

On Madagascan *Dichaetomyia* species (Diptera: Muscidae): redescriptions of six species

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Abstract: Several original descriptions of the Madagascan *Dichaetomyia* species originating from earlier years do not correspond to today's requirements since taxonomic characters which are used today successfully for differentiating species have received little or no attention in the past. Since the type specimens of some species were currently available for comparative studies, the descriptions of six species of the subgenus *Dichaetomyia* s. str. have been updated and supplemented with notes on the history of the species and some photographs.

Keywords: *Dichaetomyia*, images, Phaoniinae, redescriptions, type-material

Introduction

Several new species of the genus *Dichaetomyia* Malloch, 1921 have been described (Zielke, 2020, 2021a–c) as part of the studies on Madagascan muscids carried out at IBER since 2015. However, it also turned out that the identification keys available in the literature for the Madagascan *Dichaetomyia* species are not sufficiently discriminating to cover the broad spectrum of the taxonomic characteristics of the taxa of the genus. The identification tables currently available distinguish the species predominantly on the basis of the colouring of certain body parts. Taxonomic characteristics based e.g. on morphology and chaetotaxy have received less attention. As previously reported (Zielke 2020), the use of inadequate identification keys has already led to several misidentifications in the past. Therefore, the vast majority of recently newly described species have been compared to the holotypes and/or paratypes of the similar looking species. The type material of the *Dichaetomyia* species originating from Madagascar was kindly made available by various institutions for the duration of the investigations, thus enabling a thorough study of the species from this subregion. The intensive examination of the original specimens of the species in comparison with other taxa has also shown that not only the

identification keys, but also the original species descriptions in many cases have significant deficiencies. This applies not only to the species descriptions from the last century and older, but also to some species descriptions published in 2006 (Couri et al.). Most original descriptions of *Dichaetomyia* species rarely contain a systematic compilation of information on taxonomic characters such as for example chaetotaxy of frons, thorax, abdomen, the various parts of the legs and the setulae of wing veins, or morphological data on the formation of the frons, face and gena, of palpi, proboscis, eyes and facets. Apart from large areas and parts of the body like thorax, abdomen and wings of which usually but not always the colouring was mentioned, the colouration of small parts of the body such as palpi, antennal segments, calypters, tegula, basicosta, halteres, anterior stigma, various parts of the leg, scutellum, postpronotum or wing veins, etc. were also not systematically listed. Accordingly, reliable comparisons of *Dichaetomyia* species are hardly possible even on the basis of existing original descriptions. Due to the availability of holo- and/or paratypes of different species, it made sense to take the opportunity to revise and update the original description of some species based on the types available and to supplement the description with a few photographs where appropriate.

For the current contribution, the descriptions of six species were rewritten. For example some were either associated with misidentifications in the past as it was the case in *Dichaetomyia tristis* (Zielke, 1972), or the original description is so unspecific that it hardly adequately characterises the underlying species, as is the case with *Dichaetomyia coerulea* (Bigot, 1860). In addition, the only existing lectotype of the latter species is in a very fragile condition. A revision of the description therefore preserves the possibility of future comparisons of the taxonomic characters of this species with similar looking taxa.

Materials and methods

The holotypes and paratypes of four re-described species are kindly loaned by the KwaZulu Natal Museum (KZNM), Pietermaritzburg, SA to IBER for the investigations and will be returned to the museum after the completion of the study on *Dichaetomyia*. The lectotype of the fifth species comes from the Oxford University Museum of Natural History (OUMNH), Oxford, United Kingdom and the holotype of the sixth species of the genus is held by the IBER entomological collection. Five of the species are characterised by metallic shiny specimens and were originally assigned to the genus *Annaria* Zielke, 1972, which is known only from Madagascar and which was synonymised with the subgenus *Dichaetomyia* s. str. Malloch, 1921 by Pont (1980). The sixth species from the Oxford Museum is not shiny metallically. However, since the distinguishing features listed for this species in the only identification key (Couri et al. 2006) are not entirely clear, representatives of this species can possibly be assigned to the group of metallic-coloured species under certain lighting conditions. The material was 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 described previously (Zielke 2020, 2021a). Body length was measured in millimetres (mm). Morphological terminology follows McAlpine (1981), but postpedicel (Stuckenberg 1999) is used instead of “first flagellomere” as proposed by McAlpine. The lateral width of the postpedicel of antenna is called “depth” and refers to the greatest depth of the postpedicel. Information about the width of frons refers to the shortest distance between the margins of the eyes. The intra-alar setae of the presutural part of the mesonotum are

named posthumeral and presutural seta respectively. If 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. The anterior width of frons is measured directly at the upper margin of the lunule. Reference is made frequently to the article by Couri, Pont & Penny (2006) on the Madagascan Muscidae with the identification key to the *Dichaetomyia* species. For the sake of simplicity, instead of naming each time the three authors and the year 2006, sometimes only “Couri” is referred to. Likewise, only “overview” is used in the text instead of the full title with the names of all authors.

Results

Dichaetomyia basialaris (Zielke, 1972)

Material examined: ♀ paratype of *Annaria basialaris* Zielke, 1972; locality label: “Madagascar Centre, Anjavidilava 2020 m Andringitra Ambalavao 17.-21.01.1958 B. Stuckenberg”. Registration No.: NMSA-DIP 36600. The paratype was provided by KZNM. The female is lacking the right front and mid leg. Small traces of faeces on the type specimen and on the polyporous-foam needle holder indicate an earlier infestation with dermestids, an earlier infestation with fungi cannot be ruled out either. Overall, however, the paratype is in good condition, showing all essential taxonomic features.

Redescription (female): Head. Ground-colour reddish-brown to brown, some parts densely whitish dusted. Dichoptic; eyes with few scattered small hairs, facets of about equal size. Frons at vertex about 0.25 times as wide as maximal width of head, slightly dilated towards the anterior margin of frons; distance between eyes at level of anterior ocellus about 3.7 times and at anterior margin 4.6 times the distance between the outer margins of posterior ocelli (Fig. 1). Fronto-orbital plates of frons at midway about twice as broad as diameter of anterior ocellus; frontal triangle slender and sharply tipped somewhat below midway of frons. Parafacial distinctly tapering, at level of antenna basis at least as broad as depth of postpedicel and at the lower end about as broad as anterior ocellus, at that level facial ridge almost three times as wide as parafacial. In profile upper mouth margin in line with profrons. Genal depth below lowest eye margin almost as broad as depth of postpedicel. When viewed from an-

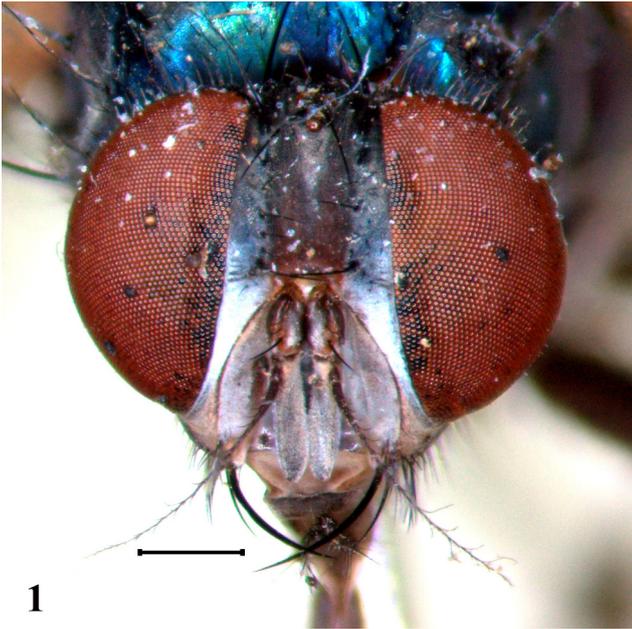


Fig. 1. ♀ paratype of *Dichaetomyia basialaris* (Zielke). Anterior view of head.

terior fronto-orbital plates predominantly dark to black, about anterior half thinly dusted, frontal vitta reddish brown in anterior half, darker in upper part, frontal triangle dusted pale, ocellar tubercle dark, parafacials dusted densely silvery-whitish, face and anterior part of gena yellowish-brown to ochre, face predominantly dusted densely whitish, gena sparsely dusted. Antennae predominantly brown, depending on viewing angle more or less dusted greyish-white.

Postpedicel about three times as long as depth and as pedicel. Arista brownish, about 2.5 times as long as length of postpedicel, longest hairs of arista about as long as depth of postpedicel. Anterior half of fronto-orbital plate with three or four setae and one or two small interstitial hairs, the anterior seta distinctly stronger and longer than the upper setae, at midway one or two small setulae and at upper half at level of anterior ocellus a strong reclinate orbital seta with another orbital seta slightly below almost as long and strong as the upper one. Between eye margin and frontal and orbital setae a few small proclinate setulae. Parafacial bare. Vibrissal setae strong and at least twice as long as the longest surrounding peristomal setae. Lateral surface of gena reddish-brownish to brown, weakly dusted, upper half of surface bare, margin of gena and post-occipital surface more dusted greyish, covered with dark setae. Proboscis brown, somewhat dilated towards labella (Fig. 2), prementum matt, slightly dusted, under

certain lighting slightly shiny, labella 1.5 times as long as greatest depth of proboscis; palpus brown, clavate, about as long as prementum.

Thorax. Ground-colour dark green and shiny, depending on incidence of light with some metallic or dark bluish reflections (Fig. 2). Presutural part of mesonotum with three broad whitish dusted stripes tapering and reaching the second presutural dorsocentral setae. Mesonotum predominantly shiny, only at certain viewing angles dusted greyish with a brownish tinge. Postpronotum and scutellum concolorous with mesonotum. The anterior lateral pleura predominantly concolorous with mesonotum, in certain conditions of light with a brownish-violet shine, the posterior pleura brownish with some violet reflections, depending on angle of viewing all pleura more or less greyish dusted. Anterior and posterior spiracles brown, the latter with black setulae at lower margin. Dorsocentrals 2+2; acrostichals 0+1, the seta barely one third as long as posterior dorsocentral seta, presutural acrostichal hairs in about six irregular rows, hairs of outer rows about as long as the inner hairs; postpronotal setae 2, the inner one barely half as long as the outer seta; posthumeral seta 1, presutular seta 1; notopleural setae 2, posterior slightly shorter than anterior seta, notopleuron with very few small black hairs; pre-alar seta about two thirds as long as posterior notopleural seta; intra-alar seta 1, supra-alar setae 2, post-alar setae 3. Greater ampulla and suprasquamal ridge bare. Prosternum haired, anepimeron with a tuft of setulae above and some scattered hairs on the posterior surface. Proepimeral area, katepimeron and meron bare. Katepisternals 1+2, the lower one distinctly closer to the posterior seta than to the anterior one. Anepisternal setae 1+6, setae of row strong but of varying length, surrounded by several interstitial seta-like hairs not quite as long as the setae. Scutellum with a pair of strong apical and strong lateral setae, basal and preapical setae much shorter, but distinguishable from the longer setulose hairs; lateral surface and margin to the ventral surface of scutellum with some setulae.

Wing. Membrane hyaline with a weak yellowish to brownish tinge, cross-veins and surrounding membrane not infuscate. Tegula pale brownish-yellow, basicosta pure yellow, basal part of wing veins - predominantly subcosta, stem vein and basis of cubitus- and anal-vein - conspicuously yellow and in contrast to the brownish subsequent parts of the veins (Fig. 2). Costal spine small, at most twice as long as adjacent bristles. Vein R4+5 and radial node dorsally bare, ventrally ra-



Fig. 2. ♀ paratype of *D. basialaris*. Lateral view: Predominantly dark legs; scutellum and postpronotal lobes concolourous with mesonotum; wing basis conspicuously yellow, stem vein (sv) and basis parts of neighbouring veins yellow, contrasting to subsequent brown parts of veins.

dial node with two small setae. Vein M somewhat diverging from vein R4+5, but slightly curved forward to R4+5 before reaching wing margin. Cross-vein r-m slightly basad of the point where vein R1 enters costa; distal cross-vein dm-cu almost straight and very little oblique. Lower calypter yellow with yellowish margin, upper calypter transparent with yellowish shimmer and yellowish margin, lower calypter about 1.5 times as long as upper calypter. Stem of haltere yellowish, knob brown.

Legs. Predominantly brown (Fig. 2). Femora more dark brown, tibiae and tarsi usually brown, but, not as dark as femur, in certain incidence of light even light brownish, tarsi under certain light condition with a yellowish tinge. Pulvilli and claws well developed but clearly shorter than the associated tarsomere. Fore femur with complete rows of posterodorsal, posterior and posteroventral setae, the posterodorsals and posteriors almost as long as and posteroventrals as long as depth of femur. Fore tibia with a median posterior seta longer than diameter of tibia. Mid femur with a complete row of posteroventral hairs about half as long as depth of femur, preapically with an anterodorsal, and three posterior to posterodorsal and almost dorsal setae. Mid tibia with two strong posterior setae, longer than the diameter of tibia. Hind coxa bare on posterior surface. Hind femur with complete row of strong anterodorsal setae, in apical half two or three somewhat

shorter anteroventral setae, preapically two strong posterodorsal to dorsal setae. Hind tibia without distinct posterodorsal seta, in middle third one strong anteroventral seta slightly longer than diameter of tibia and two weaker anteroventral setae barely as long as diameter of tibia, opposite of the anteroventrals one small but distinct posterodorsal seta at least half as long as diameter of tibia.

Abdomen. All tergites dark bluish-green (Fig. 2), not dusted and without any particular pattern, tergite five without yellow marking, apical half at certain viewing angle with brass reflections, anterior part of syntergite 1+2 depending on condition of light brownish or brass. Ventral parts of tergites concolourous with the upper surface. Tergites densely covered with small hairs, only very few discal and marginal setae, mainly laterally, not much longer than the short hairs. Sternites brownish; sternite 1 laterally with very few hairs.

Female genitalia not investigated.

Measurements. Length of body about 8.2 mm; length of wing about 8.4 mm.

Previous misidentifications: A specimen of an unidentifiable *Dichaetomyia* female and five specimens of *Dichaetomyia zuparkoi* Zielke, 2020 were wrongly assigned in the past (Couri et al. 2006) to *D. basialaris*, although only the latter species is marked by conspicuously yellow coloured veins at the wing basis.

Dichaetomyia coerulea (Bigot, 1859)

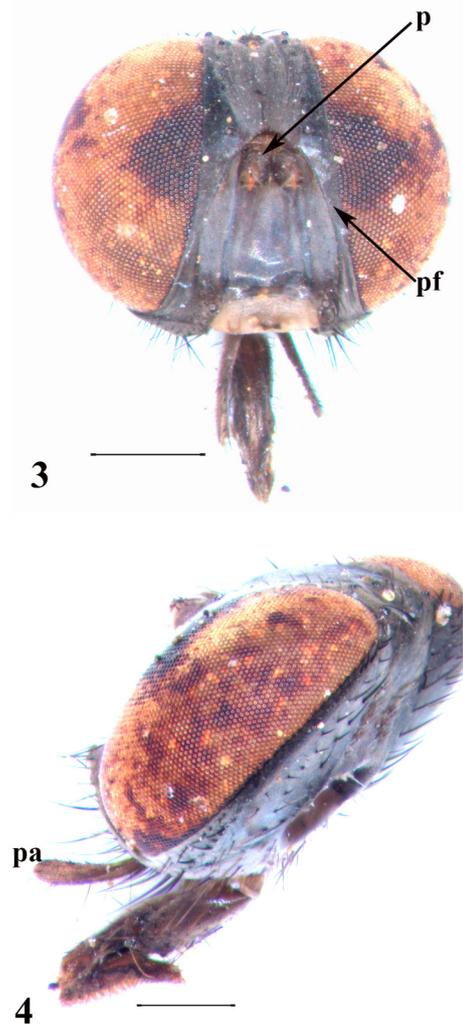
Material examined: ♀ lectotype, marked with five labels, the inscriptions taken verbatim: 1. “*Aricia coerulea* Bigot, 1859, Madagascar”; 2. “*Aricia coerulea* Bigot 1859 t. Ackland 1967”; 3. “S. coerulea EX. COL. BIG.”; 4. “LECTOTYPE ♀ *Aricia coerulea* Bigot 1860 des. by A. C. Pont 1997”; 5. on top of all other labels a round label with the inscription “LECTOTYPE”. The designation of the female specimen as lectotype was published by Pont in 2000 and it was loaned for comparison from the OUMNH. The female is lacking postpedicels of antennae and the left front leg, in addition the head is preserved in a gelatine capsule.

History: Bigot (1860) described a female specimen collected by Coquerel in Madagascar and, based on its characteristics, assigned it to the genus *Aricia* Robineau-Desvoidy, 1830. In addition, he reported also on other taxonomic characters. Among others he also

informed that the postpedicel is four times as long as the pedicel. This information is significant because Stein (1907) stated that the antennae were missing when he shortly characterised the same specimen and confirmed that it belongs to the genus *Spilogaster* Macquart, 1835. Pont (1980) transferred the species to the genus *Dichaetomyia* described by Malloch in 1921. Since apparently no type specimen of the species existed, Pont (2000) then designated the specimen that was already characterised by Bigot and Stein, as lectotype, which, in addition to the missing antennae, also had lost its left front leg. In Couri's identification key, *D. coerulea* is characterised by the couplets "7) metallic blue, green, purple, or blue-grey flies... 8" and "8) blue-grey flies with three broad longitudinal vittae of grey pollination on mesonotum... *D. Coerulea*". However, as this distinction is not sufficiently specific, the OUMNH was asked to make the lectotype available for comparative investigation. The request was kindly granted and the specimen was received with the head detached from body and held in gelatine capsule on pin. Considering that the lectotype has become increasingly fragile since the species was described in 1860, in addition to the urgently needed redescription, more taxonomic criteria of the specimen have also been documented photographically than for the other species.

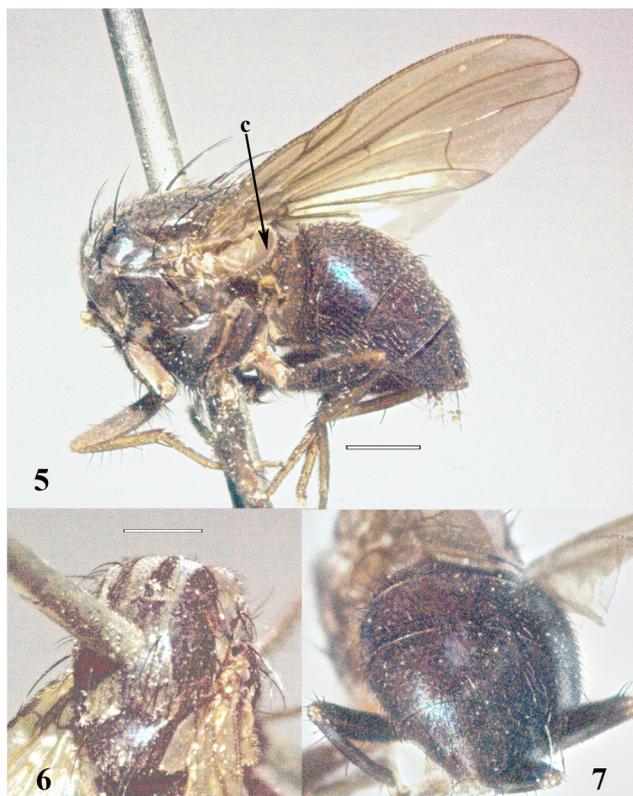
Redescription (female): Head. Ground-colour dark, partially greyish-white dusted. Dichoptic; eyes without clearly enlarged facets. Frons slightly dilated towards its anterior margin; at level of vertex about 0.25 times as wide as maximal head width; at level of anterior ocellus about 3.6 times and at anterior margin of frons 4.5 times as wide as the distance between the outer margins of posterior ocelli (Fig. 3). Fronto-orbital plates at narrowest barely as broad as distance between outer margins of posterior ocelli; anterior tip of ocellar triangle extended as thin line practically reaching anterior margin of frons. In profile upper mouth margin in line with profrons. Parafacial distinctly tapering over the length, at level of antenna basis at least half as broad as pedicel and at the lower end barely as broad as anterior ocellus.

Antenna according to Stein (1907) and Pont (2000) absent, however that is true only for postpedicel. Pedicel is present and is used for ratio calculations, which are usually based on the depth of postpedicel. According to Bigot (1860) postpedicel is four times as long as pedicel. Genal depth below lowest eye margin about as broad as width of pedicel. When viewed from anterior fronto-orbital plates, frontal vitta and parafa-



Figs 3–4. ♀ lectotype of *Dichaetomyia coerulea* (Bigot). (3) Anterior view of detached head. Only postpedicel is missing, pedicel (p) is very well preserved; parafacial (pf) very narrow. (4) Lateral view of head. Apical part of palpus (pa) distinctly paler than the basal part.

cially predominantly dark at some points of viewing weakly greyish dusted. Based on the remaining small setae of the head and of the scars of lost setae the following described chaetotaxy of the head is very likely. Anterior half of fronto-orbital plate with one strong and long anterior frontal seta and two or three smaller setae above, few small interstitial hairs between the frontal setae; upper half with two distinct reclinate orbital setae, the longer one about at level of anterior ocellus, the smaller one, about half as long, slightly more anterior, between eye margin and the row of longer setae a row of small setulae almost all along the fronto-or-



Figs 5–7. ♀ lectotype of *D. coerulea*. (5) Lateral view. Body colour of thorax and abdomen predominantly brown, somewhat shiny in places, lower calypter (c) of left side greyish matt with broad pale margin. (6) Posterodorsal view of thorax. Ground-colour brown with three broad longitudinal stripes, densely dusted and extending up to the posterior part of postsutural mesonotum. (7) Posterodorsal view of abdomen; under the current incidence of light the left part of abdomen appears brown similar to the body colouration shown in Fig. 5, the right half of the abdomen however is dark brown to blackish, both sides are shiny in places.

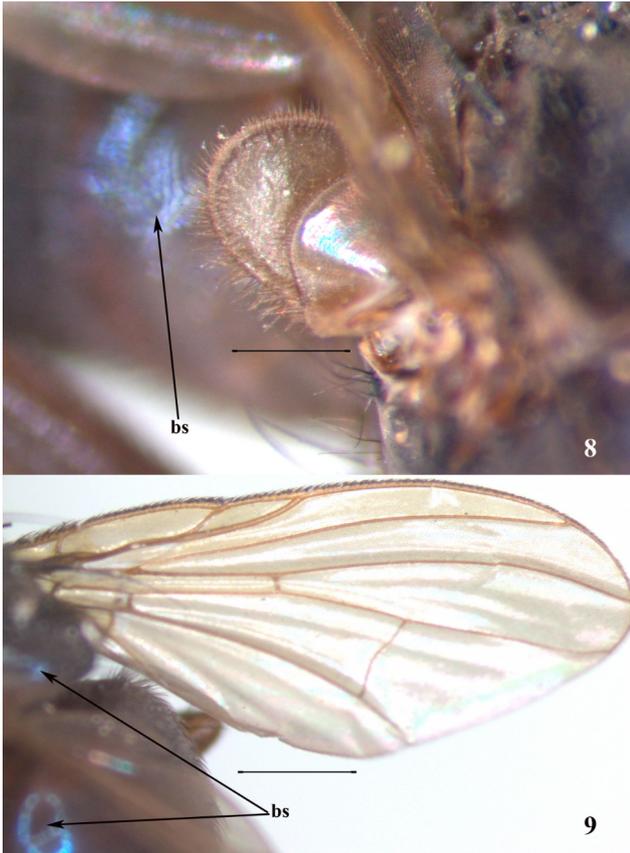
bital plate. Parafacial bare. Vibrissal setae strong and about 1.5 times as long as the longest surrounding peristomal setae. Upper half of lateral surface of gena bare or at most with few small setulae, lower surface and post-occipital surface dark, greyish dusted and with dark setulose hairs. Proboscis not conspicuously long, prementum brown, somewhat dusted, length of labella about twice as long as anterior depth of proboscis; palpus dark brown, at apical third paler, longer than prementum and weakly clavate (Fig. 4).

Thorax. Ground-colour dark brown, in certain light conditions almost blackish (Figs 5, 7), depending on the incidence of light, slightly shiny in places, and with a certain light quality with a very weak dark bluish shimmer (Fig. 9). Mesonotum in posterior view pre-

dominantly deep dark brownish, somewhat shining and depending on angle of light sparsely greyish-brownish dusted, presutural part with three broad longitudinal stripes grey densely dusted grey (Fig. 6) and tapering strongly in the postsutural part of mesonotum reaching midway between anterior and posterior postsutural dorsocentral setae, lateral surface between intra-alar and supra-alar setae at certain viewing angles weakly greyish dusted. Scutellum concolourous with mesonotum somewhat more shiny. All pleura brown usually somewhat shiny, in anterior view pale brownish dusted.

Anterior and posterior spiracle dark, the latter with black setulae at lower margin. Dorsocentrals 2+2; acrostichals 0 + 1, seta barely half as long as posterior dorsocentral seta, presutural acrostichal hairs in about six irregular rows, hairs of outer rows about as long as those of inner rows; two postpronotal setae, the outer seta lacking but the diameter of scar at least twice as long as the diameter of the inner seta; posthumeral seta 1, much shorter than the presutural seta. two notopleural setae, anterior one little longer than the posterior one, pre-alar seta more than half as long as posterior notopleural seta; two intra-alar setae, the anterior much shorter than the posterior seta, two supra-alar setae, three post-alar setae. Greater ampulla without distinct setulae, suprasquamal ridge bare. Prosternum haired, anepimeron with a tuft of setulae above and some scattered seta-like hairs on the posterior surface. Proepimeral area and katepimeron bare, meron without hairs but with few small setulae above hind coxa. Katepisternals 1+2, the lower one distinctly closer to the posterior seta than to the anterior one. Posterior margin of anepisternum at basal third with one seta, and at upper third with three strong setae and with some shorter interstitial seta-like hairs. Scutellum with a pair of strong apical and strong lateral setae, basal and preapical setae not much longer than the longer seta-like ground-hair, lateral surface including the margin to ventral surface with few setulae.

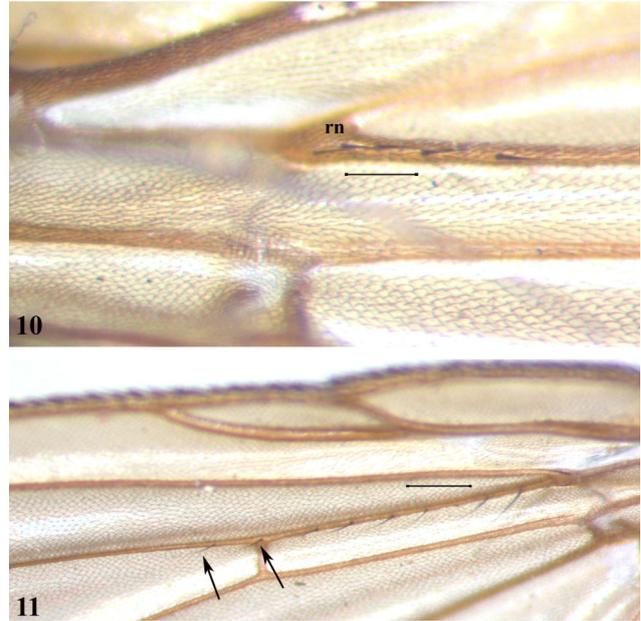
Wing. Membrane with a strong brownish shimmer, cross-veins and surrounding membrane not infuscate. Tegula and basicosta brown, veins yellowish-brownish, basal parts of veins not contrasting to the subsequent parts. Bristles of costa of about same length, costal spine usually barely distinguishable from and at most twice as long as adjacent bristles. Radial node and basal part of vein R4+5 dorsally with about four distinct setulae (Fig. 10), ventrally radial node with few small setulae and vein R4+5 with a complete row of



Figs 8–9. ♀ lectotype of *D. coerulea*. (8) Calypters of right side at a different incidence of light, predominantly brownish matt with a brownish broad margin; lateral part of anterior tergites with a bluish shine (bs) in places. (9) Left side of thorax and abdomen with small areas of bluish shimmer (bs).

strong setulae about reaching or even slightly exceeding cross-vein r-m (Fig. 11). Vein M somewhat diverging from vein R4+5, but slightly curved forward to R4+5 before reaching wing margin. Cross-vein r-m distinctly basad of the point where vein R1 enters costa; distal cross-vein dm-cu sinusoid and oblique. Both calypters roundish, dark brownish-grey transparent, margins brown depending on angle of light darker or paler than surface of calypter (Fig. 8), lower calypter almost twice as long as upper calypter. Stem and knob of haltere brown, basis of stem yellowish.

Legs. Coxae, trochanters and femora predominantly brown, at certain light conditions coxae with a yellowish shine, tibiae and tarsi yellowish-brownish or depending on condition of light even yellowish. Pulvilli and claws well developed about half as long as the corresponding tarsomere. Fore femur with com-



Figs 10–11. ♀ lectotype of *D. coerulea*, right wing. (10) Dorsal surface with distinct setulae on radial node (rn) and basis of vein R4+5. (11) Ventral surface with a row of setulae on vein R4+5, arrows pointing to the setae posterior of cross-vein r-m.

plete rows of posterodorsal, posterior and posteroventral setae, posteroventrals longer than depth of femur, posterodorsals and posteriors at most as long as depth of femur. Fore tibia with a median posterior seta, somewhat longer than diameter of tibia. Mid femur with at least two posteroventral hair-like setae in basal half at least about as long as depth of femur, preapically with a short anterodorsal and three longer posterior to posterodorsal setae. Mid tibia with two strong posterior setae somewhat longer than the diameter of tibia. Hind coxa bare on posterior surface. Hind femur with complete row of strong anterodorsal setae, in apical third two strong anteroventral setae, and in basal half two anteroventral and one posteroventral hair-like setae about as long as depth of femur; preapically two strong posterodorsal to dorsal setae. Hind tibia without distinct posterodorsal seta, at middle third one anterodorsal about as long as diameter of tibia and two slightly weaker anteroventral setae.

Abdomen. Macroscopically depending on quality of light dark brownish to dark, somewhat shiny in places with a more or less bluish sheen (Figs 8, 9). Microscopically without specific pattern, predominantly shiny dark brown to deep dark brown, depending on incidence of light (Figs 5, 7), only very sparsely brown-

ish-grey dusted. Tergite 3 with a row of short but distinct marginals, the marginals of tergite 4 are somewhat longer and tergite 5 with a row of long marginals (mainly left as scars) and an irregular row of discals. Sternites brown, somewhat shiny; sternite 1 laterally with some seta-like hairs.

Female genitalia. Not examined.

Measurements. Length of body about 7.5 mm; length of wing about 6 mm.

Male not known.

Inconsistencies: The characterisation of *D. coerulea* in the determination table of the overview is un-specific due to an ambiguous wording. The statement in couplet 7) “metallic blue, green, purple, or blue-grey flies... 8” includes, on the one hand, “any metallic-appearing blue, green, violet, or blue-grey flies”. Another possible interpretation is that “metallic blue, green, and purple flies or non-metallic-looking blue-grey *Dichaetomyia* specimens run to couplet 8”. Although the authors probably meant the latter option, it cannot be ruled out that some dipterologists will follow the first option. *Dichaetomyia coerulea* specimens in the sense of Couri’s definition would then be excluded from couplet 8. Inconsistencies with regard to body colour exists also between the early characterisations of the specimen by Bigot (1860) and Stein (1907) and the current observations on the lectotype. When Pont (2000) designated the specimen as lectotype of *D. coerulea*, he confirmed the deficiencies noted by Stein, but did not comment on any taxonomic feature. Bigot described the colouration of the thorax as shiny dark blue, with grey pollinosity, especially on the sides, and with three broad longitudinal bands that are densely dusted grey, fading posteriorly. Furthermore, the scutellum was shiny blue, and the pleura were brownish black with grey pollinosity; abdomen was blue and fairly shiny, the ventral side of the abdomen of the same colour as the dorsal surface but with a greyish base. Calypters were grey with black margins, halteres dark, the base of the stem pale brown. Stein commented on body colour in the very brief characterisation of the species’ only female as follows. Palpi black, thorax, scutellum and abdomen black-blue, thorax seen from behind dusted in the front part so that four stripes were visible. Calypters almost blackish with an even darker margin, halteres dark with a lighter stem. Both authors give practically no information worth mentioning about the chaetotaxy of the lectotype. Whereas Bigot reports shiny dark blue mesonotum, scutellum and abdomen and dark brown pleura, Stein speaks of black-

blue thorax, scutellum and abdomen. The current examination revealed a predominantly brown to dark brown coloration (Figs 5–7) not only of the pleura as also observed by Bigot, but also of the body parts described by the two earlier authors as shiny dark bluish. In the current investigations only in certain lighting conditions the colour was almost blackish (Fig. 7) and a little shiny in places. A bluish tinge as described by Bigot was in general not visible, apart from small local areas of the body (Figs 8–9) that were usually slightly indented. However, when the specimen was viewed macroscopically in sunlight, the body colour appeared significantly darker with some bluish tinge. Possibly the differences in body colours observed can be explained by the light sources used. Bigot’s and Stein’s observations were made 160 and 110 years ago, respectively. The light sources applied by the authors are not known, even sunny daylight may have been used. However, the quality of light available at that time certainly differs from the lighting options used today for microscopy and photography of flies. The differences observed in the colouring of the calypters and palpi may also be explained by the different incidence and quality of light. As shown (Figs 5, 8) different viewing angles result in differently coloured calypters of the same fly. For future comparisons, the current redescription should probably be taken as basis, since new investigations will most likely be carried out with light sources that are closer to today’s standard.

Dichaetomyia frontata Couri, Pont & Penny, 2006

Material examined: ♂ holotype of *Annaria frontalis* Zielke, 1972; locality label reads: “Madagascar Centre, Ambohitantely 1,600 m, det Ankazobe, January 1958 B. Stuckenberg” (the date of collecting has since been cut out of the label. It was therefore taken from the original description of the species.) Registration No.: NMSA-DIP 36579. The holotype was loaned by KZNM. The holotype is in a good shape, some major setae of the thorax are missing, however, the scars are clearly visible. Tergite 5 has been removed when extracting the male genitalia in previous years (Zielke 1972).

History: Due to the synonymisation of *Annaria* with *Dichaetomyia* by Pont (1980) the species name is now a junior secondary homonym of *Dichaetomyia frontalis* (Stein, 1918). It was renamed *Dichaetomyia frontata* by Couri, Pont & Penny in 2006.

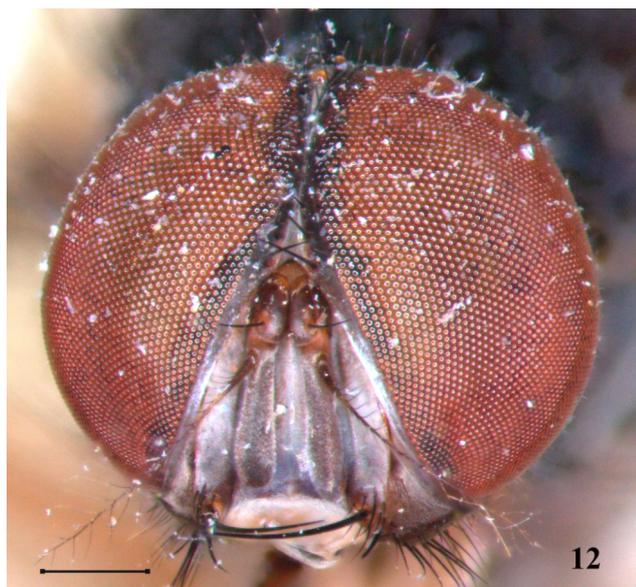


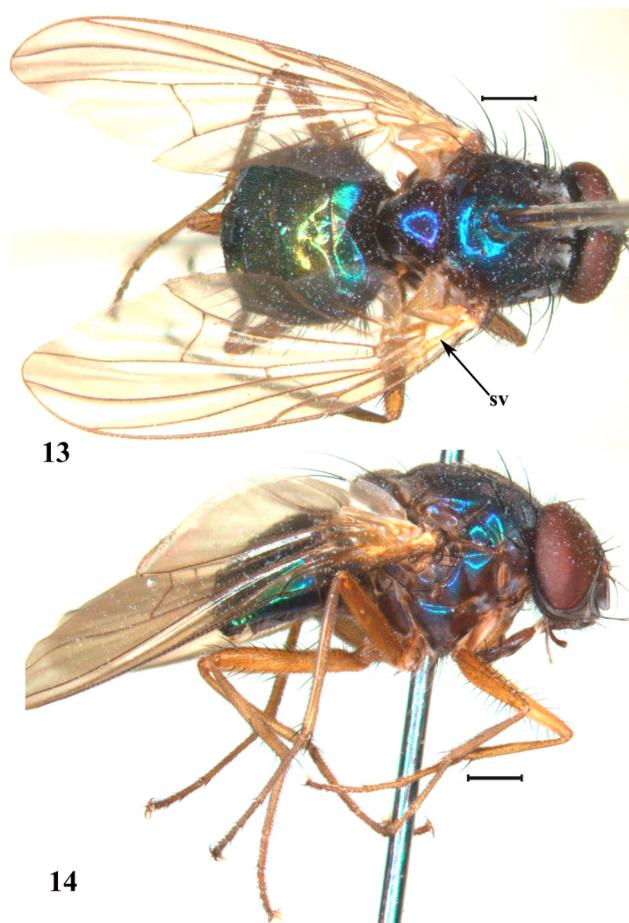
Fig. 12. ♂ holotype of *Dichaetomyia frontata* Couri, Pont & Penny. Anterior view of head.

Redescription (male): Head. Ground-colour dark, depending on incidence of light more or less greyish-white dusted. Eyes with few scattered small hairs, facets next to frons only slightly larger than those on the outer side of eye; shortest distance between eyes about as wide as diameter of anterior ocellus (Fig. 12). Width of fronto-orbital plate at shortest distance between eyes barely half as wide as diameter of anterior ocellus; fronto-orbital plates touching at middle third of frons and separated by narrow triangular-shaped frontal vitta at the anterior and upper third.

In profile mouth margin in line with profrons. Parafacial weakly tapering, at level of base of antenna about half as wide as depth of postpedicel, at lower part barely as wide as anterior ocellus. Parafacial bare, on lower third of facial ridge few small fine setulae recognizable, not strikingly dark coloured. Genal depth below lowest eye margin about two thirds as wide as depth of postpedicel. In anterior view fronto-orbital plate, face, parafacial and anterior surface of genae dark with whitish-grey pollinosity, anterior triangular-shaped frontal vitta and ocellar tubercle contrasting brown and dark respectively. Antennal segments predominantly brownish, depending on viewing angle dusted greyish-white, basis of postpedicel with a very narrow yellowish base. Postpedicel slightly more than three times as long as deep and at least two and a half times as long as pedicel. Arista yellowish-brownish, not conspicuously dilated at basis, approximately twice

as long as length of postpedicel, longest dorsal hairs of arista about one and a half times as long as depth of postpedicel. Fronto-orbital plate with three well developed setae, upwards of declining length and with few shorter interstitial hairs on the anterior third of frons and one or two significantly short setulae at the middle third, at the level of the anterior tip of the ocellar triangle a strongly reclinate orbital seta with a slightly shorter reclinate seta somewhat below, both reclinate setae distinctly weaker than the anterior fronto-orbital setae. Vibrissal setae strong and about twice as long as the longest surrounding peristomal setae. Lateral surface of gena brown barely dusted, postgenal and occipital surface dark, with sparse grey dust and dark seta-like hairs. Proboscis brown and slender, prementum brown, depending of viewing angle somewhat shiny or densely dusted; length of labella at least twice as long as depth of proboscis, palpus brown not dark brown, apically somewhat darkened, weakly clavate, about as long as prementum.

Thorax. Ground-colour shiny dark greenish-blue to brownish-violet. Mesonotum depending on incidence of light more greenish or bluish-violet (Figs 13, 14), in direct posterior view anterior half brownish-grey dusted, presutural part with three broad longitudinal stripes dusted greyish-white, reaching the transverse suture, the paramedian stripes tapering towards the suture, the broad median stripe unchanged in width, all three somewhat exceeding the suture; at certain viewing angle postpronotum also somewhat dusted greyish. Postalar area in certain conditions of light somewhat brownish, scutellum uniformly predominantly violet (Fig. 13). All pleura depending on point of viewing shiny (Fig. 14) or more or less greyish dusted, anterior pleura bluish-greenish-violet with strong brown shimmer, posterior pleura predominantly brownish, at certain viewing angles with weak violet reflections. Anterior spiracle ochre-brown to brown (Fig. 14), posterior spiracle dark brownish with several black setulae on the lower margin. Dorsocentrals 2+2; acrostichals 0 + 1, the acrostichal seta distinctly weaker than posterior dorsocentral seta, presutural acrostichal hairs in about eight irregular rows, hairs of the rows about equally long; two postpronotal setae, the outer one stronger and almost one and a half times as long as the inner one; one post humeral seta and one presutural seta, both strongly developed, the presutural much longer, two notopleural setae, anterior one somewhat longer, notopleuron with a few small black hairs; prealar seta distinct, about two thirds as long as posterior



Figs 13–14. ♂ holotype of *D. frontata*. (13) Dorsal view. Scutellum predominantly violet; abdomen with brass reflections; basal parts of wing veins yellow (for example stem vein = sv) and in contrast to the brownish-yellow subsequent parts of veins. (14) Lateral view. Yellow legs; postpronotal lobe concolourous with mesonotum; basal part of wing conspicuously yellow.

notopleural seta; scars of two intra-alar setae recognizable, two supra-alar and three post-alar setae. Greater ampulla without distinct setulae, suprasquamal ridge bare. Prosternum haired, anepimeron with a tuft of setulae above and scattered seta-like hairs on the posterior surface. Proepimeral area, katepimeron and meron bare. Katepisternals 1+2, the lower one distinctly closer to the posterior seta than to the anterior one; anepisternals 1+5, the setae of the posterior row varying in length and surrounded by several shorter interstitial seta-like hairs, the anterior upper anepisternal seta weak, barely one third as long as the longest seta out of the posterior row. Scutellum with strong apical and lateral setae, basal and subapical setae barely

longer than the longest hairs of ground-hair; lateral surface of scutellum including the margin to the ventral surface with setulae.

Wing. Membrane hyaline, with a distinct yellowish to brownish shimmer depending on incidence of light, cross-veins and surrounding membrane not infuscate. Tegula predominantly dark brown, basicosta brown, base of the wing-veins strikingly yellow (Figs 13, 14) strongly contrasting to the subsequent brown parts of the veins. Costal spine short and not prominent, at most twice as long as adjacent bristles. R4+5 dorsally bare, ventrally radial node and the very base of vein R4+5 with a few small setulae. Vein M somewhat diverging from vein R4+5, but slightly curved forward to R4+5 before reaching wing margin. Cross-vein r-m slightly basad of the level where vein R1 enters costa; distal cross-vein dm-cu somewhat sinuous and oblique. Calypters yellowish transparent, margins yellow, the lower calypter about one and a half times as long as the upper one. Haltere stem yellow, knob ochre.

Legs. Coxae, trochanters, femora, tibiae and tarsi yellow (Fig. 14). Pulvilli and claws well developed but not as long as associated tarsomere. Fore femur with complete rows of posterodorsal, posterior and posteroventral setae; the setae about as long as depth of the femur. Fore tibia with a median posterior seta about one and a half times as long as diameter of tibia. Mid femur with a row of posteroventral seta-like hairs along its entire length, the hairs of basal half about as long as of depths of femur, of apical half distinctly shorter, preapically a short anterodorsal and three strong posterior to posterodorsal setae. Mid tibia with two posterior setae longer than the diameter of tibia. Hind coxa bare on posterior surface. Hind femur with complete row of strong anterodorsal setae, at apical third four or five strong anteroventral setae, preapically two strong posterodorsal to dorsal setae. Hind tibia without long posterodorsal seta, at middle third with one strong anterodorsal seta distinctly longer than diameter of tibia and usually two weaker anteroventral setae, about at the same level a short posterodorsal seta, barely as long as diameter of tibia.

Abdomen. Predominantly shiny dark green with brass reflections (Fig. 13), anterior part of dorsal surface of syntergite 1+2 brownish violet and laterally completely violet, the remaining tergites dorsally, laterally and ventrally shiny green, dorsally with distinct brass reflections. Tergite five lacking as consequence of previous extirpation of hypopygium, according to original description of the species (Zielke 1972) the ter-

gite was marked with a yellow apical band. Tergite 3 laterally with long marginal setae, dorsally only few short marginals, tergite 4 with a row of strong marginals and laterally few strong discals; no information available on tergite 5 as the major part was destroyed by the dissection. Sternites brown, sternite 1 haired.

Male genitalia were pictured in the original description (Zielke 1972).

Measurements. Length of body about 8 mm; length of wing about 8.5 mm.

Dichaetomyia rangeri (Zielke, 1973)

Material examined: ♂ holotype of *Annaria rangeri* Zielke, 1973; locality label: “Madagascar D.-S., Mtge. d’Ambre 24.V.58 F. Keiser”. The holotype is located in the entomological collection of IBER. Apart from the fact that the left mid leg is missing the specimen is very well preserved.

History: After Pont integrated the genus *Annaria* into *Dichaetomyia*, Couri et al. synonymised *Dichaetomyia scutellaris* (Zielke, 1974) with *Dichaetomyia rangeri* (Zielke, 1973) without comparing specimens or at least the descriptions of the two species. The authors then identified and recorded several *Dichaetomyia* specimens, which were actually *D. scutellaris*, as *D. rangeri*. Since both species differ significantly from each other, *D. scutellaris* was reactivated as an independent species (Zielke 2016). The name, however, was replaced by *Dichaetomyia perineta* Zielke, 2016 since the epithet “*scutellaris*” was preoccupied by *Dichaetomyia scutellaris* Malloch, 1928. The original species *D. rangeri* still existed, but since the name was misapplied by Couri for the present *D. perineta*, the original *D. rangeri* and its taxonomic features were not considered in the overview on the Malagasy Muscidae and in the identification key for the genus, respectively. The species was fallen into complete oblivion for the period from 2006 to 2016.

Redescription (male): Head. Ground-colour pale brownish (Fig. 15), depending on viewing angle more or less dusted greyish-white. Holoptic; eyes very large with very few scattered microscopic hairs, facets near to frons somewhat enlarged; shortest distance between eyes at most as wide as diameter of the anterior ocellus. Fronto-orbital plates touching along middle third of frons, lower and upper third each with a small triangular shaped frontal vitta, narrowest width of fronto-orbital plate less than half the diameter of anterior ocellus.

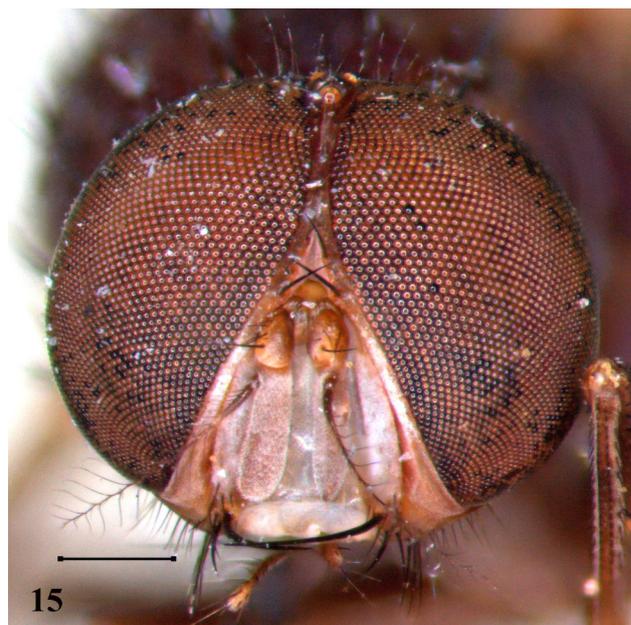


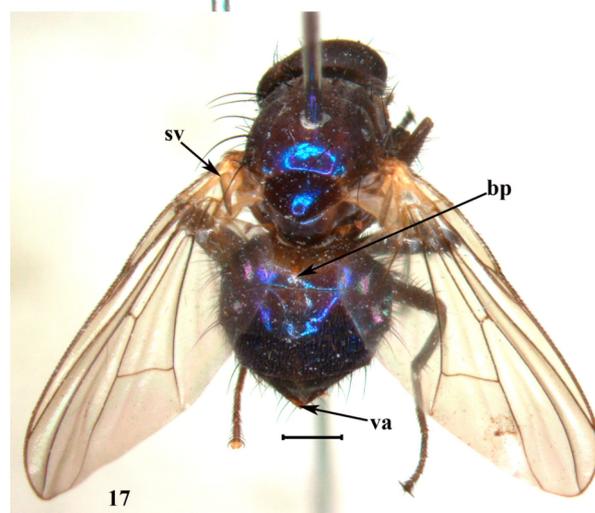
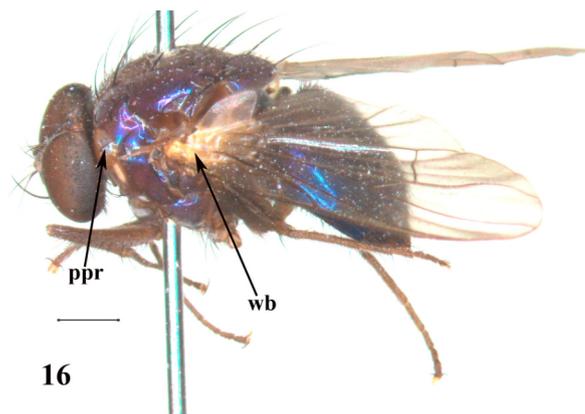
Fig. 15. ♂ holotype of *Dichaetomyia rangeri* (Zielke). Anterior view of head.

lus. Parafacial almost parallel sided, at level of base of antenna throughout to the lower part of parafacial about as wide as diameter of anterior ocellus. Facial ridge in lower third about two thirds as wide as depth of postpedicel. In profile upper mouth margin in line with profrons. Genal depth below lowest eye margin very narrow since the eye extends almost to the lower margin of gena (Fig. 15).

Depending on incidence of light fronto-orbital plate and parafacial yellowish-brown or dusted greyish-white, frontal vitta, where present, somewhat contrasting reddish-brown, face and facial ridge very pale or sparsely dusted whitish, peristomal area and gena pale reddish-brown, not dusted. Antennae light brown dusted greyish-white, pedicel at certain viewing angle partly yellow (Fig. 15). Postpedicel about three times as long as deep and slightly more than twice as long as pedicel. Basis of arista dark brown and slightly dilated, otherwise brownish, more than twice as long as length of postpedicel, longest dorsal hairs of arista about twice as long as depth of postpedicel. Fronto-orbital plate with about three setae and a few interstitial hairs in the anterior third, on middle third of frons about two small setulae and in the upper third at the level of the anterior tip of the ocellar triangle a reclinate seta, not very strong, and a smaller reclinate seta, about half as long as the upper one, closely below. Parafacial and anterior surface of gena bare. Facial ridge with

some tiny setulae in lower half, not conspicuous but clearly detectable. Ocellar seta well developed, about twice as long as inner and outer vertical setae and about as long but not as strong as the anterior fronto-orbital seta. Vibrissal setae strong and somewhat longer than twice the length of the longest surrounding peristomal setae. Lateral surface of gena where present and post-occipital surfaces reddish-brown and with long dark setae. Proboscis not conspicuously long and rather slender, brown, prementum brown somewhat shiny, sparsely dusted; length of labella about one and a half times as long as maximal depth of proboscis; palpus pale brown depending on conditions of light with a more or less yellowish tinge, predominantly slender only weakly clavate and somewhat longer than prementum.

Thorax. Ground-colour violet with predominantly bluish reflections (Fig. 16). Mesonotum uniformly shiny violet, in postero-dorsal view presutural part with a broad median longitudinal stripe densely dusted whitish-grey and reaching the transverse suture, two paramedian stripes dusted greyish and tapering towards the suture, in lateral view slightly exceeding the transverse suture. Scutellum uniformly violet, somewhat darker than the mesonotum and bluish reflections more distinct (Fig. 17). In direct posterior view mesonotum largely densely dusted whitish. Postpronotum and the area around the anterior spiracle strikingly yellow (Fig. 16), in contrast to the adjacent violet anterior part of mesonotum and the surrounding pleura. Pleura predominantly concolourous with the violet mesonotum, apart from the shiny brown meron. At certain viewing angles the pleura more or less dusted whitish. Anterior spiracle yellow, posterior spiracle brownish with dark setae at lower margin. Dorsocentrals 2+2; acrostichals 0 + 1, seta barely half as long as posterior dorsocentral seta; two postpronotal setae, the outer one about twice as long as the inner seta; posthumeral seta 1, presutural seta 1, at least twice as long as the posthumeral seta; two notopleural setae, anterior one somewhat longer, notopleuron with very few small black hairs; pre-alar seta distinct, about half as long as posterior notopleural seta; intra-alar setae 1, the anterior one not detectable; supra alar setae 2, the posterior seta weak and short, post-alar setae 3. Greater ampulla without distinct setulae, suprasquamal ridge bare. Prosternum haired, anepimeron with a tuft of setulae above and some scattered hairs on the posterior surface. Proepimeral area, katapimeron and meron bare. Katapisternals 1+2, the lower one distinctly



Figs 16–17. ♂ holotype of *D. rangeri*. (16) Lateral view. Legs brown, but not dark brown; postpronotum (ppr) and the area around the anterior spiracle strikingly yellow; wing base (wb) conspicuously yellow. (17) Dorsal view. Abdomen with a brownish area (bp) on syntergite 1+2 and partly at the base of tergite 3; basal parts of wing veins yellow (for example stem vein = sv) and in contrast to the darker subsequent parts of veins.

closer to the posterior seta than to the anterior one. Anepisternal setae 1+5, the posterior setae varying in length, interstitial seta-like hairs much shorter. Scutellum with a pair of strong apical and strong lateral setae, basal seta and preapical seta much weaker and barely distinguishable from the longer seta-like ground-hairs; lateral surface and margin to the ventral surface with some setulae.

Wing. Membrane hyaline with a weak brownish shimmer, cross-veins and surrounding membrane not infusate. Tegula dark yellow, basicosta pale yellow, veins at wing basis strikingly yellowish (Figs 16, 17),

subsequent parts of veins contrastingly brown. Costal spine about twice as long as neighbouring bristles, but not prominent. Vein R4+5 and radial node dorsally bare, ventrally with one or two setulae on the basis of R4+5. Vein M somewhat diverging from vein R4+5, but slightly curved forward to R4+5 before reaching wing margin. Cross-vein r-m at least at the level or even slightly apical of the point where vein R1 enters costa; distal cross-vein dm-cu weakly curved and weakly oblique. Both calypters whitish transparent, margins white at most with a very weak yellowish tinge, lower calypter at most one and a half times as long as upper calypter. Stem of haltere dark yellow to brownish, knob brownish.

Legs. Coxae, trochanters and femora brown (Fig. 16), not dark brown, femora at certain incidence of light pale brownish with a yellowish shine, tibiae yellowish to brownish, depending on light incidence, tarsi more dark yellowish. Pulvilli and claws well developed but not as long as the corresponding tarsomere. Fore femur with complete rows of posterodorsal, posterior and posteroventral setae, the posterodorsals and posteriors distinctly shorter than the posteroventral setae. Fore tibia with a median posterior seta more than twice as long as diameter of tibia. Mid femur in basal two thirds with a row of posteroventral hairs almost as long as depth of femur, preapically with an anterodorsal seta and one almost dorsal and two posterior to posterodorsal setae. Mid tibia with two strong posterior setae, almost twice as long as diameter of tibia. Hind coxa bare on posterior surface. Hind femur with complete row of strong anterodorsal setae and only one strong anteroventral seta in apical third, two or three slightly elongated anteroventral hairs may be adjacent, preapically two strong posterodorsal to dorsal setae. Hind tibia without distinct posterodorsal seta, at middle third one strong anterodorsal seta slightly longer than and two weaker anteroventral setae about as long as diameter of tibia.

Abdomen. Tergites depending on viewing angle predominantly shiny violet or shiny dark bluish with strong violet reflections, syntergite 1+2 and anterior half of tergite 3 at certain incidence of light more pale brownish, tergite 5 with a very narrow yellowish apical band and a poorly defined equally narrow yellow median stripe (Fig. 17). When viewed directly from posterior or lateral dorsal surface of abdomen partly whitish dusted. All tergites laterally and ventrally more shiny bluish, sternites brownish; sternite 1 laterally with several longer seta-like hairs.

Male genitalia. The determination of the species is not based on characters of genitalia. Thus, it has been refrained from extracting the genitalia to avoid inflicting damage on the only available male specimen.

Measurements. Length of body about 7 mm; length of wing about 6.4 mm.

Previous misidentifications: Couri et al. (2006) recorded 17 specimens of *D. rangeri* of which the recheck of 16 specimens (Zielke 2020) revealed that four specimens belonged to *Helina flavomaculata* Couri, Pont & Penny, 2006, eleven specimens were *D. perineta* and one male is a representative of *Dichaetomyia mikeana*, a recently (Zielke, 2022) described new species.

Dichaetomyia tristis (Zielke, 1972)

Material examined: ♂ holotype of *Annaria tristis* Zielke, 1972; locality label: "Madagascar Centre, Anjavidilava 2020 m Andringitra Ambalavao 17.-21.01.1958 B. Stuckenberg". Registration No.: NMSA-DIP 36771. 1 ♂ and 2 ♀♀ paratypes of *Annaria tristis* with same locality label as holotype, the ♂ registered as NMSA-DIP 81786 and the females with registration numbers NMSA-DIP 81787 and NMSA-DIP 81788, respectively. All type specimens were kindly loaned by the KZNM. Both knobs of the halteres of the holotype are missing. Apparently they have been destroyed by dermestids. The colour of the haltere heads was given as brown in the first description of the species and is confirmed in the paratypes. Apart from some contamination with traces of faeces and some remains of mycelium (?), the holotype is in good condition and shows all taxonomic characters well. The male paratype is less contaminated, but the right mid leg is missing, tergite 5 has been removed when extracting the male genitalia in previous years. The extremities of both female paratypes are complete. However, the paratype with the registration number 81788 is soiled with small traces of faeces and remains of mycelium and some large bristles are missing. The female with the number 81786, on the other hand, is in good and practically unpolluted condition. *Dichaetomyia tristis* is the type-species of genus *Annaria*.

Redescription (male): Head. Ground-colour dark brownish to blackish, depending on incidence of light more or less silvery-white dusted (Fig. 18). Holoptic, eyes with several scattered small but clearly visible hairs, facets next to frons somewhat larger than those



Fig. 18. ♂ holotype of *Dichaetomyia tristis* (Zielke). Anterior view of head.

on the outer side of eye; shortest distance between eyes about one and a half times as wide as the diameter of anterior ocellus. Fronto-orbital plate at shortest distance between eyes slightly wider than half the diameter of anterior ocellus; fronto-orbital plates separated by a narrow frontal vitta with the shortest width less than half as wide as the narrowest width of fronto-orbital plate. Parafacial at level of basis of antenna barely as wide as depth of postpedicel, tapering slightly toward lower half, where parafacial and facial ridge separate, about as wide as anterior ocellus. Facial ridge in lower third about as wide as depth of postpedicel. In profile upper mouth margin in line with profrons. Genal depth below lowest eye margin slightly wider than depth of postpedicel. In anterior view fronto-orbital plate and frontal vitta dark, face, parafacial and anterior surface of gena dark sparsely dusted greyish-white, when viewed from above or lateral fronto-orbital plate silvery-white, frontal vitta and ocellar tubercle contrasting dark to black, face and parafacial depending on viewing angle more or less silvery-white, gena moderately dusted whitish. Antennal segments predominantly brownish, when viewed from lateral pedicel with a very narrow orange apical margin and postpedicel with a narrow orange basis barely reaching the level of insertion of arista; depending on viewing angle sparsely or densely

dusted whitish-grey (Fig. 18). Postpedicel three times as long as deep and about two and a half times as long as pedicel. Arista brownish, not conspicuously dilated at basis but paler, at least twice as long as length of postpedicel, longest dorsal hairs of arista about one and a half times as long as depth of postpedicel. Fronto-orbital plate with about three setae on the anterior third of frons and a few distinctly shorter interstitial hairs, about two of the latter ones also in the middle third of frons, at the level of the anterior tip of the ocellar triangle a reclinate orbital seta about as long as the anterior fronto-orbital setae, a distinctly shorter hair-like reclinate seta closely below of the upper seta. Parafacial bare, facial ridge with one or two barely detectable small setulae. Vibrissal setae strong and more than twice as long as the longest surrounding peristomal setae. Lateral surface of gena brown, postgenal and occipital surface brownish with sparse grey dusting and dark seta-like hairs. Proboscis slender not conspicuously long, brown, prementum brown, depending on incidence of light somewhat shiny or densely dusted; length of labella at least twice as long as apical width of proboscis; palpus brown, slender and weakly clavate, about as long as prementum.

Thorax. Ground-colour shiny dark green, with strong bluish shine or brass reflections (Fig. 19), depending on incidence of light. Mesonotum at certain viewing angle partly sparsely dusted grey, predominantly in the anterior half. Presutural part of mesonotum with three broad longitudinal stripes dusted greyish-white (Fig. 19), in dorsal view barely reaching the transverse suture, in direct posterior view extending almost to the middle of the postsutural part of mesonotum. Scutellum uniformly dark violet, not conspicuously but still coloured differently than the mesonotum. All pleura depending on viewing angle shiny or dusted greyish (Fig. 19), the anterior pleura anepisternum and katepisternum at certain viewing angles with clear greenish-blue reflections, the posterior anepimeron and meron purely brownish. Anterior spiracle light brown, at some point of viewing somewhat contrasting to the surrounding area, posterior spiracle brown with black setulae at lower margin. Dorsocentrals 2+2; acrostichals 0+1, presutural acrostichal hairs in about six irregular rows, hairs of the rows about equally long; two postpronotal setae, the outer stronger and almost twice as long as the inner seta; posthumeral seta 1, presutural seta 1, clearly more than twice as long as the posthumeral seta, two notopleural setae, anterior one slightly longer, no-

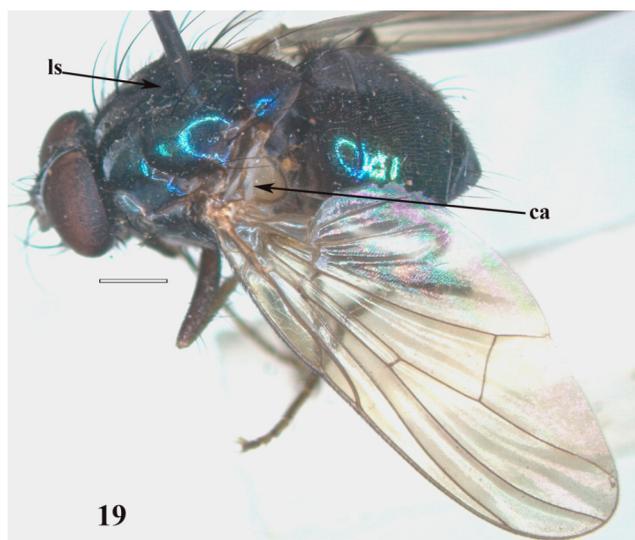


Fig. 19. ♂ holotype of *D. tristis*. Dorsolateral view. Shiny dark green ground-colour, thorax and abdomen practically without any yellow area; mesonotum with greyish longitudinal stripes (ls), at least the median one almost reaching median part of postsutural mesonotum; basis of wing without conspicuous yellow marking, stem-vein not strikingly different coloured than the subsequent parts of vein; calypters (ca) greyish matt with a striking dark margin in most angles of viewing; legs with predominantly brown to dark brown femora.

topleuron with very few small black hairs close to base of the setae; pre-alar seta distinct, at least half as long as posterior notopleural seta; intra-alar setae 2, supra-alar setae 2, post-alar setae 3. Greater ampulla without distinct setulae, postalar declivity and suprasquamal ridge bare. Prosternum haired, anepimeron with a tuft of setulae above and scattered hairs on the posterior surface. Proepimeral area, katepimeron and meron bare. Katepisternals 1+2, the lower one distinctly closer to the posterior seta than to the anterior one. Anepisternals 1+5, the setae of the posterior row varying in length and surrounded by several shorter interstitial seta-like hairs, the anterior upper anepisternal seta weak, barely one third as long as the longest seta of the posterior row. Scutellum with a pair each of strong apical and strong lateral setae, basal seta at most one third as long as the lateral seta, subapical seta about as long as basal seta but distinctly weaker therefore barely distinguishable from the longer hairs of ground-hair; lateral surface of scutellum including the margin to the ventral surface with few setulae.

Wing. Membrane hyaline, with a brownish tinge, cross-veins and surrounding membrane not infuscate

(Fig. 19). Tegula and basicosta brown, wing at basis somewhat yellowish, but stem vein and basal parts of adjacent veins brown and not in contrast to subsequent parts of veins. Costal spine barely distinguishable from surrounding bristles. Radial node dorsally and ventrally bare, basis of vein R4+5 ventrally with only one setula well developed and visible, dorsally bare. Vein M somewhat diverging from vein R4+5, but slightly curved forward to R4+5 before reaching wing margin. Cross-vein r-m slightly basad from the point where vein R1 enters costa; distal cross-vein dm-cu very weakly sinuous and slightly oblique. Upper calypter yellowish transparent with a yellowish-white margin, lower calypter somewhat darker matt transparent with yellowish-brownish shimmer and depending on viewing angle with a broad dark brown (Fig. 19) or dark yellow margin, the lower calypter about one and a half times as long as the upper one. Stem of haltere yellow, knob brown.

Legs. Coxae, trochanters and femora brown, depending on conditions of light trochanters sometimes paler, almost yellowish, tibiae and tarsi yellow. Pulvilli and claws well developed but shorter than the associated tarsomere. Fore femur with complete rows of posterodorsal, posterior and posteroventral setae, the posterodorsals and posteriors barely as long as depth of femur and posteroventrals longer than depth of femur. Fore tibia with a median posterior seta about twice as long as diameter of tibia. Mid femur in general without long setae or hairs, preapically a short anterodorsal and three strong posterior to posterodorsal setae. Mid tibia with two strong posterior setae distinctly longer than the diameter of tibia. Hind coxa bare on posterior surface. Hind femur with complete row of strong anterodorsal setae about as long as depth of femur, in apical third two or three strong anteroventral setae, one or two shorter seta-like anteroventral hairs present or absent in the middle third, preapically two strong posterodorsal to dorsal setae. Hind tibia without distinct posterodorsal seta, at middle third with one strong anterodorsal seta distinctly longer than diameter of tibia and usually two weaker anteroventral setae.

Abdomen. Without specific pattern, predominantly shiny greenish (Fig. 19), depending on viewing angle with some brass or violet reflections, tergite 4 and 5 with very distinct brass reflections, in posterior view abdomen partly sparsely dusted greyish. Anterior half of syntergite 1+2 shiny brownish to violet with weak brass reflections, ventral parts of tergites practically

concolorous with dorsal surface of tergites. Syntergite 1+2 and tergites 3 and 4 laterally with some stronger marginal setae, only tergite 5 with a complete row of long marginals; tergites 3 to 5 with few longer lateral discal setae, but without complete rows of discals. Sternites predominantly brown; sternite 1 with some setulae.

Male genitalia. The male genitalia were pictured in the original description (Zielke 1972).

Measurements. Length of body 7.5 mm; length of wing about 7 mm.

Redescription (female): Head. Ground-colour dark, depending on incidence of light partially more or less dusted greyish-white. Dichoptic; eyes with several scattered small hairs, facets of about equal size. Frons somewhat dilated towards the anterior margin, at vertex about 0.35 times as wide as maximal width of head, distance between eyes at level of anterior ocellus about 3.7 times and at anterior margin 4.3 times the distance between the outer margins of posterior ocelli; fronto-orbital plates at midway of frons at least twice as broad as anterior ocellus and frontal vitta at that point about three times as wide as distance between posterior ocelli, frontal triangle slender and sharply tipped at level of third pair of frontal setae. Parafacial distinctly tapering, at level of antenna basis almost one and a half times as wide as depth of postpedicel and in the lower part of face at level where parafacial and facial ridge separate about as wide as anterior ocellus; facial ridge in lower half about as wide as depth of postpedicel. In profile upper mouth margin in line with profrons. Genal depth below lowest eye margin almost one and a half times as wide as depth of postpedicel. In anterior view fronto-orbital plate predominantly dark to black, at most thinly grey dusted, parafacial densely dusted whitish, frontal vitta matt dark brownish to blackish, frontal triangle dark at certain angle of lighting slightly shiny, ocellar tubercle black, and face predominantly uniformly dusted whitish-greyish, gena dusted sparsely. Antennae predominantly brown and depending on condition of light with some greyish dusting. Postpedicel about three times as long as deep and almost two and a half times as long as pedicel. Arista brownish, at basis slightly dilated, about twice as long as length of postpedicel, longest hairs of arista somewhat longer than depth of postpedicel. Anterior half of fronto-orbital plate with three setae and one or two small interstitial hairs, the anterior seta somewhat stronger and longer than the upper ones, at midway one or two distinctly shorter seta-like hairs and at upper

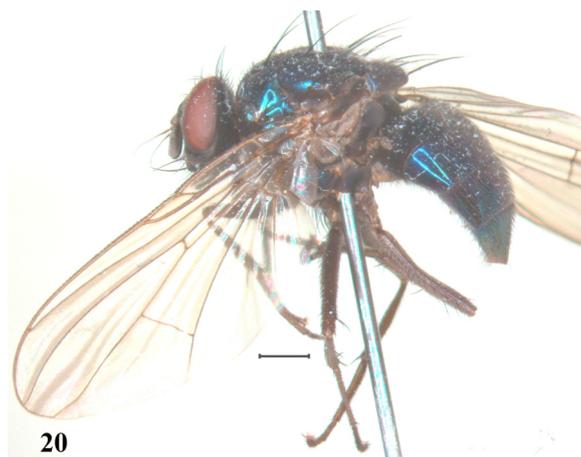


Fig. 20. ♀ paratype of *D. tristis*. Lateral view, very similar to male in Fig. 19.

half at level of anterior ocellus a strong reclinate orbital seta and another orbital seta slightly below, almost as long and strong as the upper one. Ocellar setae long, inner vertical seta strongly developed, almost twice as long as outer vertical seta. The surface between eye margin and frontal and orbital setae with a few scattered proclinate setulae. Parafacial bare, lower half of facial ridge with about two fine small setulae, barely visible. Vibrissal setae strong and approximately twice as long as the longest surrounding peristomal setae. Lateral surface of gena matt brown, dusted sparsely and upper surface bare, margin of gena and post-occipital surface with dark setae. Proboscis not conspicuously long, but broader than in male, prementum dilated towards anterior margin, brown and matt, slightly dusted, labella somewhat longer than maximal depth of proboscis; palpus brown, slender and weakly clavate, about as long as prementum.

Thorax. Similar to male (Fig. 20), however, grey longitudinal stripes predominantly confined to presutural part; scutellum violet but not as distinct as in males, posterior lateral pleura shiny brown with weak violet reflections, anterior spiracle dark brown.

Wing. Vein R4+5 and radial lobe dorsally bare, ventrally with about two distinct setulae on the basal node and up to three setulae at the basis of R4+5. Upper calypter transparent margin slightly brownish, lower calypter yellowish-brownish to brownish transparent with a broad dark brown margin, the lower calypter about one and a half times as long as the upper one. Basis of stem of haltere yellowish brown, upper half of stem and knob brownish to dark brown.

Legs. Median posterior seta of fore leg only slightly longer than diameter of tibia; basal half of mid femur with about four seta-like posteroventral hairs, almost half as long as depth of femur, the posteroventral hair at basis of femur almost as long as depth of femur.

Abdomen. Marginal and discal setae less developed than in males, colour of tergite five, in contrast to the other tergites, predominantly shiny brassy with corresponding reflections.

Genitalia. Not investigated.

Measurements. Length of body and length of wing about 8.5 mm.

Previous misidentifications: When in 1972 the first group of metallicly coloured *Dichaetomyia* species were described as *Annaria* Zielke, the six species were easily distinguished by a rather simple key mainly based on differently coloured body parts. *Dichaetomyia tristis*, the type species of the genus, stood out in this group of colourful flies with a more or less uniform plain dark green body coloration. Depending on the incidence of light, the body colour reflected brass, blue and sometimes blue-violet. The simplified distinguishing features used in the *Annaria*-key were integrated almost unchanged into the identification table for all Madagascan *Dichaetomyia* species by Couri et al. (2006). When the authors applied this key to determine the *Dichaetomyia* specimens of the Californian Academy of Sciences they recorded 19 specimens of *D. tristis*, 15 of which were re-identified as part of comparative studies on *Dichaetomyia* species (Zielke 2020). All specimens led in the key to *D. tristis*, but due to differences in several other taxonomic features they did not form a homogeneous group of individuals. Only one fly male of the 15 checked specimens turned out to be *D. tristis*. Five specimens were identified as *Dichaetomyia diazbastiania* Zielke, 2020, four proved to be *Dichaetomyia grinteri* Zielke, 2020, one each was *Dichaetomyia copopea* Zielke, 2020 and *Dichaetomyia talata* Zielke, 2020 respectively, and two belonged to *Dichaetomyia zuparkoi* Zielke, 2020. In addition, one female was a representative of another taxa, however due to a very poor condition of the body unidentifiable down to species-level.

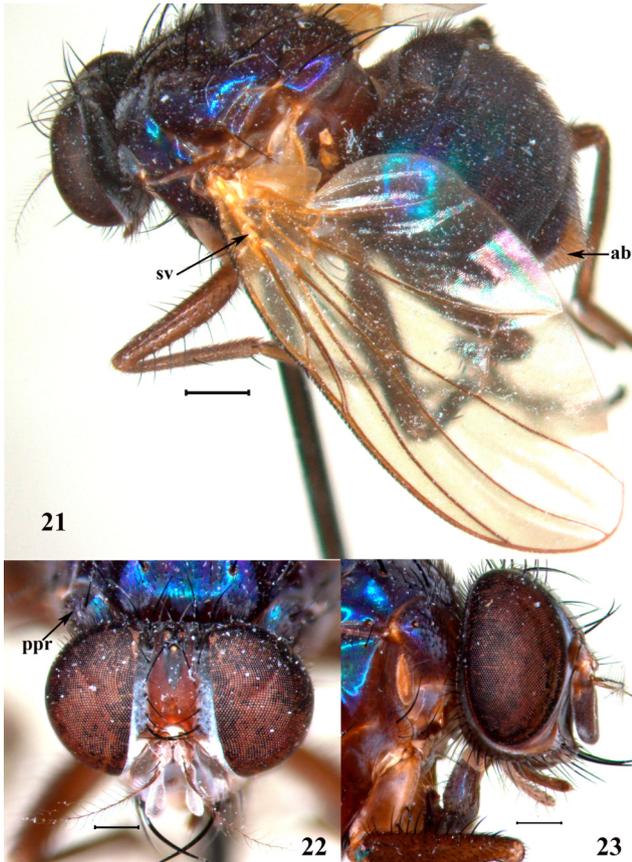
Dichaetomyia zielkei Couri, Pont & Penny, 2006

Material examined: ♀ holotype of *Annaria apicalis* Zielke, 1972; locality label: “Madagascar Nord, Montagne d’Ambre 1000 m det. Diego-Suarez,

23.11.-4.12.1957 B. Stuckenberg”. Registration No.: NMSA-DIP 36587. 1 ♀ paratype of *Annaria apicalis*; locality label: “Madagascar Centre, Anjavidilava 2020 m Andringitra Ambalavao 17.-21.01.1958 B. Stuckenberg”. Registration No.: NMSA-DIP 36599. Apart from missing tarsi of the right hind leg and of the tarsi 2 to 5 of the right mid leg the holotype is in an excellent condition. The paratype lacks the tarsi of the left front leg and it is clearly contaminated with old mycelium remnants from a previous fungal infestation. Both specimens were kindly loaned by KZNM.

History: The synonymisation (Pont 1980) of *Annaria* with *Dichaetomyia* demoted the epithet of *Annaria* to a junior secondary homonym of *Dichaetomyia apicalis* (Stein, 1904). The species was renamed *Dichaetomyia zielkei* by Couri, Pont & Penny in 2006.

Redescription (female): Head. Ground-colour from pale brown to almost black, depending on light conditions partially densely dusted whitish (Figs 22, 23). Dichoptic; eyes with very few scattered small hairs, facets of about equal size. Frons slightly dilated towards the anterior margin of frons (Fig. 22), at vertex about 0.25 times as wide as maximal width of head, distance between eyes at level of anterior ocellus about 3.3 times and at anterior margin 4.0 times the distance between the outer margins of posterior ocelli; fronto-orbital plate at midway of frons almost twice as broad as anterior ocellus and frontal vitta at that point about 2.3 times as wide as distance between posterior ocelli, frontal triangle slender and sharply tipped at level of third pair of frontal setae. Parafacial distinctly tapering, at level of antenna basis almost as broad as depth of postpedicel and at the level where parafacial and facial ridge separate barely as broad as anterior ocellus; facial ridge in lower half at least half as broad as depth of postpedicel. In profile upper mouth margin in line with profrons. Genal depth below lowest eye margin about three quarters as broad as depth of postpedicel (Fig. 23). In anterior view fronto-orbital plate predominantly dark to black, at most sparsely dusted, parafacials densely dusted whitish, frontal vitta contrasting matt reddish brown or blackish, frontal triangle dark and very weakly dusted greyish, ocellar tubercle blackish, face, facial ridge and anterior part of gena yellowish-brown or brownish, face and facial ridge predominantly dusted densely white, gena only sparsely dusted. Antennae predominantly brown and depending of incidence of light densely or less dusted greyish-white, apical margin of pedicel and basis of postpedicel some-



Figs 21–23. ♀ holotype of *Dichaetomyia zielkei* Couri, Pont & Penny. (21) Dorsolateral view. Thorax predominantly violet with bluish reflections, mesonotum with three broad dusted stripes exceeding the transverse suture; abdomen mainly shiny greenish-bluish; tergite 5 with a yellow apical band (ab); basal parts of wing veins yellow (for example stem vein = sv) and in contrast to the darker subsequent parts of veins; legs brown, but not dark brown. (22) Anterior view of head. Postpronotum (ppr) concolourous with mesonotum. (23) Lateral view of head. Anterior spiracle of anterior part of thorax yellowish-ochre.

what yellowish in holotype (Fig. 23) and uniformly dark brown in paratype. Postpedicel about four times as long as deep and about three times as long as pedicel. Arista brownish at some points of viewing with a yellowish shine, at least twice as long as length of postpedicel, longest hairs of arista almost one and a half times as long as depth of postpedicel. Anterior half of fronto-orbital plate with three setae and one or two small interstitial hairs, the anterior seta strong and long, the upper ones about half as long as the anterior one, at midway one or two small setulae and at upper half at level of anterior ocellus a strong reclinate orbital seta,

another orbital seta slightly below, almost as long and strong as the upper seta. Ocellar seta strong and almost as long as inner and outer vertical setae, the latter one slightly shorter than the inner seta. Between eye margin and frontal and orbital setae all over the length of frons an irregular row of small proclinate setulae. Parafacial bare, facial ridge with a few detectable fine setulae in lower half. Vibrissal setae strong and at least twice as long as the longest surrounding peristomal setae. Lateral surface of gena reddish-brownish to brown, weakly dusted and upper half bare, margin of gena and post-occipital dusted more greyish and with dark setae. Proboscis not conspicuously long, somewhat dilated towards anterior tip, prementum matt brown, slightly dusted, labella almost twice as long as depth of proboscis; palpus yellowish to ochre or brown, at certain viewing angle clearly dusted, slender, weakly clavate, about as long as prementum.

Thorax. Ground-colour depending on incidence of light predominantly shiny violet (Fig. 21) or more greenish-blue with violet, bluish or greenish reflections, at certain incidence of light with a brass shine. Presutural part of mesonotum with three broad stripes dusted whitish (Fig. 21) slightly exceeding the transverse suture, the posterior half of the paramedian stripes distinctly tapering. In posterior view, mesonotum more or less dusted whitish. Postpronotum concolourous with mesonotum (Figs 22, 23) at certain viewing angle dusted white, scutellum predominantly shiny violet. The anterior lateral pleura predominantly almost concolourous with mesonotum but with a strong brownish tinge, the posterior pleura uniformly brownish, depending on viewing angle all pleura more or less dusted greyish. Anterior spiracle ochre (Fig. 23), posterior spiracle brown with black setulae at lower margin. Dorsocentrals 2+2; acrostichals 0 + 1, seta barely as long as posterior dorsocentral seta, about eight rows of presutural acrostichal hairs without distinctly elongate hairs. Two postpronotal setae, the inner one about half as long as the outer seta; two notopleural setae, posterior slightly shorter than anterior seta, notopleuron with few small black hairs; posthumeral seta 1, presutural seta 1, distinctly longer than the posthumeral seta; pre-alar seta longer than half the length of posterior notopleural seta; intra-alar seta only one distinct one, a small seta not clearly longer than the ground hair could possibly be the second intra-ala seta. Greater ampulla without distinct setulae, suprasquamal ridge bare. Prosternum haired, anepimeron with a tuft of setulae above and some scattered hairs on the pos-

terior surface. Proepimeral area, katepimeron and meron bare. Katepisternals 1+2, the lower one distinctly closer to the posterior seta than to the anterior one. Anepisternals 1+4, the posterior setae of varying length and surrounded by clearly shorter interstitial seta-like hairs. Scutellum with a pair each of strong apical and strong lateral setae, basal and preapical setae much shorter, basal seta clearly and lateral seta barely distinguishable from the longer setulose hairs; lateral surface and margin to the ventral surface of scutellum with several setulae.

Wing. Membrane hyaline with a weak yellowish to brownish tinge, cross-veins and surrounding membrane not infusate (Fig. 21). Tegula and basicosta yellow, basal part of wing veins, in particular stem vein, subcosta and cubital-anal vein pale yellow contrasting with the darker yellowish-brownish or brownish distal parts of veins. Costal spine small, at most one and a half times as long as neighbouring bristles. Vein R4+5 dorsally usually without setulae on radial node and basis, ventrally with some setulae on radial node and at basal part of R4+5. Vein M somewhat diverging from vein R4+5, but slightly curved forward to R4+5 before reaching wing margin. Cross-vein r-m slightly basad of the point where vein R1 enters costa; distal cross-vein dm-cu somewhat sinuous and slightly oblique. Both calypters yellowish transparent with broad yellowish margin, lower calypter about one and a half times as long as upper calypter. Basal half of stem of haltere yellow, upper half of stem and knob ochre to yellowish-brown.

Legs predominantly brownish or brown (Fig. 21), in certain light conditions tarsi yellowish. Pulvilli and claws well developed but clearly shorter than the corresponding tarsomere. Fore femur with complete rows of posterodorsal, posterior and posteroventral setae, the posterodorsals and posteriors about as long as depth of femur, posteroventrals slightly longer than depth of femur. Fore tibia with a median posterior seta longer than diameter of tibia. Mid femur preapically with a short anterodorsal and usually with a posterior, posterodorsal and an almost dorsal seta. Mid tibia with two strong posterior setae, longer than the diameter of tibia. Hind coxa bare on posterior surface. Hind femur with complete row of strong anterodorsal setae, at the apical third two or three anteroventral setae only, preapically two strong posterodorsal to dorsal setae. Hind tibia without distinct posterodorsal seta, at middle third one strong anterodorsal seta slightly longer than diameter of tibia and one or two weaker anteroventral setae

barely as long as diameter of tibia, at level of anteroventrals one short posterodorsal seta about as long as diameter of tibia.

Abdomen. Ground colour shiny, depending on viewing angle bluish-green (Fig. 21) or brownish-violet, not dusted, without any particular pattern, apart from the pale or darker brown anterior part of syntergite 1+2 and the yellow apical third or half of tergite 5 (Fig. 21). Surface of tergites in holotype varying depending on point of viewing between metallic green and violet with corresponding reflections on dorsal and lateral surface and predominantly violet at ventral surface of tergites, or in paratype uniformly metallic green without violet shine but with some brass reflections, tergites dorsally without distinctly elongate discal and marginal setae. Sternites yellowish to brownish; sternite 1 laterally haired.

Female genitalia not investigated.

Measurements. Length of body about 9.2 mm; length of wing about 8.5 mm.

Male not known.

Remarks

It is understandable that the species descriptions from earlier times do not correspond to today's requirements. With a small number of species, different taxa were often quickly described on the basis of few taxonomic criteria. A comprehensive systematic description of the various taxonomic criteria of a new species, whether or not the characters are needed for current differentiation, is rarely found. In meantime many new muscid species have been described. For example, in 1986, Pont put the number of muscid species known worldwide at 4,500 specimens. According to the COL (2022), almost 5,400 species are currently registered and there is evidence that many of the described species have not yet been included in the catalogue. With the increasing number of species, the differentiation of the taxa has become more complex and is also based on unobtrusive taxonomic criteria that were not considered in the earlier descriptions. For the verification of new species, comparison with similar looking taxa is often essential. Identification keys usually provide the first indication that a specimen deviates from the criteria listed in the key. In general, however, the criteria in the identification tables are not comprehensive enough to validate a new species. The direct comparison with type specimens is logistically complex and

sending the preserved, sometimes very fragile flies by post or courier carries the risk of damage and loss. The most important possibility for comparison therefore remains the species description that is based on the type material. Unfortunately, many descriptions from earlier years are not very informative and can hardly be used today for a qualified comparison. It is all the more astonishing that relatively few redescriptions of species can be found in the literature compared to the large number of taxonomic publications. Couri & Pont (2016, 2020) published very useful summarising characterisations from the type material of the *Coenosia* species of the Natural History Museum, London described by van Emden (1940, 1941), and also from all the type material of the same genus deposited in the Museum für Naturkunde, Berlin, respectively. However, a general species description is not replaced by the characterisation, although some of these compilations are much more informative than the previous original species descriptions produced by the responsible author. The species description should ultimately be the document that can be used to identify a species without type material. The key published by Couri lists twenty *Dichaetomyia* species from Madagascar. However, the incorrectly synonymised species *Dichaetomyia perineta* (= *D. scutellaris*) is not included in this compilation. Accordingly, there are 21 species of this genus to consider, most of which need updating of their descriptions. The new descriptions based on existing type specimens are presented for six species in the paper in hand. However, up to fifteen other descriptions are waiting to be revised as well.

Acknowledgements

I am extremely grateful to the colleagues of the KwaZulu-Natal Museum, Pietermaritzburg, South Africa and I wish to express my severe thanks to Kirstin Williams, chief-curator of Arthropoda for generously providing type specimens for the duration of the investigations and to Tricia Pillay, Arthropoda research technician for organising very efficiently packaging and transportation of the needed material. Without their kind support the study in hand would not have been feasible. Urgently needed type material for comparison was also provided by Zoë Simmons, Collections Manager Diptera and Arachnida from the Oxford University Museum of Natural History, I am very grateful for this special help. Christopher Grinter, Col-

lections Manager of Entomology of Californian Academy of Sciences and of his team Robert Zuparko supported my studies by making specimens available for comparison which had been listed in the review on the Madagascan Muscidae. My thanks are also due to Toshko Ljubomirov, responsible for the Zoological Collection of the Institute of Biodiversity and Ecosystem Research, Sofia, Bulgaria for supporting my work on the taxonomy of the Muscidae by giving me generous access to the Diptera collection of the Institute and the facilities needed for the examination of the material. I also wish to thank two anonymous reviewers for the very helpful comments for the improvement of this article.

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