Neither Stein nor Couri & Pont report any conspicuous features of the calypters of *C. exigua*, only the whitish colour [28] and the length (about 2.5 times as long as the upper calypter) [26] are mentioned. When comparing the holotype of *Coenosia exima* spec. nov. in the Berlin Museum directly with the *C. exigua* male determined by Pont and with the original description [28], the two specimens differed in several respects very clearly from each other as well as from the original description of *C. exigua*. The lower calypter of the new species *Coenosia exima* spec. nov. is almost circular, not subparallel in middle and distinctly wider than the upper calypter; the frons is as wide as the width of an eye; the gena below lowest eye-margin is about as wide as depth of postpedicel; the postpedicel is largely yellow, only at certain incidence of light brownish in the basal half the palpus is strikingly yellow, slender but somewhat dilated in apical half and about as long as prementum; and the mesonotum has no distinct dark stripes, a faint median stripe can only be seen at a certain viewing angle. On the other hand, in *C. exigua* the lower calypter of the male corresponds with the description given in van Emden's key [8] and is in the examined male almost subparallel and at most as wide as the upper calypter; the frons is only up to three quarters as wide as an eye; the gena is very narrow, almost absent; the postpedicel and palpi are brown in the Asian male identified by Pont and according to Stein yellow with the palpus being rather short; the mesonotum has a distinct brown longitudinal stripe reaching end of mesonotum [28] or even scutellum respectively [26].

***Coenosia madaxenia* spec. nov. (Figs 24-29)**

Material examined

♀ Holotype, locality label reads: "E. Madagascar Ranomafana N. P. 987 m; FIT 2, S21°15'46"E47°45'14", 10-14.i.2017, sweeping veg. P. Jansta." Female paratype with the label: "Madagascar Andasibe Analamazaotra S. R. Perinet circuit Indri ca 950 m, S18.935882-938042°E48.419051-419332°, 16.i.2017 screen sweeping P. Jansta." The holotype is lacking the right mid and fore leg and the paratype both mid legs. The head of each specimen has shrunk slightly, which resulted in that parafacial and eye margin are partially separated (Fig. 24). In addition, the body of the paratype is in general somewhat shrivelled. Both specimens are also missing several large setae. Despite these shortcomings, identification and description of the new species were possible without restrictions. As mentioned in the chapter "Materials and Methods" the holotype will be returned to the Moravian Museum. The paratype will be stored in entomological collection of IBER

Etymology: The epithet "*madaxenia*" is a feminine adjective composed of "Madagascar", the name of the country of origin, and "*xenia*", the name of the *Coenosia* species closest to the new species.

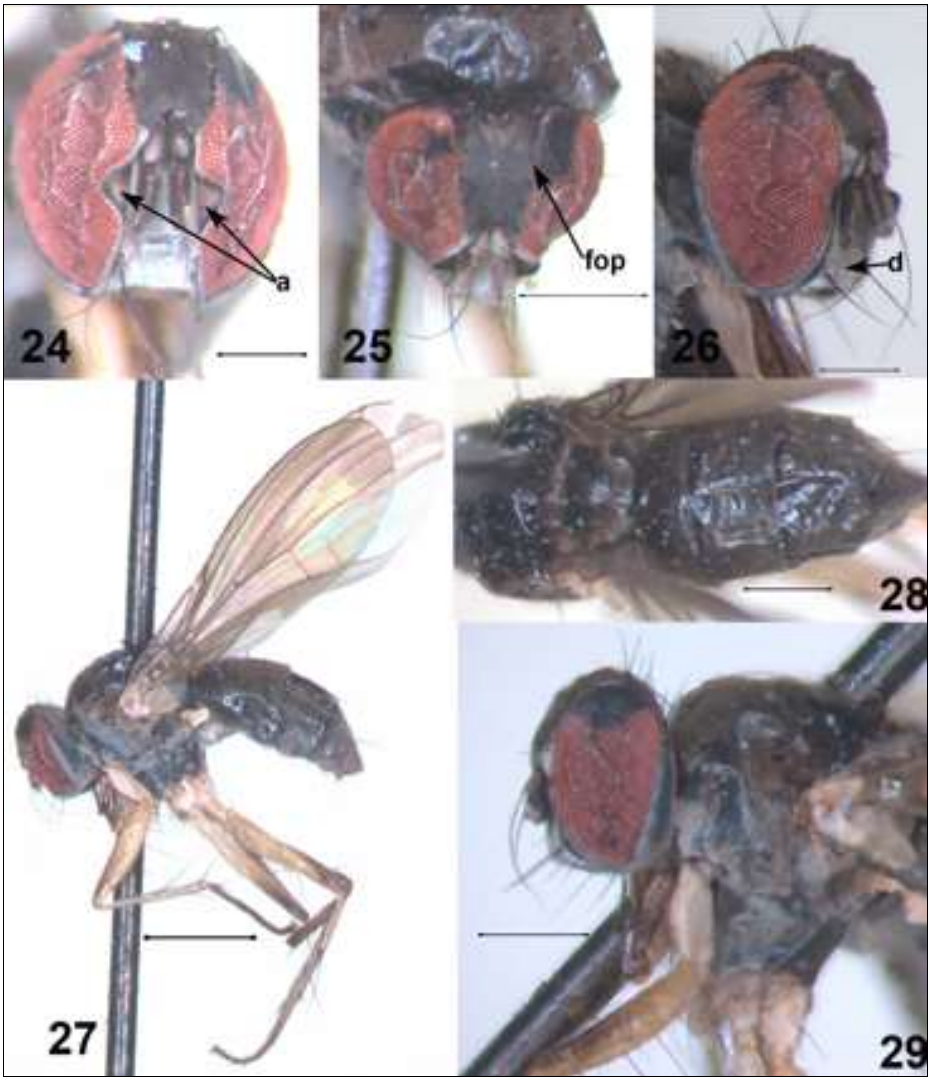
Description (female)

Head. Upper half of head dark, lower half greyish. Eye practically bare. Frons slightly shorter than face, distinctly dilating from antenna basis to vertex (Fig. 24), in anterodorsal view above lunule about two thirds as wide and at vertex one and a third times as wide as maximum width of an eye (Fig. 25). The frontal vitta is dark brown, matt and appears bulky, it occupies practically the entire frons. Fronto-orbital plate very narrow (Fig. 25), at midlength about as wide as anterior ocellus, the surface at the level of the two anterior frontal setae greyish (Fig. 26), the subsequent upper part pale brown only weakly contrasting with the brown frontal vitta. The frontal triangle is practically undefined, at a certain viewing angle, however, a trace of the front part of the triangle can be guessed, indicating that the front tip reaches about the level of the orbital seta. Parafacial, face, gena and occiput are pale grey or dark greyish, depending on incidence of light. In profile (Fig. 26); vibrissal angle almost in line with profrons; parafacial visible throughout its length; antenna falling short of facial margin by almost the length of postpedicel (Fig. 26); gena below lowest eye-margin barely one third as wide as depth of postpedicel; facial margin somewhat above the level of lowest eye-margin. Only one strong vertical seta; ocellar seta about one third as long as total frons; three inclinate frontal setae, the middle one somewhat weaker and shorter; one reclinate orbital seta. Antenna dark brown, pedicel dorsally strikingly dusted whitish, postpedicel barely three times as long as deep and twice as long as pedicel, the anterior tip rounded, not ending into a point. Arista dark brown, pubescent in basal third, the longest hairs not as long as the width of dilated base of arista. Parafacial at base of antenna about two thirds as wide as depth of postpedicel, in upper part tapering very strongly downwards and then parallel-sided throughout its entire length, about half as wide as anterior ocellus. Vibrissal seta strong, about twice as long as adjacent peristomal setae. Proboscis with prementum brown, glossy. Palpus dark brown, slender, apically slightly dilated, somewhat longer than prementum.

Thorax. Lateral pleura dark, predominantly dusted grey (Figs 27 & 29); mesonotum and scutellum dark brown, mainly shiny, at certain incidence of light sparsely dusted brownish, without any distinct pattern (Fig. 28). Few short acrostichal setulae in two rudimentary rows reaching the transverse suture. Dorsocentrals 1+3; postpronotal setae 2, the outer seta long, the inner one much shorter; posthumeral seta 1; presutural seta 1; notopleural setae 2; intra-alar setae 2, the anterior one rather weak; proepisternal setae 2, both fairly long, the lower one rather thin and hair-like; proepimeral setae 2, the lower smaller one curved downwards; the anterior katepisternal seta of the equilateral triangle weaker than the lower one, the posterior seta almost three times as long as the anterior seta; scutellum with a pair of long apical and sub-basal lateral setae each, the lateral setae only about half as long as the apical seta, disc with a few setulae.

Wing. Membrane with a smoky tinge (Fig. 27); veins brown, tegula and basicosta yellowish. Veins bare except for costa; costal spine inconspicuous. Cross-vein r-m about at the point where R1 enters costa; cross-vein dm-cu straight and at least 1.5 times as long as the distance between apex of vein CuA1 and the junction of cross-vein with CuA1. Vein A1+CuA2

very short, not reaching halfway from its base to wing-margin. Calypters fairly small, both almost transparent with a weak whitish tinge, margins white with a yellowish tinge; lower calypter not as long as haltere and narrow, subparallel-sided, at least twice as long as but only half as wide as maximum width of upper calypter, distinctly projecting beyond the upper one. Haltere with knob and stem pale yellow.



Figs 24-29: *Coenosia madaxenia* spec. nov., female paratype (Figs 24-26), holotype (Figs 27-29): (24) head, anterior view on face, parafacial and eye margin are partially separated, the anomaly (a) could possibly have been caused by the drying process; (25) head, anterodorsal view, frons strongly dilating, frontal vitta extremely broad, fronto-orbital plate (fop) very narrow and paler than frontal vitta; (26) head, lateral view, distance (d) between tip of antenna and facial margin about twice the depth of postpedicel; (27) lateral view of holotype, legs fairly long and predominantly yellowish; (28) dorsal view of thorax (partly) and abdomen, predominantly dark and shiny; (29) lateral view of thorax, predominantly dusted dark greyish. Scale bars: Figs 24-26, 0.25 mm; Fig. 27, 1 mm; Figs 28-29, 0.5 mm.

Legs. Predominantly pale yellow (Fig. 27). Fore femur in apical third or half with the dorsal surface somewhat brownish and approximately the apical third of mid and hind femora dorsal and lateral brown; tibiae yellow, mid tibia in apical and basal third somewhat infuscate at certain incidence of light; tarsi predominantly strongly infuscate, only at certain viewing angle yellowish. Fore femur with a row of only four very long posteroventral seta-like hairs, the longest hair about 2.5 times as long as depth of femur, the shortest one almost twice as long as depth of femur, the long hairs alternating with hairs at most half as long as the long hairs. Fore tibia with a long submedian posterior seta-like hair, longer than half the length of tibia. Mid femur in basal two thirds with a row of four posteroventrals, longer than depth of femur; an anterior seta about at midlength of femur, barely as long as depth of femur; two not very strong preapical setae on the posterior surface. Mid tibia in middle third with one long anterodorsal and a posterior seta not half as long. Hind femur with a complete row of five anterodorsal setae, at most half as long as depth of femur; two anteroventral setae in apical third, somewhat longer than depth of femur, and an irregular row of anteroventral setae in basal two thirds about half as long or slightly longer than half the depth of femur; in basal two thirds of femur two or three posteroventral seta-like hairs distinctly longer than depth of femur; a posterodorsal preapical bristle. Hind tibia with a long anterodorsal and a somewhat shorter anterior seta; a strong dorsal and anterodorsal preapical seta each; without posterodorsal or anteroventral setae. The setae of hind tibia in paratype in general distinctly shorter than in holotype.

Abdomen. Uniformly dark brown to almost blackish and shiny without any pattern (Fig. 28), depending on viewing angle partially dusted greyish or brownish, under certain conditions of light the apical tergite predominantly shining

dark greyish. Ventral surfaces of tergites and sternites depending on incidence of light greyish or brown. Marginal setae of tergites weakly developed; tergites 4 and 5 with complete rows of distinct discal setae. Sternite 1 with two seta-like hairs on posterior margin.
Female genitalia**.** Not investigated

Measurements. Length of body, 3 mm. Length of wing, 3 mm.

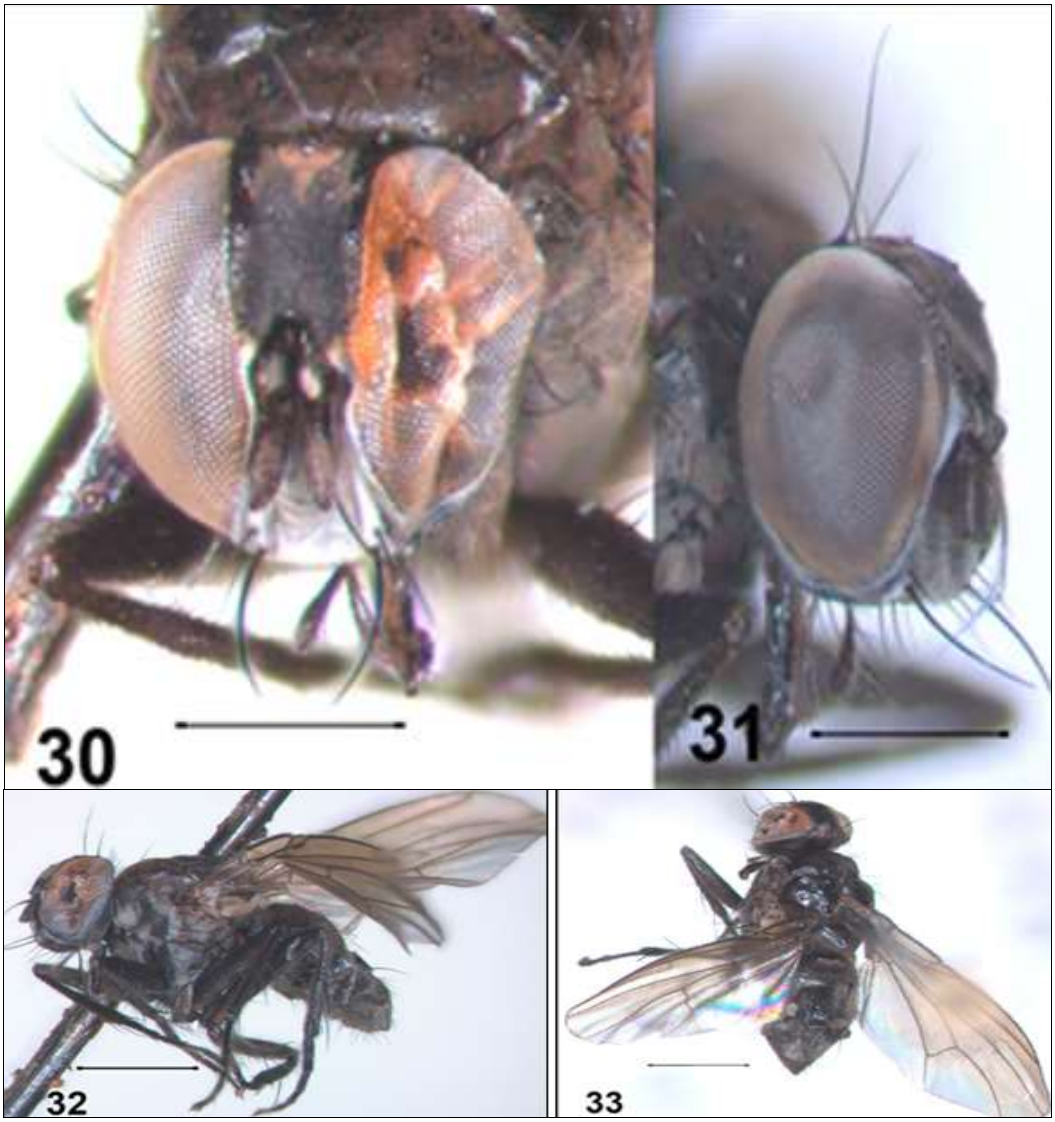
Male: Not known.

Diagnosis
Coenosia madaxenia spec. nov. belongs to the *strigipes* species-group. The female runs in the corresponding key [8] to *Coenosia xenia* Malloch, 1922. However, it differs from the latter in that the shiny black-brown coloured mesonotum and abdomen have no distinct markings. In addition, the anterior tip of the postpedicel is rounded and does not end in a point, and the distance between the tip of the wing vein CuA1 and the point where the transverse vein dm-cu enters CuA1, is at least 1.5 times as long as the cross-vein. In contrast, the thorax of *C. xenia* is according to Malloch [19] "evidently vittate" and the abdomen is characterized by large but not clearly defined spots and a complete median dorsal vitta, the anterior tip of the postpedicel is not rounded, but ends in an acute point, and the distance between the apex of vein CuA1 and the insertion of the cross-vein dm-cu into CuA1, is about as long as the length of the cross-vein.

***Coenosia mafascia* spec. nov. (Figs 30-33)**
Material examined
♀ Holotype with the locality label: "E. Madagascar Ranomafana N. P. road TV-Tower, S21.25098-247721°E47.40722-403699°; 10-14.i.2017, sweeping veg. P. Jansta". Two female paratypes with the same label as holotype. The left eye of the holotype is indented and somewhat shrivelled, but otherwise it is in fairly good condition, the paratypes are slightly more shrivelled than the holotype. The holotype will be returned to the Moravian Museum, the paratypes will remain in the entomological collection of IBER.

Etymology
The name of the species "*mafascia*" is a feminine adjective, which is composed of syllables from Madagascar, the name of the country of origin, and "*fascigera",* the name of a similar *Coenosia* species.

Description (female). Head. Upper half of head dark, almost black, lower half contrasting pale grey (Fig. 30 & 31). Eye practically bare. Frons slightly longer than face, dilating from antenna basis to vertex, in frontal view above lunule 0.8 times and at vertex about as wide as an eye. Frontal vitta almost black and matt. Fronto-orbital plate pale dark greyish-brown and at midlength almost twice as wide as anterior ocellus. Frontal triangle not clearly defined, at certain viewing angle the anterior tip seems to reach the level of the upper frontal seta, the upper half of the triangle rusty brown and in contrast to dark brown to blackish frontal vitta (Fig. 30) and the lower part of frontal triangle. Parafacial, face, gena and occiput predominantly pale grey. In profile (Figs 31 & 32): anterior profrons smoothly rounded; facial margin somewhat behind the anterior point of the profrons; parafacial visible throughout it length; antenna falling short of facial margin by about half of postpedicel's length; gena below lowest eye-margin around half as wide as depth of postpedicel; facial margin about at level of lowest eye-margin. Only one strong and long vertical seta; ocellar seta approximately one third as long as total frons; three inclinate frontal setae, the middle one somewhat weaker; one reclinate orbital seta. Antenna almost black, pedicel marked by an anterior patch dusted conspicuously whitish-grey, postpedicel about three times as long as deep and twice as long as pedicel, the anterior tip of postpedicel is not rounded, ending in an outwardly directed blunt tip. Arista dark brown, pubescent in basal third, the longest hairs almost as long as width of dilated base of arista. Parafacial at base of antenna slightly wider than depth of postpedicel, tapering sharply downwards in the upper part of parafacial and then practically parallel-sided over the entire length, barely one third as wide as depth of postpedicel. Vibrissal seta strong, about three times as long as adjacent peristomal setae, but not as long as vertical seta. Prementum of proboscis brown, glossy. Palpus dark brown, slender, apical third dilated, about three times as wide as at midlength, approximately as long as prementum.
Thorax. Lateral pleura dark, predominantly dusted grey (Fig. 32); mesonotum and scutellum dark brown to blackish and shiny (Fig. 33), without any distinct pattern, at certain viewing angle uniformly dusted brown. Few relatively long acrostichal setulae in two rudimentary rows reaching the transverse suture. Dorsocentrals 1+3; postpronotal setae 2, the outer seta very long, the inner one strikingly short; posthumeral seta 1, presutural seta 1, both setae relatively short; notopleural setae 2, intra-alar setae 2, the anterior rather weak; proepisternal setae 2, both fairly long, the lower one somewhat shorter; proepimeral setae 2, the lower smaller one curved downwards; anterior katepisternal seta weaker than lower one, the surface of the almost equilateral triangle with a few short hairs; scutellum with a pair of long apical and sub-basal lateral setae each, the disc with about four setulae.
Wing. Membrane with a distinct smoky tinge, in particular the surface between costa and vein M darkened (Figs 32 & 33); veins brown, tegula and basicosta brown. Veins bare except for costa; costal spine inconspicuous. Cross-vein r-m very slightly behind the point where vein R1 enters costa; cross-vein dm-cu slightly sinuous and clearly shorter than the distance between apex of vein CuA1 and the junction where the cross-vein enters CuA1. Vein A1+CuA2 very short, not reaching halfway from its base to wing-margin. Calypters fairly small, the upper one almost transparent with a whitish tinge, the lower calypter whitish translucent with a very weak yellowish tinge, in basal part somewhat subparallel, about twice as long as but not as wide as upper calypter, distinctly projecting beyond the upper one, the margins predominantly white. Haltere with upper surface of knob brown, but not dark brown, the lower part of knob yellowish, framing the brown surface with a yellow margin; basal part of stem brown to dark brown, upper part pale yellow.



Figs 30-33: *Coenosia mafascia* spec. nov., female holotype: (30) head, anterior view, left eye shrivelled and indented; (31) head, lateral view, eyes rather large, parafacial and gena very narrow; (32), lateral view, dark ground colour, thorax at certain viewing angle dusted dark greyish; (33) dorsal view, predominantly dark shiny, membrane of wing between costa and vein M distinctly brownish tinged, see also Fig. 32. Scale bars: Figs 30-31, 0.5 mm; Figs 32-33, 1 mm.

Legs. Coxae dark, predominantly dusted densely greyish; trochanters glossy black; femora dark and depending on viewing angle shiny or somewhat dusted greyish-brown; tibiae and tarsi predominantly dark brown without any yellowish markings, tibiae predominantly shiny (Fig. 32). Fore femur with a row of posterodorsal setae and a row of strong posterior setae, the setae about as long as or slightly longer than the depth of the femur; a row of about five posteroventral setae, significantly longer than the depth of the femur, some of which alternate with shorter setae only about as long as the depth of the femur; basal half of femur with a row of anteroventral spine-like setae almost one third as long as depth of femur. Fore tibia with a long submedian posterior seta almost half as long as the tibia. Mid femur in basal two thirds with a row of anterior setae of increasing length with the most apical setae distinctly longer than depth of femur; a row of four posteroventrals, varying in length, the longest one in middle third of femur almost twice as long as depth of femur, the other setae about as long as or somewhat longer than depth of femur; two strong preapical bristles on the posterior surface. Mid tibia in middle third with one long anterodorsal and a posterior seta one-third as long. Hind femur with a complete row of about five anterodorsal setae somewhat longer than depth of femur, on anteroventral surface in apical third two strong setae, longer than depth of femur, and in basal half about three distinctly shorter hair-like setae; two posteroventral setae longer than twice the depth of femur in apical half, and some posteroventrals barely as long as depth of femur in basal third; preapically a posterodorsal bristle. Hind tibia with a very long anterodorsal and a somewhat shorter anterior seta at the same level; a strong dorsal and anterodorsal preapical seta each; no posterodorsal or anteroventral setae.

Abdomen. Ground-colour dark, in dorsal view tergite 5 greyish (Fig. 33), syntergite 1+2 and tergite 3 almost uniformly dark brown and shiny, tergite 4 depending on incidence of light predominantly greyish or brownish and tergite 5 with a median dark stripe in one paratype. In lateral view the lateral sides of tergites up to the lateral dorsal surface of tergites shiny greyish, the dorsal surfaces brownish, a distinct pattern not recognizable. Ventral surfaces of tergites and sternites similar as dorsal surface of tergites, varying between grey and brown depending on incidence of light. Marginal setae of all tergites somewhat longer than ground-hair, tergites 4 and 5 with rows of strong discal setae. Sternite 1 bare.

Female genitalia. Not investigated.

Measurements. Length of body, 3.2 mm. Length of wing, 2.9 mm.

Male. Not known.

Diagnosis

Coenosia mafascia spec. nov. belongs to the *C. semifumosa* species-group and led to *Coenosia fascigera* Stein, 1918 in the first screening of the unidentified Madagascan specimens. The latter species is marked by a weakly brownish tinged wing membrane, yellow-coloured base of the tibiae, a lower calypter, which is not only longer but also wider than the much shorter upper calypter, and yellow halteres. The new species, on the other hand, is notable for its rather dark tinged wing membrane, uniformly dark tibiae without any yellow markings, a lower calypter which is longer but narrower than the upper calypter, and a predominantly brown knob of the halters. However, a clear assignment of *Coenosia mafascia* to a similar species using the identification key [8] for the species of the *semifumosa* group was not really possible. According to couplet 1(4) of the identification key [8], the halteres have a black or dark brown knob and the frons is subparallel, and in 4(1) the knob of the halteres is yellow. Both options do not match the features of the holotype and both paratypes. Their halteres have a brown but not dark brown knob, which has a narrow yellow frame when viewed from dorsal. In order to integrate *Coenosia mafascia* spec. nov. into the identification key, it is suggested to supplement the identification table as follows.

- 4(1) Halteres with the knob yellow or brown, not dark brown or black
- 4a(4b) At least dorsal surface of knob of halteres brown with a narrow yellowish frame. *Mafascia* spec. nov.
- 4b(4a) Halteres with the knob yellow.
- 5(6) Continue as indicated in key.

***Coenosia ranoma* spec. nov. (Figs 34-41)**

Material examined

♂ Holotype and ♀ paratype with same locality label that reads: "E. Madagascar Ranomafana NP 987 m; FIT 2, S21°15'46"E47°45'14", 10.-14.i.2017 loc. coll." The male is lacking the left mid leg and the right mid tibia, the female is without the left mid leg and right fore tibia, several setae are missing in both specimens, however the scars of the lost setae are well visible. The male holotype will be returned to the Moravian Museum in Brno, the female paratype will be stored in the muscid collection of IBER.

Etymology

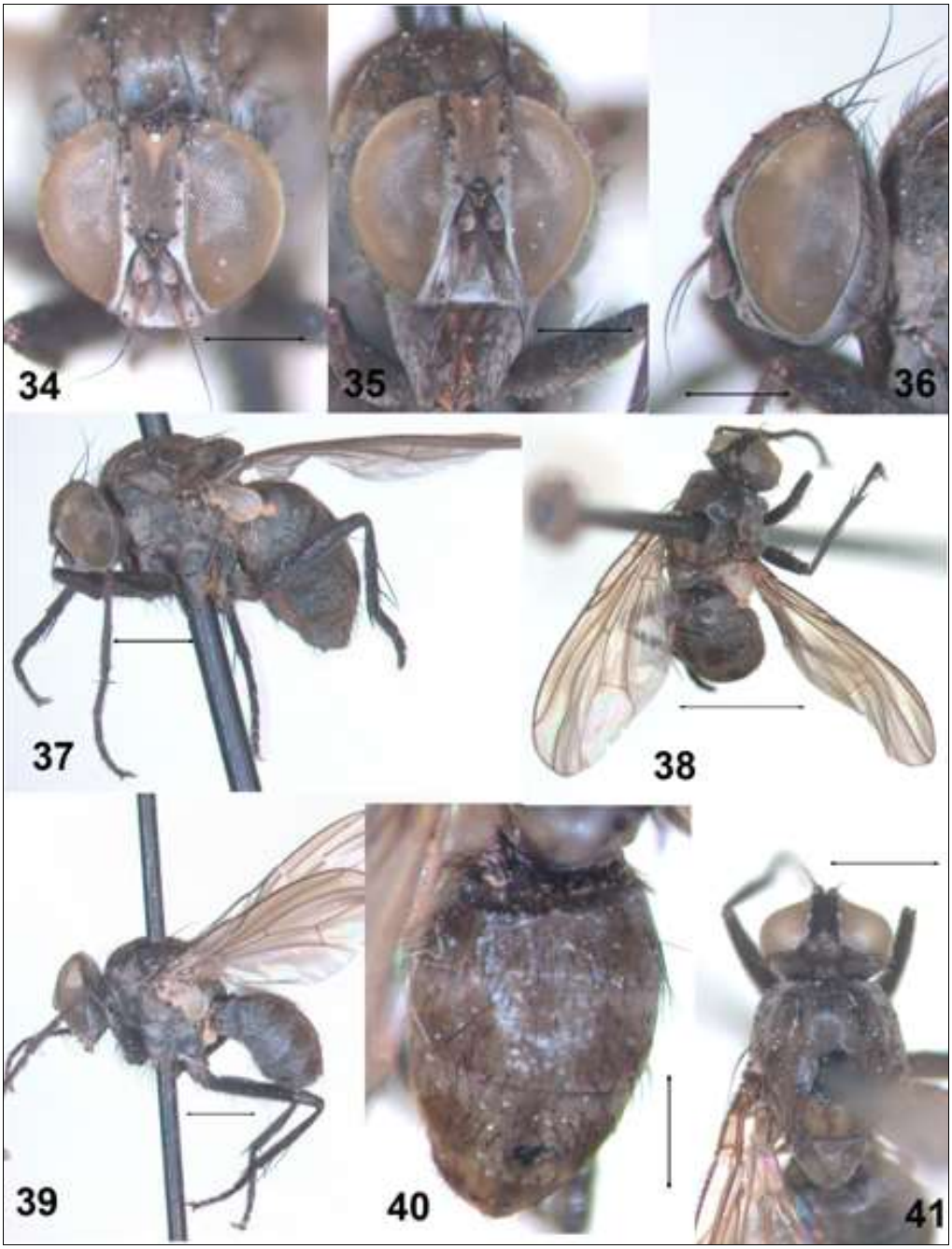
The epithet "*ranoma*" is a female adjective and refers somewhat abbreviated to the area, where the flies have been collected.

Description (male)

Head. Ground-colour dark, predominantly dusted grey. Eyes with several small hairs about as long as diameter of a facet. Frons about as long as face, almost parallel-sided (Fig. 41), but very slightly dilating towards anterior margin and to vertex, in frontal view above lunule about 0.7 times as wide and at vertex 0.9 times as wide as maximum width of an eye. Frontal vitta blackish, matt, sparsely dusted greyish. Frontal triangle pale greyish, partially with a rusty-brownish tinge. Fronto-orbital plate whitish-grey; parafacial densely whitish-grey, face and gena dark and depending on viewing angle sparsely or densely dusted whitish-grey, occiput uniformly greyish. Fronto-orbital plate at middle about 1.5 times as wide as anterior ocellus. Frontal triangle distinct, reaching midlength of frons. In profile (as in female, Fig. 36); facial margin somewhat behind level of profrons; parafacial visible throughout its length; antenna falling short of facial margin by about the depth of postpedicel; gena below lowest eye-margin about half as wide as depth of postpedicel; facial margin above level of lowest eye-margin. One strong vertical seta; ocellar seta clearly weaker than reclinate orbital seta; three inclinate strong frontal setae, the middle one somewhat weaker, one reclinate orbital seta. Antenna dark; inner surface of pedicel glossy black the outer surface densely dusted greyish; postpedicel dark, moderately dusted greyish, about three times as long as deep and barely twice as long as pedicel, the anterior end is somewhat rounded and does not end in a point. Arista pubescent up to the apical part, the longest hairs in basal third about 1.5 times as long as the width of the dilated base of arista. Parafacial at basis of antenna barely as wide as depth of postpedicel, tapering sharply downwards in the upper part and then practically parallel-sided over the entire length, slightly wider than diameter of anterior ocellus. Vibrissal seta strong. Prementum of proboscis dark brown, glossy. Palpus dark brown, slender, apical barely noticeably dilated, about as long as prementum.

Thorax. Lateral pleura including postpronotum and notopleuron uniformly grey (Fig. 39), mesonotum dark and predominantly dusted brownish (Fig. 41), dorsal surface of scutellum densely dusted brown, lateral sides of scutellum dark and greyish. Mesonotum without distinct longitudinal dark stripes. Acrostichal setulae distinct and fairly long, in two rows reaching the scutellar suture. Dorsocentrals 1+3; postpronotal setae 2, the outer one long and strong the inner seta weak and short; posthumeral seta 1 not very long; presutural seta long, notopleural setae 2, the anterior seta clearly longer; intra-alars 2, the anterior seta clearly shorter; proepisternal setae 2, the lower one also long; proepimeral setae 2, the lower smaller one curved downwards; anterior katepisternal weaker than lower one; katepisternal triangle with the posterior side shorter than the anterior side, the surface of the triangle with a few fine hairs; scutellum with a pair of long apical and sub-basal lateral setae each, disc with several short seta-like hairs.

Wing. Membrane with a smoky tinge (Fig. 39); tegula dark brown, basicosta pale brown, veins brown and bare except for costa; costal spine inconspicuous. Cross-vein r-m at the point where R1 enters costa; cross-vein dm-cu almost straight and about its own length distant from distal end of vein CuA1. Vein A1+CuA2 very short, not reaching halfway from its base to wing-margin. Calypters both translucent with a weak whitish tinge, margin white partly with a weak yellowish tinge; lower calypter almost subparallel in middle part, apically rounded, strongly projecting beyond upper one, at least 2.5 times as long as upper calypter (Fig. 39); both calypters about equally wide. Haltere predominantly yellowish.



Figs 34-41: *Coenosia ranoma* spec. nov., male holotype (Figs 39-40), female paratype (Figs 34-38, 41): (34) head, anterior view, frons almost parallel shaped; (35) head, anterior view of face, distance between tip of antenna and facial margin about as long as depth of postpedicel; (36) head, profile, gena below lowest eye margin very narrow; (37) lateral view, thorax predominantly dark grey, lower calypter distinctly longer than upper one, legs without any yellow or pale markings; (38) dorsal view, membrane of wing with a distinct brownish tinge, dark patches of tergites more distinct than in male (Fig. 40); (39) lateral view of male, abdomen in lateral view predominantly greyish; (40) abdomen, dorsal view, predominantly brownish, dark markings not very distinct; (41) thorax, dorsal view, ground-colour dark, partially dusted brownish, without distinct markings. Scale bars: Figs 34-36 & 40, 0.5 mm; Figs 37, 39 & 41, 1 mm; Fig. 38, 2 mm

Legs. Coxae dark, mainly densely dusted greyish; trochanters glossy dark brown to black; femora dark and depending on viewing angle more or less dusted greyish; tibiae (mid tibiae are missing) predominantly dark, at certain viewing angle somewhat greyish (Fig. 39); tarsi dark. Claws and pulvilli about as long as last tarsomere. Fore femur with a row of about five posterodorsal setae, a complete row of posterior setae, and a row of about six posteroventrals, the posterodorsal and posterior setae longer than depth of femur, the posteroventrals partly almost twice as long as depth of femur or longer, basal quarter of femur with a short row of 4-5 anteroventral spine-like setae almost one third as long as depth of femur. Fore tibia with a long submedian posterior seta, almost half as long as length of tibia. Mid femur in basal two-thirds with three posteroventral setae about twice as long as the depth of the femur and between every two long setae a seta half as long; in basal quarter about four anteroventral setae, distinct but barely half as long as depth of femur; a long anterior seta distal in the mid third; (apex of the femur and the left mid femur are missing). Hind femur with a complete row of about six anterodorsal seta, distinctly longer than depth of femur; anteroventral surface with an irregular row of several hairs, about a third as long as the depth of the femur, however, one or two of these hairs are prominent in both the apical and basal halves and are almost as long as the depth of the femur; near the base of the femur a posteroventral hair-

like seta, about as long or longer than the depth of the femur, in the middle third with two hair-like posteroventral setae, the proximal one almost twice as long as the depth of the femur, the distal one slightly shorter a posterodorsal preapical bristle. Hind tibia with a long anterodorsal and an anterior seta half as long, both inserted at the same level; a strong dorsal and an anterodorsal preapical seta, there are no posterodorsal or anteroventral setae present.

Abdomen. The apical two thirds are not compressed in the dorsal view (Fig. 40) but are clearly somewhat elevated in the lateral view (Fig. 39). Hypopygium itself not very prominent. Depending on light conditions tergites either almost uniformly greyish or with a weak brownish tinge, all tergites with a weak median longitudinal brownish vitta, at certain incidence of light not visible on tergite 5, in dorso-lateral or lateral view tergites 3-5 with a pair of large paramedian brown round patches mainly in posterior half, poorly defined and changing shape when viewing angle is changed, the patches of tergite 5 somewhat smaller. Marginal setae of all tergites weakly developed, tergites 4 and 5 with complete rows of distinct discal setae. Ventral surfaces of tergites and sternites including hypopygium uniformly greyish. Sternite 1 bare.

Male genitalia. The new species is clearly distinguished from the other known taxa of the genus on the basis of several taxonomic characters, the hypopygium is not needed for identification purposes. Therefore, it was deemed wiser not to extract the genitalia, to avoid inflicting damage on the hitherto only available male of the species.

Measurements. Length of body, 4.5 mm. Length of wing, 4.3 mm.

Description (female)

The female is very similar to the male, only the differences are listed. Head. Eyes with less and shorter hairs. Frons slightly more parallel-sided and less dilated towards vertex than in male (Figs 34 & 35). Frontal vitta more brownish dusted, frontal triangle rusty brown. Fronto-orbital plate slightly narrower than in male, at most as wide as anterior ocellus. Pedicel of antenna almost uniformly dusted greyish. Palpus apically about twice as wide as at midlength.

Wing. Membrane with a distinct brownish tinge (Fig. 38). Lower calypter not as long as in male (Fig. 37), projecting beyond upper one by at least 1.5 times the length of the upper calypter.

Legs. Claws and pulvilli well developed, at least claws almost as long as last tarsomere. Mid femur in basal third with about three strong curved anterior bristles somewhat longer than half the depth of femur, and a very strong anterior seta distal of middle third, almost twice as long as depth of femur, two posterodorsal preapical bristles. Mid tibia with one long anterodorsal and one shorter posterior seta in middle third.

Abdomen. The dark pattern as in male but more defined (Fig. 38).

Female genitalia. Not investigated.

Measurements. Length of body, 4.6 mm. Length of wing, 4.9 mm.

Diagnosis

Coenosia ranoma spec. nov. belongs to the *semifumosa* species-group. The taxonomic characteristics of the species lead in the corresponding identification key [8] to couplet no. 18, which is closest to *Coenosia tripunctiventris* (Malloch, 1922) in couplet 20. The latter species is only briefly described by Malloch [19], with the author pointing out the species' hyaline wing membrane and the almost cylindrical male abdomen. Van Emden [8] mentions in the key that *C. tripunctiventris* is characterized by a short-plumose arista, "as wide as or wider, including pubescence, than third antennal joint", the fifth abdominal segment of the male "is moderately compressed, not very high and the lobes of the apical sternite are black and shining on interior part". On the other hand, *Coenosia ranoma* spec. nov. is marked by a wing membrane distinctly brownish tinged in both sexes; the longest arista hairs are only about 1.5 times as long as the width of the dilated base of the arista; the abdomen of the male is not cylindrical, in dorsal view the abdomen is not compressed in the apical two thirds but is noticeably elevated in lateral view, and the sternites, including the fifth sternite and its lobes, are uniformly dusted grey. In addition the eyes are sparsely but distinctly covered with microscopic hairs, a taxonomic feature which is not mentioned from *C. tripunctiventris*.

Discussion and Conclusion

When van Emden [8] revised the Afrotropical species of the Coenosiinae in 1940, *Coenosia* and *Caricea* Robineau-Desvoidy, 1830 were still separate genera. The species of *Coenosia* are widely represented in the Palearctic region, but only very few are known from the Afrotropical region. On the other hand, *Caricea* species are rarer in the Palearctic region but more common and diverse in the Afrotropical region. Van Emden [8] assigned the vast majority of *Caricea* species to newly defined species groups within the genus to get the large number of known and newly discovered species classified. In addition to the typical *Coenosia* group, he also introduced the following seven groups of *Caricea* species: *C. calopoda*, *C. humilis*, *C. rebmanni*, *C. strigipes*, *C. semifumosa*, *C. tigrina*, and *C. vittata*, with an identification key for each species-group. This division allowed for a better overview and more efficient identification of new species. Therefore, even after Hennig [29] synonymized *Caricea* with *Coenosia* the division in species-groups is still being used. Species that were described after the publication of the overview of the Coenosiinae and after the synonymization by Hennig are largely assigned to the individual groups sensu van Emden. However, the identification tables created by van Emden in 1940 for the different groups of species have not been replaced by new keys nor have they been revised, with the exception of the recently published identification key [5] for the Afrotropical species belonging to the *Coenosia* group in sensu van Emden. In the present publication new species from the *humilis*, *semifumosa* and *strigipes* groups are described. They are always compared with similar species in the group. In some cases it is also suggested how the new species can be integrated into the respective identification key. Unfortunately, for some new species introduced, the description is based on only a single specimen. As already addressed in previous publications, e.g. [7, 30], the description of a new species from just one specimen carries a certain risk. The species described in this paper, however, differ from the hitherto known similar species by more than one taxonomic feature, allowing a more solid differentiation of the similar taxa. It is most of the time not realistic to expect more and better material from a particular species to become available in the foreseeable future. Thus, introducing a new species into the scientific community, even based on just a single

specimen, seems to be a better contribution to science than postponing description for an unpredictable period of time. The newly identified species would not be available for further scientific study, whereas each new species contributes to improving knowledge of the previously little-studied Afrotropical muscid fauna.

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