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Taxonomic observations regarding four genera of Afrotropical robber flies, *Choerades* Walker, 1851, *Laphria* Meigen, 1803, *Nannolaphria* Londt, 1977 and *Notiolaphria* Londt, 1977, and the description of *Ericomyia* gen. n. (Diptera, Asilidae, Laphriinae)

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ABSTRACT

Four established genera of Afrotropical Asilidae: Laphriinae, *Choerades* Walker, 1851, *Laphria* Meigen, 1803, *Nannolaphria* Londt, 1977 and *Notiolaphria* Londt, 1977 are discussed, and a new genus, *Ericomyia* gen. n. described. As no true *Laphria* are known from the afrotropics the following nine species are newly combined with *Choerades* pending review: *auricorpus* (Hobby, 1948) comb. n., *ctenoventris* (Oldroyd, 1970) comb. n., *fortipes* (Walker, 1857) comb. n., *hera* (Bromley, 1935) comb. n., *luctuosa* (Macquart, 1847) comb. n., *metalli* (Walker, 1851) comb. n., *ricardoi* (Bromley, 1935) comb. n., *rueppelii* (Wiedemann, 1828) comb. n., *schoutedeni* (Bromley, 1935) comb. n. This brings the number of recognised Afrotropical *Choerades* species to 25.

New records are provided for the monotypic *Nannolaphria*, known only from South Africa (KwaZulu-Natal and Eastern Cape Provinces).

Notiolaphria is reviewed with many new records provided. Six species are recognised, four transferred from *Laphria* and two new to science: (1) *No. coerulescens* (Macquart, 1834) comb. n., a widely distributed species (Indian Ocean Islands and African Mainland), and six species newly synonymised with it (*Laphria albimaculata* Macquart, 1838, *Laphria breonii* Macquart, 1838, *Laphria cyaneogaster* Macquart, 1838, *Laphria submetallica* Macquart, 1838, *Laphria macra* Bigot, 1859 (with existing synonym *Laphria nusoides* Bromley, 1931), *No. africana* (Londt, 1977); (2) *No. dimidiatifemur* (Oldroyd, 1960) comb. n. (Madagascar); (3) *No. microtheres* sp. n. (Madagascar); (4) *No. miltothorax* sp. n. (Madagascar); (5) *No. rufitibia* (Oldroyd, 1960) comb. n. (Madagascar); (6) *No. stuckenbergi* (Oldroyd, 1960) comb. n. (Madagascar). The species are well illustrated and a key for their separation is provided along with distribution maps.

Ericomyia gen. n. is described and illustrated based on Madagascan material previously assigned to *Laphria atomentosa* Oldroyd, 1960.

The considerable variation in size of *No. coerulescens* specimens and the species' wide distribution, presently involving five Indian Ocean islands and a number of African countries, is discussed. It is suggested that oceanic currents are responsible for the distribution, while deforestation may have resulted in a decreased size of individuals.

KEY WORDS: Asilidae, Laphriinae, Afrotropical, Taxonomy, *Laphria*, *Choerades*, *Nannolaphria*, *Notiolaphria*, *Ericomyia*, Madagascar.

INTRODUCTION

Laphria Meigen, 1803, as one of the earliest described genera of Asilidae, has a long and convoluted history. Along with *Choerades* Walker, 1851, a morphologically similar genus which has been variously treated as separated or combined with *Laphria*, many species have been described from all five major zoogeographical regions. The Oriental region appears to possess the richest fauna with some 98 listed species (Oldroyd 1975) that include those assigned to *Choerades*. The Palaearctic fauna is also significant with 44 species listed under *Laphria* and 23 under *Choerades* and includes the type species, *Asilus gibbosus* Linnaeus, 1758 (Lehr 1988). Martin and Wilcox (1965) list some 62 Nearctic species, while Martin and Papavero (1970) list 20 from the Neotropical Region, and Daniels (1989) catalogues 33 from the Australasian and Oceanian regions. Although Oldroyd (1980) lists 35 species for the Afrotropical Region there has long

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been a great need for revisionary work, with a strong likelihood that many new species await description. This paper provides observations and decisions, some of a preliminary nature, relating to *Laphria*, *Choerades* and two other more recently established, but similar genera, *Nannolaphria* Londt, 1977 and *Notiolaphria* Londt, 1977, designed to improve our overall understanding of these poorly researched Asilidae. In addition an undescribed genus has been recognised and described.

The long and fairly complex taxonomic history surrounding Afrotropical species assigned to *Laphria* and the other genera included in this study is perhaps best summarised chronologically as follows:

Meigen (1803) – Described *Laphria* with *Asilus gibbosus* Linnaeus, 1757, a Palaearctic species, as type species.

Fabricius (1805) – Described the first Afrotropical species, *L. lateralis*, from 'Guinea'.

Wiedemann (1821) – Described *L. flavipes* from 'Prom. Bon. Sp.' (Cape of Good Hope, South Africa).

Wiedemann (1828) – Described *Dasypogon rueppelii* (as *Rüppelii*) from 'Aus Nubien' (Sudan).

Macquart (1834) – Described *L. coerulescens* from 'De'Ile-de-France' (Mauritius) and *varipes* from 'Du cap de Bonne-Espérance' (Cape of Good Hope, South Africa).

Macquart (1838) – Described *L. albimaculata* from 'Du Cap et de I'ile Bourbon' (The Cape & Réunion) and *breonii* from 'De I'ile Bourbon' (Réunion) together with *cyaneogaster* and *submetallica* both from 'De I'ile-de-France' (Mauritius).

Macquart (1847) – Described *L. luctuosa* from 'Du Senegal' (Senegal).

Walker (1849) – Described *Dasypogon decula* (as *Decula*) from 'Sierra Leone'.

Walker (1851) – Described *L. metalli* from South Africa as well as the new genus *Choerades* (then monotypic) with *C. aurigena* Walker, 1851, an Oriental species from 'Java or Sumatra', as type species.

Walker (1857) – Described *L. fortipes* from 'Port Natal' (Durban, South Africa).

Loew (1858) – Described *L. bella* from 'Caffraria' (South Africa).

Bigot (1859) – Described *L. macra* from Madagascar.

Loew (1860) – Redescribed *L. flavipes* from 'Cap' (Cape, South Africa), establishing *varipes* as a synonym, and *bella* from 'Caffrerei' (South Africa).

Bigot (1878) – Described *Dasythrix nigrapex* from 'Natal' (KwaZulu-Natal Province, South Africa).

Bigot (1891) – Described *L. bipenicillata* from 'Assinie' (Ivory Coast).

Ricardo (1900) – Described *L. aureopilosa* from 'Durban' (South Africa).

Bezzi (1908) – Described *L. superbiens* from 'Chutes de Semlia' (Gabon) and *serpentina* on 'Un ♂ du Congo belge; une ♀ Leo-Stanleyville' (DR Congo).

Kertész (1909) – Catalogued world Asilidae including many species of *Laphria*.

Ricardo (1925) – Described *L. aurifera* from 'Toro or Durro Forest and Unyora, Budongo Forest' (Uganda) and 'Nyasaland' (Malawi), *carbonaria* from 'N. Nyasaland' (Malawi), 'Toro, Daro or Durro Forest', 'Chagwe, Mabira Forest' and 'Mbarara Fort, Portal Road, Southern Toro' (Uganda), and *nigrescens* from 'Mt. Mlanje, Nyasaland' (Malawi).

Curran (1928) – Supplied a replacement name, *L. consistens*, for *carbonaria* Ricardo, a junior homonym, preoccupied by *carbonaria* Williston, 1896.

Bromley (1931) – Described *L. nusoides* from Madagascar.

Bromley (1935) – Described six new species *L. bequaerti* (as *Bequaerti*) from 'Kakataon', 'Bomboma, Moala' and 'Bakratown' (Liberia), *hera* from 'Kasai, Kondué'

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(DR Congo), *iola* from 'Elizabethville' (DR Congo), *nigribimba* from 'Mayumbe', 'Mayumbe-Zobe', 'Mayumbe-Lembo' (DR Congo), 'Edea' (Cameroon) and 'Du River (Camp 3)' (Liberia), *ricardoi* from 'Mayumbe', 'Sankuru', 'Mayumbe-Zobe' and 'Lubutu' (DR Congo) and *schoutedeni* from 'Lubumbashi' (DR Congo). A key to 11 species of DR Congo *Laphria* was provided.

Bromley (1947) – Described *L. variabilis* from 'Durban' and 'Park Rynie' (South Africa.

Hobby (1948) – Described *L. auricorpus* from 'Mt. Mlanje' (Malawi) and *contristans* from 'Ituri Forest, Beni' (DR Congo).

Janssens (1953) – Described *L. maynei* (as *Maynéi*) from 'Yangambi' (DR Congo).

Oldroyd, (1960) – Described *L. atomentosa, dimidiatifemur* and *rufitibia* from 'Maroantsetra, Ambohitsitondrona' (Madagascar), and *stuckenbergi* (as *Stuckenbergi*) from 'Ifanadiana, Ranomafana' (Madagascar) while also recording both *macra* and *nusoides* from the 'Comores' (Comoros) and Madagascar. A key to these six species was provided.

Hull (1962) – In his coverage of world asilid genera included both *Laphria* and *Choerades* as full genera. While he listed no Ethiopian (= Afrotropical) species of *Choerades*, he listed no fewer than 29 species of *Laphria* believed to inhabit the region.

Oldroyd (1968) – Recorded *L. lateralis* from 'Côte-d'Ivoire: Divo' and described *L. ivorina* from 'Côte-d'Ivoire: Zepreghé' (Ivory Coast).

Oldroyd (1970) – Described *L. ctenoventris* from DR Congo and provided new records for seven other species (*aurifer* (= *aurifera*), *carbonaria*, *contristans*, *iola*, *maynei*, *nigribimba*, *ricardoi*). A key to 19 Ethiopian (= Afrotropical) *Laphria* species was provided that included *aureopilosa*, *auricorpus*, *aurifer* (= *aurifera*), *bella*, *bipenicillata*, *carbonaria*, *contristans*, *ctenoventris*, *flavipes*, *hera*, *iola*, *lateralis*, *luctuosa*, *maynei*, *nigrescens*, *nigribimba*, *ricardoi*, *schoutedeni*, *serpentina* (in addition five species were listed as suspected synonyms - *bequaerti*, *consistens*, *fortipes*, *metalli*, *variabilis*).

Oldroyd (1974) – Discussed *Laphria* and *Choerades* in an Afrotropical context and produced a key to South African species, which were retained in *Laphria*. Species included were *aureopilosa* (with *variabilis* as synonym), *bella*, *flavipes*, *nigrescens*, *serpentina* and newly described *multipunctata* from 'Matjiesfontein; Seven Weeks Poort' (South Africa).

Londt (1977) – Discussed *Laphria* and *Choerades*, and transferred southern African species to *Choerades*, creating new combinations for *aureopilosa* (with synonym *variabilis*), *bella*, *flavipes*, *multipunctata*, *nigrescens* and *serpentina*. Southern African records were provided for these species. Two new genera were established: *Notiolaphria* for *macra* (with *nusoides* as synonym) and a new species, *No. africana*, and *Nannolaphria* for a unique new species, *Na. niger*, from South Africa.

Oldroyd (1980) – Catalogued Afrotropical *Laphria* (listing *Choerades* as a synonym), synonymizing *nigrapex* with *flavipes* and recognising 35 as valid species (*albimaculata*, *atomentosa*, *aureopilosa*, *auricorpus*, *aurifera*, *bella*, *bipenicillata*, *breonii*, *coerulescens*, *consistens*, *contristans*, *ctenoventris*, *cyaneogaster*, *dimidiatifemur*, *flavipes*, *fortipes*, *hera*, *iola*, *ivorina*, *lateralis*, *luctuosa*, *macra*, *maynei*, *metalli*, *multipunctata*, *nigrescens*, *nigribimba*, *nusoides*, *ricardoi*, *rufitibia*, *rueppelii*, *schoutedeni*, *serpentina*, *stuckenbergi*, *submetallica*), four synonyms (*bequaerti*, *decula*, *variabilis*, *varipes*) and the replacement name for a homonym (*carbonaria*). In his

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appendix, *Nannolaphria* and *Notiolaphria* were listed together with the names of new species in these genera (*Na*. *nigra* – for *niger*, and *No*. *africana* respectively).

Lehr (1991) – Revised Palaearctic *Choerades*, transferring many species previously classified as *Laphria* to the genus, including 12 Oriental ('Indo-Malayan Region') and four Afrotropical species (*aurifer* (= *aurifera*), *lateralis*, *contristans* and *maynei*). This paper, originally published in Russian, was subsequently translated into English.

Tomasovic & Kwandjo (2007) – Transferred *L. superbiens*, then in *Proagonistes* to *Choerades*. [*Note*: The history of its transfer to *Proagonistes* is not known to me].

Tomasovic (2007) – Described *C. kwadjoi* from 'P.N. Pongara' (Pongara National Park, Gabon) and formally transferred five *Laphria* species to *Choerades* (*bipenicillata*, *carbonaria*, *iola*, *ivorina*, *nigribimba*). A key to 13 Central African species of *Choerades* (*bipenicillata*, *carbonaria*, *contristans*, *ctenoventris*, *hera*, *iola*, *kwadjoi*, *lateralis*, *luctuosa*, *maynei*, *nigribimba*, *ricardoi*, *schoutedeni*), based on Oldroyd's (1970) key to species then placed in *Laphria* was presented without the formal transfer of five species (*carbonaria* (= *consistens*), *ctenoventris*, *hera*, *ricardoi*, *schoutedeni*) to the genus. In addition the name *carbonaria* was used instead of its replacement name *consistens*, without comment.

At the commencement of this study there were, therefore, 34 valid species allocated to either *Laphria* or *Choerades*. Sixteen were either originally described in *Choerades* (1) or had been formally transferred to the genus (15) and include (*aureopilosa*, *aurifera*, *bella*, *bipenicillata*, *consistens*, *contristans*, *flavipes*, *iola*, *ivorina*, *kwadjoi*, *lateralis*, *maynei*, *multipunctata*, *nigrescens*, *nigribimba*, *superbiens*). While Tomasovic (2007) included a few of the balance (5) in a key to Central African *Choerades* (ie. *ctenoventris*, *hera*, *luctuosa*, *ricardoi*, *schoutedeni*) these had not formally been transferred to the genus from *Laphria*. This means that 18 species remained formally allocated to *Laphria* at the onset of this project (*albimaculata*, *atomentosa*, *auricorpus*, *breonii*, *coerulescens*, *ctenoventris*, *cyaneogaster*, *dimidiatifemur*, *fortipes*, *hera*, *luctuosa*, *metalli*, *ricardoi*, *rufitibia*, *rueppelii*, *schoutedeni*, *stuckenbergi*, *submetallica*). In addition, there were two species considered to belong to *Notiolaphria* (*africana*, *macra*) and a single species of *Nannolaphria* (*nigra*).

Although it is highly desirable that all these taxa be fully reviewed, this would be a major undertaking and not within the scope of the present study. However, in the interests of stabilisation and progress, these genera, and in some instances species, are handled below, although in some cases in what can only be described as a preliminary manner.

MATERIAL AND METHODS

Material

The following institutions possess material referred to in this publication (names of curators responsible for loans or other assistance are provided in brackets):

BMNH – The Natural History Museum, London, UK (E. McAlister);
BMSA – National Museum, Bloemfontein, South Africa. (A. Kirk-Spriggs);
CAS – California Academy of Sciences, San Francisco, U.S.A. (E. Fisher);
CNC – Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Canada (J. O'Hara);
DMSA – Durban Natural Science Museum (K. Williams);

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GULB – Unité d'Entomologie fonctionnelle et évolutive, Gembloux Agro-Bio Tech, Université de Liège, Gembloux, Belgium (J. Bortels);
MNHN – Museum national d'Histoire naturelle, Paris, France (C. Daugeron);
MRAC – Musee Royal de l'Afrique Centrale, Tervuren, Belgium (E. De Coninck);
NMK – Nairobi National Museum, National Museums of Kenya, Nairobi, Kenya (R. Copeland);
NMSA – KwaZulu-Natal Museum, Pietermaritzburg, South Africa (B. Muller);
USNM – National Museum of Natural History, Smithsonian Institute, Washington, U.S.A. (T. Dikow).

Note: Dr Eric Fisher has informed me that the CAS material will probably be shared between CAS, CSCA (California State Collection of Arthropoda), USNM and the EFC (Eric Fisher Collection).

All material available for study is listed as fully as possible in order to facilitate future recognition. Information pertaining to each label is contained within single inverted commas while information appearing on separate lines is demarcated by the use of spaced slashes (/). Information appearing in square brackets represents additional data not appearing on labels, or comment when this is considered necessary. In as many instances as possible, coordinates for localities are provided. When these do not appear on labels, Google Earth was used to locate places and coordinates recorded along with approximate altitudes in many instances. A question mark (?) signifies unknown or doubtful information. Although a few specimens may have been formally recorded before, these are listed again for reasons of completeness (the opportunity being taken to correct any minor errors that may have been made) and marked with an asterisk (*).

Descriptive passages

Brief generic diagnoses are provided which contain only key characters. Species descriptions are based on all available material, and focus chiefly on characteristics that are considered reasonably helpful in the separation of species. It should be noted that many of the specimens studied had been collected in Malaise traps and subsequently mounted on pins after removal from alcohol. This frequently meant that wings were bent and twisted and other parts slightly deformed through shrinkage. Wings were removed and flattened between glass slides for photography and terminalia excised, softened through maceration in 10% KOH and physically extruded before being illustrated. Final illustrations of genitalia were prepared from pencil drawings (made using a drawing tube) without employing any graphic software for their manipulation and do not depict setae.

Measurements were taken as follows: Antenna: The lengths of scape, pedicel, postpedicel and style (when present) were measured in lateral view. Wing length was measured from humeral crossvein to tip, while breadth was measured at the level of the r–m crossvein.

Standard abbreviations and terminology are used, chiefly in accordance with McAlpine (1981).

TAXONOMY

Genus *Choerades* Walker, 1851

Choerades Walker, 1851*b*: 109. Type species: *Choerades aurigena* Walker, 1851 [= *Laphria vulcanus* Wiedemann, 1828], by monotypy.

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Diagnosis: *Head*: Antennal postpedicel at most twice as long as scape and pedicel combined, antennal stylus absent. Maxillary palpus 2-segmented. Proboscis long, narrow and laterally compressed (knife-like). *Thorax*: Prosternum fused to proepisternum. Anepisternum with at least 1 strong, long macroseta at supero-posterior angle, in front of wing insertion. Apical scutellar macrosetae present. Postmetacoxal area membranous. Anatergal setae absent. Metathoracic femur not obviously inflated mediodistally and ventrodistal macrosetae not mounted on tubercles. Prothoracic tibia without an apical spur. Pulvilli present. Wing with alula present. Cell r_1 closed, joined to C by an obvious, fairly straight stalk. Cell r_5 open or closed. Apical portion of vein M3 not perfectly aligned with proximal portion of M2 (forming a cross). *Abdomen*: T2 no more than four times as long as wide and S1 confined beneath T1. Male gonopods highly distinctive in possessing fused or semifused setae on their ventral surfaces. Female terminalia simple, without acanthophorite spines. Ovipositor short and not markedly tubular.

Although some 16 species of Afrotropical *Choerades* (*aureopilosa*, *aurifera*, *bella*, *bipenicillata*, *consistens*, *contristans*, *flavipes*, *iola*, *ivorina*, *kwadjoi, lateralis*, *maynei*, *multipunctata*, *nigrescens*, *nigribimba*, *superbiens*) have already been formally recognised, there remain a number of species, presently catalogued under *Laphria*, that require transfer to *Choerades*, and review (an opinion shared by Lehr (1991)). As only a single, true, Afrotropical *Choerades* specimen has been reported beyond the African mainland (see below), other African species still remaining in *Laphria* are here formally transferred to *Choerades* giving rise to the following new combinations:

Choerades auricorpus (Hobby, 1948), **comb. n.**
Choerades ctenoventris (Oldroyd, 1970), **comb. n.**
Choerades fortipes (Walker, 1857), **comb. n.**
Choerades hera (Bromley, 1935), **comb. n.**
Choerades luctuosa (Macquart, 1847), **comb. n.**
Choerades metalli (Walker, 1851), **comb. n.**
Choerades ricardoi (Bromley, 1935), **comb. n.**
Choerades rueppelii (Wiedemann, 1828), **comb. n.**
Choerades schoutedeni (Bromley, 1935), **comb. n.**

With acceptance of this transfer of nine *Laphria* species, the number of *Choerades* species is effectively increased to 25. While it remains possible that, pending review, one or more of these species may prove to belong to *Notiolaphria*, or some other genus, this appears highly unlikely as only one widespread species of *Notiolaphria* has been reported from the eastern parts of the African mainland where *Choerades* is the dominant genus.

First record of an Afrotropical Choerades *from an Indian Ocean island*:

The following specimen represents the only record, known to me, of an Afrotropical *Choerades* not found on the African mainland. Although it is possible that the specimen is mislabelled, it may represent an interesting zoogeographical phenomenon requiring future verification and explanation.

SEYCHELLES: 1♀ 'Mahé [*c.* 04°40'58"S 55°28'50"E, *c.* 620 m] 08-9 / Seychelles Exp.', 'Seychelles Is. / Pres. By / Percy Sladen / Trust Cttee. / B/M. 1922-157', '*Laphria* / sp. ?', ~ 'F. Hermann' [orange] (BMNH).

Observation: Oldroyd (1975) records the type species of *Choerades* as having been collected from 'Celebes, Formosa, Java, Malaya, Philippines, Sumatra; Moluccas (Ceram)'. As the species is found on a number of islands I believe that future revisionary

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work on Oriental *Choerades* should include the comparison of species with Indian Ocean species currently assigned to *Notiolaphria*.

Genus *Nannolaphria* Londt, 1977

Nannolaphria Londt, 1977: 47. Type species: *Nannolaphria niger* Londt, 1977, by original designation.

Diagnosis: Generally small, dark red-brown to black flies. *Head*: Antennal postpedicel with at most 1 or 2 poorly developed setae dorsally; scape usually only a little longer than pedicel, antennal stylus absent. Mystax not overlaid by shiny scale-like setae. Posterior margin of lower occiput not extended and flange-like. Maxillary palpus cylindrical in cross-section, 2-segmented. Proboscis short, not laterally compressed, but subtriangular in cross-section. *Thorax*: Prosternum fused to proepisternum. Anepisternum with at least 1 strong, long macroseta at supero-posterior angle, in front of wing insertion. Apical scutellar macrosetae present. Postmetacoxal area membranous. Anatergal setae absent. Legs entirely blackish, femur rather slender. Prothoracic tibia without an apical spur. Pulvilli present. Wing with alula present. Cell r_1 closed, joined to C by an obvious, fairly straight stalk. Cell r_5 open. Vein M2 reaching wing margin. Apical portion of vein M3 not perfectly aligned with proximal portion of M2 (forming a cross). Wing membrane extensively covered with black microtrichia. *Abdomen*: T2 no more than 4× as long as wide; S1 confined beneath T1. Female ovipositor short and not markedly tubular. Female terminalia simple, without acanthophorite spines.

This monotypic genus of tiny black flies (Fig. 1) is confined to a relatively small region centred on the south-eastern parts of KwaZulu-Natal Province, South Africa, and is unlikely to be confused with other genera treated here. While Londt's (1977) description is adequate, new records are provided below.

Nannolaphria nigra Londt, 1977

Figs 1, 2, 34

Nannolaphria niger Londt, 1977: 48; Oldroyd 1980 (as *nigra*): 1218.

Previous records: The following type specimens were listed by Londt (1977). All specimens are in NMSA except for 3 pairs deposited in BMNH, MNHN and USNM respectively.
SOUTH AFRICA: 1♂ holotype, 1♂ 3♀ paratypes, Natal, Pietermaritzburg, Town Bush [29°33'03"S 30°20'20"E, *c.* 970 m], forest margin, 26.xi.1976, J. G. H. Londt; 5♂ 14♀ paratypes. same data but 7.xii.1976; 3♂ 3♀ paratypes, Pietermaritzburg. Town Bush, 18.xii.1961 (1♂ 2♀), 27.xii.1961 (1♂ 2 ♀), 21.xi.1962 (1♂), B. & P. Stuckenberg. 1♀ paratype, Port St Johns [31°37'08"S 29°30'56"E, *c.* 170 m], 22–25.xi.1961, B. & P. Stuckenberg.

New records: SOUTH AFRICA: 1♀ 'R.S.A.: KZ-Natal #56 / Lekkerwater Farm / 29°00'S 29°24'E 1470 m / Date: 18.xii.1996 / Coll: J.G.H. Londt / In grotto near farm' (NMSA); 1♂ 2♀ 'South Africa: Natal / Karkloof Nature Res / 29°18'10"S 30°13'40"E, / 1260 m 10.xii.1987 / J & H Londt Mixed / *Podocarpus* For. Edge' (NMSA); 4♀ 'South Africa: Natal / Karkloof [29°19'23"S 30°14'18"E, *c.* 1155 m] 2930AB / Coll. JGH Londt / Date 22.xii.1982' (NMSA); 2♀ 'South Africa KZN / Fort Nottingham Nature / Reserve 1525m / 29°24'44"S 29°55'00"E, / J & A Londt 5.ii.2011 / *Podocarpus* Forest area' (NMSA); 2♂ 3♀ 'South Africa KZN / Pietermaritzburg 916m / Queen Elizabeth Park / 29°34'06"S 30°19'15"E, / J.G.H. Londt 19.xii.2012 / Forest clearing sun spot' (NMSA); 4♀ 'South Africa: Natal / Pietermaritzburg / 2930Cb 24.xi.1977 / J.G.H. Londt / Town Bush [29°33'03"S 30°20'20"E, *c.* 970 m]' (NMSA); 1♂ 2♀ same data but 28.xi.1978 (NMSA); 2♂ 6♀ same data but 7.xii.1978 [2 pinned with prey items] (NMSA); 1♀ same data but 14.xii.1978 [pinned with prey item] (NMSA); 1♂ 3♀ same data but 20.xi.1978 [all pinned with prey items] (NMSA); 1♀ 'South Africa: Natal / Town Bush Forest Res / 2930CB D. Barraclough / Date 10 Feb. 1983' (NMSA); 1♂ 3♀ 'South Africa: Natal / Ferncliffe Forest Res [= Town Bush] / 29°33'00"S 30°20'30"E, / 975m A. Seymour / Mistbelt Mixed Forest / Date 23.xi.1987' (NMSA); 1♂ 3♀ 'South Africa: Natal / Ferncliffe Forest Res / 29°33'00"S 30°20'30"E, / 975m A. Seymour / Mistbelt Mixed Forest / Date 23.xi.1987' (NMSA); 1♀ 'South Africa: Natal / Ferncliffe Nature Res / nr Pietermaritzburg / 29°33'S 30°20'E 1020 m / Date: 16.xii.1996 / Coll: J &

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Fig. 1. *Nannolaphria nigra* Londt, 1977, ♂ Pietermaritzburg.

A Londt / Forest margin' (NMSA); 1♀ 'South Africa: KZ-Natal #58 / Ferncliffe / 29°33'S 30°20'E / Indig. For. 9.i.1990 / A.E. Whittington' (NMSA); 1♂ 13♀ 'S Africa KwaZulu-Natal / Marutswa Forest Reserve / 29°48'29"S 29°47'04"E, J & A Londt 23.i.2015 / 1455m *Podocarpus* forest' (NMSA).

Distribution, phenology and biology: Recorded from a relatively small region extending from the foothills of the Drakensberg Mountains in South Africa's KwaZulu-Natal Province (Lekkerwater Farm) to the coast of the Eastern Cape Province (Port St. Johns) (Fig. 34). Collected only during the warmer summer months, November–February (Table. 1). All specimens were collected in low vegetation in sunny patches under a forest canopy (Fig. 2) or along the margins of indigenous forest. Prey items include small alate insects of the following groups: Diptera (Ceratopogonidae, Scatopsidae), Hemiptera (Aleyrodidae, Aphididae, Cicadellidae), Hymenoptera (Cynipidae, Formicidae).

Genus *Notiolaphria* Londt, 1977

Notiolaphria Londt, 1977: 50. Type species: *Laphria macra* Bigot, 1859 (= *Laphria coerulescens* Macquart, 1834), by original designation.

Diagnosis: Generally dark red-brown to black flies. *Head*: Antennal postpedicel with at most 1 or 2 poorly developed setae dorsally; scape usually only a little longer than pedicel, antennal stylus absent. Mystax overlaid by shiny scale-like setae. Posterior margin of lower occiput not extended and flange-like. Maxillary palpus cylindrical in

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TABLE. 1

Phenology of *Nannolaphria*, *Notiolaphria* and *Ericomyia* species. Months of the year abbreviated. AM = African Mainland, IOI = Indian Ocean Islands.

Species	J	F	M	A	M	J	J	A	S	O	N	D
Na. nigra	●	●	–	–	–	–	–	–	–	–	●	●
No. coerulescens IOI	●	●	●	●	●	●	●	–	●	●	●	●
No. coerulescens AM	●	●	●	–	●	–	●	●	●	●	●	●
No. dimidiatifemur	–	●	–	–	–	–	–	–	–	–	–	●
No. microtheres	–	–	●	●	●	●	●	●	●	●	●	●
No. miltothorax	–	–	●	●	●	–	●	–	–	–	●	–
No. rufitibia	–	–	–	–	–	–	–	–	–	–	●	–
No. stuckenbergi	●	●	●	●	–	–	●	–	–	●	●	●
E. atomentosa	–	–	–	–	–	–	●	–	●	●	●	●

Fig. 2. *Nannolaphria nigra* Londt, 1977, habitat at Marutswa Forest Reserve, Bulwer, South Africa.

cross-section, 2-segmented. Proboscis short, not laterally compressed, but subtriangular in cross-section. *Thorax*: Prosternum fused to proepisternum. Anepisternum with at least 1 strong, long macroseta at supero-posterior angle, in front of wing insertion. Apical

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scutellar macrosetae present. Postmetacoxal area membranous. Anatergal setae absent. Legs commonly entirely blackish, but may have reddish parts, femur only slightly inflated. Prothoracic tibia without an apical spur. Pulvilli present. Wing with alula present. Cell r_1 closed, joined to C by an obvious, fairly straight stalk. Cell r_5 open. Vein M2 reaching wing margin. Apical portion of vein M3 not perfectly aligned with proximal portion of M2 (forming a cross). Wing membrane covered with black microtrichia distally. *Abdomen*: T2 no more than four times as long as wide; S1 confined beneath T1. Male epandrium not indented medially. Female ovipositor short and not markedly tubular. Female terminalia simple, without acanthophorite spines.

While only two Afrotropical species of *Notiolaphria* have so far been reported, *africana* from the eastern parts of the African mainland, and *macra* from some of the Indian Ocean islands (Londt 1977), there are others that require formal transfer to the genus. Having never seen a true *Laphria*, *Choerades* or *Nannolaphria* from Madagascar, or any of the other Indian Ocean islands (apart from the single *Choerades* specimen mentioned above from Seychelles), I believe that almost all species from these islands, previously allocated to *Laphria*, should now be transferred to *Notiolaphria*. While some can be verified as definitely belonging to the genus, others may need confirmation following study of type material. In the interests of taxonomic stability the following new combinations are here formally proposed (species arranged alphabetically):
Notiolaphria albimaculata (Macquart, 1838), **comb. n**.
Notiolaphria breonii (Macquart, 1838), **comb. n**.
Notiolaphria coerulescens (Macquart, 1834), **comb. n**.
Notiolaphria cyaneogaster (Macquart, 1838), **comb. n**.
Notiolaphria dimidiatifemur (Oldroyd, 1960), **comb. n**.
Notiolaphria rufitibia (Oldroyd, 1960), **comb. n**.
Notiolaphria stuckenbergi (Oldroyd, 1960), **comb. n**.
Notiolaphria submetallica (Macquart, 1838), **comb. n**.

These proposals, being accepted, bring the number of species to 10. This number will, however, require adjustment following observations reported below. It should be noted that *Laphria atomentosa* Oldroyd, 1960 is excluded from the list above as it is clearly digeneric and belongs to an undescribed genus named later in this publication.

It should be noted that a number of factors have contributed to making this study of *Notiolaphria* difficult. Although fairly large collections have been made available, along with some photographs of type specimens, few actual types have been available for detailed study. However, one of the biggest challenges has been to make sense of the considerable variation that appears to exist. Not only can there be considerable variation in the size of specimens, even within samples collected at the same place on the same day, but there are also variations in morphological characteristics (some probably corresponding to differences in size). This being true, I believe it is sensible to take a fairly conservative approach to species identification. The following six species are here recognised as distinctive.

Notiolaphria coerulescens (Macquart, 1834), **comb. n.**

Figs 3, 4, 5, 11, 12, 34

Laphria coerulescens Macquart, 1834: 286; Kertész 1909: 179 (catalogue); Hull 1962: 323; Oldroyd 1980: 351 (catalogue). Mauritius.

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Laphria albimaculata Macquart, 1838: 64 [1839: 180]; Kertész 1909: 176 (catalogue); Hull 1962: 323; Oldroyd 1980: 351 (catalogue). South Africa; Madagascar, Réunion. **Syn. n.**
Laphria breonii Macquart, 1838*b*: 65 [1839: 181]; Kertész 1909: 179 (catalogue); Hull 1962: 323; Oldroyd 1980: 351 (catalogue). Réunion. **Syn. n.**
Laphria cyaneogaster Macquart, 1838: 64 [1839: 180]; Kertész 1909: 180 (catalogue); Hull 1962: 323; Oldroyd 1980: 351 (catalogue). Mauritius. **Syn. n.**
Laphria submetallica Macquart, 1838: 63 [1839: 179]; Kertész 1909: 195 (catalogue); Hull 1962: 323; Oldroyd 1980: 352 (catalogue). Mauritius. **Syn. n.**
Laphria macra Bigot, 1859: 415; Kertész 1909: 189 (catalogue); Oldroyd 1960: 283 (fig. 12 ♂ gen.); Hull 1962: 323; 1980: 352 (catalogue). Madagascar; Comoros, Mauritius. **Syn. n.**
Laphria nusoides Bromley, 1931: 287; Oldroyd 1960: 284 (fig. 13 ♂ gen.); Hull 1962: 323; 1980: 352 (catalogue). Madagascar, Comoros.
Notiolaphria africana Londt, 1977: 53; Oldroyd 1980: 1218 (catalogue). South Africa & Zimbabwe. **Syn. n.**

Comments on new synonymy: I have studied many specimens from Madagascar and other Indian Ocean islands and am convinced that the vast majority belong to a single widely distributed species which I here call *coerulescens* as this is the oldest available name. Although I have not seen the types of the following species, their descriptions appear to agree well with material I have studied and now list under *coerulescens* (*albimaculata*, *breonii*, *cyaneogaster*, *submetallica* and *macra*). Since seeing additional material from the African mainland I have become convinced that *africana* is not sufficiently distinct to warrant separation from other material now listed under *coerulescens*.

The following is a transcription of Macquart's (1834) original, brief description:

28. L. BLEUATRE. – *Laphria coerulescens*, Nob.

Long. 5 lig. Noire. Face blanchâtre; moustache noire. Abdomen à reflets bleus et violets; un peu de blanc aux côtés de chaque segment. Ailes brunâtres. De l'Ile-de-France; cabinet de M. de Serville.

Fig. 3. *Notiolaphria coerulescens* (Macquart, 1834), ♂ Réunion (Photo: Dominique Matiré).

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Translated this reads:

28 L. BLUISH. – *Laphria coerulescens*, New.

Length. 5 lines. Black. Face white; moustache black. Abdomen with blue and purple hues; a little white at the sides of each segment. Wings brownish. Ile-de-France; cabinet of M. de Serville.

Although brief, this description agrees well with all specimens studied and listed below.

Etymology: The name is derived from the Latin *caeruleus/coeruleus* (sky blue, azure), presumably referring to the blue hue of the abdomen.

Redescription: Based on all material examined. A morphologically uniform species (Fig. 3), despite considerable size variation. No apparent sexual dimorphism exists.

Head: Black, silver and gold pruinose, black and white (rarely pale yellow) setose. Antenna: Black, scape and pedicel black setose. Segmental ratios (scape as 1) — 1 : 0.6 : 2.9. Style absent, postpedicel tipped with a pit-enclosed spine-like sensory element. Face black, moderately gibbose ventrally, gold (rarely silver) pruinose. Mystax with long, black (may possess a few small white) setae a pair of dorsolaterally situated groups of gold (rarely silver), glistening, scale-like setae. Dorsal region of face with 1 pairs of moderately developed black macrosetae (and commonly a few smaller black or white setae) situated close to antennal bases. Frons black, dull gold pruinose with fine black setae laterally adjacent to eye margin. Ocellar tubercle with a pair of long, strong, black macrosetae. Vertex black, dull gold pruinose. Postocular (occipital) region black, gold puinose and strongly black setose dorsally, silver pruinose and fine white setose ventrally. Palpi and proboscis dark red-brown to black, white setose.

Thorax: Black, with areas of silver and gold pruinescence, black, pale yellow and white setose. Pronotum black. Mesonotum black, extensively shiny apruinose, but with areas of fine silver-gold pruinescence situated mainly laterally and posteriorly (medial part of postpronotal lobe and adjacent area; a pair of spots along transverse suture). Acrostichals black, poorly developed. Dorsocentrals black, relatively poorly developed anterior of transverse suture. Mesonotal macrosetae: Black, 2 npl, 2 spal, 2–3 pal. Scutellum shiny black with silver-gold pruinose anterior margin (of varying width), disc with tiny black setae, 6 long black apical macrosetae (accompanied by a variable number of smaller setae). Pleura: Black, entirely silver pruinose, black, pale yellow and white setose. Anepisternum with 1 black macrosetae posteriorly. Katatergal macrosetae mostly black (dorsally) and white (ventrally). Anatergites uniformly silver pruinose, asetose. Legs: Coxae black, silver pruinose, fine yellow-white setose. Trochanters shiny black, apruinose, pale yellow-white setose. Femora somewhat inflated, entirely black, macrosetae black, other setae black or yellowish. Tibiae and tarsi shiny black, macrosetae and minor mainly black (few fine yellowish may be present). Claws black, pulvilli and empodia well developed. Wings: ♂ 3.4×1.2–12.6×3.8 mm, ♀ 4.9×1.7–12.1×3.9 mm (wide variation). Veins dark red-brown to black, cell r_5 open or closed on margin, m_3 and cua closed and stalked, membrane brownish stained, transparent, microtrichia largely absent from proximal half of wing and extensive in distal half (Fig. 5). Halter pale yellow.

Abdomen: Shiny dark red-brown to black, terga largely apruinose except for small silver pruinescence posterolateral areas, sterna paler than terga, uniformly dull silver pruinose. T1 with 3–5 laterally situated pale yellowish macrosetae, T2 with 2 macrosetae, T3 with 1–2, T4–5 with 1. Female may have fewer macrosetae and T5 always lacks a macroseta.

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Terga have short black setae dorsally, longer pale yellow to white setae laterally, sterna uniformly longish pale yellow setose.

Male terminalia (Figs. 11–12): Rotated through 90°. Epandrium as a single shield-like plate, showing no indication of bifurcation distally but tapering to broad apex. Proctiger jutting out beyond distal end of epandrium, ventral lobes more prominent than dorsal lobes. Gonocoxites composed of external and internal lobes. External lobe broad proximally (as broad as epandrium in lateral view), tapering to narrowly rounded apex in lateral view. Internal lobe laterally compressed, jutting out distally beyond level achieved by external lobe, slightly dorsally hooked terminally. Gonostylus projecting a little beyond internal lobe of gonocoxite, laterally compressed, with hook-like apex directed ventrally. Hypandrium, longer than wide in ventral view, reduced to a subtriangular sclerite less than half the length of gonocoxites, with acutely rounded medial lobe. Aedeagus of moderate length with three terminal prongs.

Female terminalia: Simple, slightly telescopic, setaceous and lacking spines.

Material examined (some previously recorded in publications are marked with an asterisk*): BURUNDI: 3♂ 'Burundi, Bururi / National Forest / 1955m, 3.93022°S. / 29.61697°E' [*c*. 03°55'47"S 29°37'01"E, *c*. 2040 m], 'Malaise trap, Indigenous / forest, near stream / 21 Sep–5 Oct 2010 / R. Copeland' (NMKE); 1♀ same data but 24 Aug – 7 Sep 2010 (NMKE). COMOROS: 1♀ 'Pamanzi / lac Dziani [*c*. 12°46'14"S 45°17'19"E, *c*. 20 m]/ Pr. M vi', 'Institut / Scientifique / Madagascar' (BMNH). KENYA: 1♂ 1? 'Kenya, Coast Prov / Taita Hills, Mbololo / Forest, 3.33271°S. / 38.44769°E [*c*. 03°19'58"S 38°26'52"E, *c*. 1505 m], 1671m', 'Sweep net, along / road in forest / 2 Jan 2012 / R. Copeland' (NMKE); 1♀ 'Kenya, Coast Prov. / Taita Hills, Chawia / Forest. 3.47908°S / 38.34162°E [*c*. 03°28'45"S 28°20'30"E, *c*. 1530 m]. 1614m', 'Malaise trap, next / to small forest pond / 28 Nov – 12 Dec / 2011. R. Copeland' (NMKE); 1♀ same data but 23 Jan – 6 Feb 2012 (NMKE); 1♂ 'Pinned after initial / alcohol preservation', 'Kenya: Taita Hills area / Ngangao forest 1800 [m] / 03°22'S 38°21'E 21.ii – / 8.iii.1999 R Mwakodi / T. Hills Biodiv. Project' (NMSA); 1♀ 'Kenya: / Diani Beach [*c*. 04°16'47"S 39°35'41"E, *c*. 5 m] / vii.1951 / N.L.H. Krauss / B.M. 1951-541' (BMNH. MADAGASCAR: 1♂ 'Madagascar, Province / d'Antsiranana. Montaigne / Francais, elev 150m / 23 January 2001', '12°19.5'S 49°20'E [12°19'30"S 49°20'00"E, *c*. 226 m] / California Acad of Sciences / M.E. Irwin coll. Hand netted / along forested limestone / ridge. MA-01-06-03' (CAS); 2♂ 1♀ 'Madagascar, Antsiranana Province / Sakarany, 7 km N Joffreville, hand / netted in tropical deciduous forest / M.E. Irwin, F.D. Parker, R. Harin'Hala / 7.i.2007, 360m, 12°20'S 49°15'E' (CAS); 1♀ 'Madagascar, Antsirama Prov. / Parc Nat. Montagne d'Ambre / 960m, 12°30'52"S 49°10'53"E, / 26 – 29 Jan 2001, CAS, coll. M.E. / Irwin, E.I. Schlinger & R. Harin'Hala / Malaise trap MA-01-01A-02' (CAS); 1♂ 'Madagascar, Province / d'Antsiranana. Parc National / Montagne d'Ambre / elev 1050m, 25 Jan 2001', '12°31'13"S 49°10'45"E, / California Acad of Sciences / M.E. Irwin collector / hand netted MA-01-01C-03' (CAS); 2♂ 1♀ 'Madagascar Nord / Montagne d'Ambre [*c*. 12°37'S 49°09'E, *c*. 525 m] 1000m / dct Diégo-Suarez / 23.xi – 4.xii.57 B. Stuckenberg' (BMNH); 1♂ 'Madagascar Nord / Montagne d'Ambre [*c*. 12°37'S 49°09'E, *c*. 525 m] 1700m / dct Diégo-Suarez / 11–15.xii.57 B. Stuckenberg' (BMNH); 1♂ 'Madagascar N. / Ambohitra / Montagne / d'Ambre [12°43'S 49°05'E], 1000m / 9.iv.1991 / A. Freidberg / & Fini Kaplan' (NMSA); 1♀ 'Madagascar, Antsirama Prov. / Ankarana Special Reserve, hand / netted, tropical rainforest 5.i.2007 / M.E. Irwin, F.D. Parker, R. Harin'Hala / 50 m, 12°57.52'S 49°07.19'E [12°57'31"S 49°07'11"E, *c*. 130 m]' (CAS); 2♂ 2♀ 'Madagascar Sambirano / Lokobe Nossi-Bé [13°23'S 49°19'E] 6m / 9 – 23.xi.57 B. Stuckenberg' (NMSA)*; 1♀ 'Nosy-Komba [*c*. 13°28'17"S 48°20'56"E, *c*. 535 m] / Sommet / v-56 A.R.', 'Institut / Scientifique / Madagascar' (BMNH); 1♀ 'Madagascar: Tam. / Manambato [13°42'S 49°07'E] / 4.iv.1995 / A. Pauly col' (GULB); 1♂ 2♀ 'Madagascar E. / Perinet / (Andasibe [13°48'S 49°52'E]) / 16, 17.iv.1991 / A. Freidberg / & Fini Kaplan' (NMSA); 2♂ 2♀ 'E Madagascar Perinet / 20km E. Moramanga / (Andasibe) 3.4.1982 / leg. Barkemayer' (NMSA); 1♀ same data bit 1.4.1982 (NMSA); 2♂ 2♀ same data but 4.4.1982 (NMSA); 1♂ same data but 5.4.1982 (NMSA); 1♀ 'Madagascar, Antsirama Prov. / Parc Nat. Marojejy, 5 km W Manan- / tenina village. Camp Mantella / 14°26.29'S 49°46.44'E [14°26'17"S 49°46'40"E, *c*. 530 m] 490m / 25 Feb – 4 Mar 2005, CAS, coll. / R. Harin'Hala, mal.trap MA-31-13' (CAS); 1♀ 'Maroantsetra / Fampanombo [*c*. 15°22'32"S 49°37'19"E, *c*. 185 m] / 8-56 m 7', 'Institut / Scientifique / Madagascar' (BMNH); 1♀ 'Madagascar, Sofia Region / Port-Berger Distric, 20km N / Ambovomamy, Elev. 86m, ex / malaise trap, 21 – 28.xii.2008, 15°27.07'S 47°36.80'E [15°27'09"S 47°36'48"E, *c*. 70 m], colls. M. Irwin, R. Harin'Hala MG-33-73' (CAS); 1♂ 1♀ 'Madagascar Est / Sahasoa [16°04'S 49°13'E] Fampanambo 80m / dct Maroantsetra / 26 – 29.iii.1958, B. Stuckenberg' (NMSA)*; 1♂ 'Anakarafantsika / Forest [Ankarafantsika 16°06'S 47°05'E]', 'Tsaramandroso / Madagascar / Jan. 1956 / B. Stuckenberg' (NMSA)*; 1♂ 1♀

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'Ankarafantsika [Nature Reserve *c.* 16°06'59"S 47°05'49"E, *c.* 170 m]/ Forest', 'Tsaramandroso / Madagascar / Jan. 1956 / B. Stuckenberg' (BMNH); 1♂ 2♀ 'Madagascar Sud / Route d'Anosibe [16°17'S 44°53'E] 840m / dct Moramanga / 18 – 21.xii.57 B. Stuckenberg' (NMSA)*; 1♂ 'Sahafanjana / Manambato / (Anove) [*c.* 16°20'59"S 49°14'41"E, *c.* 655 m]', 'Institut / Scientifique / Madagascar' (BMNH); 1♂ 'Madagascar / Mailaka [*c.* 16°27'S 46°29'E, *c.* 25 m] / i.1952 / N.L.H. Krauss / B.M. 1952-146' (BMNH); 1♂ 'Madagascar Est / Antanambe [16°27'S 49°50'E] 8m / 1.iv.1958 / B. Stuckenberg' (NMSA)*; 1♂ 1♀ 'E. Madagascar Nosy / Boraha [16°53'40"S 49°54'21"E, *c.* 20 m]: 1km N Lon- / kintsy 13.4.1982 / leg. Barkemeyer' (NMSA); 1♀ 'Madagascar: Tam. / Besarikata / 17°27'S 48°51'E / 1 – 3.iv.1995 / A. Pauly col' (GULB); 9♂ 8♀ 'Coll. Mus. Tervuren / Madagascar: Tam. / Manakambahiny nr. Vavatène / 17°35'S 48°58'E / ii.1995, A. Pauly réc' (GULB); 1♂ 3♀ 'Madagascar: Tam. / Manakambahiny / 1 – 7.ii.1991 / A. Pauly col' (GULB); 1♀ 'Madagascar: Tam. / Fulpointe [Foulpointe – 17°41'S 49°30'E] / 9 – 11.ix.1993' (GULB); 4♂ 4♀ 'Coll. Mus. Tervuren / Madagascar: Tam. / Didy [18°07'S 48°32'E], 18°04'S 48°32'E / iii.1992, forêt, bac jaune / A. Pauly col' (GULB); 3♂ 1♀ 'Madagascar: Tam. / Didy 0.iii.1992 / A. Pauly réc' (GULB); 2♂ same data but 0.iv.1992 (GULB); 1♂ 'Madagascar: Tam. / Didy / le 0.vi.1992 / Leg. A. Pauly' (GULB); 1♂ 'Madagascar Centre / Ambohitantely [18°10'S 47°17'E] 1600m / dct Ankazobe / B. Stuckenberg', '6.i.58' (NMSA)*; 2♀ 'Madagascar Centre / Ambohitantely 1600m / dct Ankazobe / B. Stuckenberg', '6.i.58' (BMNH); 9♂ 5♀ 'Madagascar, Antananarivo Pr. / 3 km 41° NE Andranomay 11.5km 147° SSE Anjozorobe, 1300m [1385 m], 5 – 13 / Dec 2000, 18°28'24"S 47°57'36"E, / coll Fisher, Griswold et al CAS / Mal. Trap, mont. Rainfor. [montane rainforest] BLF2375' (CAS); 1♂ 'Malaise traps / primary / rainforest', 'Madagascar: Tamatave / Torotorofotsy, Andasibe / (Perinet), 22km NW / 18°46.25'S 48°25.93'E / 23–25.x.2004, 960m. / A.H. Kirk-Spriggs & R. Harin'Hala' (BMSA); 1♀ 'E Madagascar 5km E / Andekaleka (Lohari: / andava [18°46'S 48°40'E]) 7.4.1982 / leg. Barkemayer' (NMSA);3♂ 1♀ 'Madagascar Nord / Montagne d'Ambre [18°55'S 47°33'E] 1000m / dct Diego-Suarez / 23.xi – 4.xii.57 B. Stuckenberg' (NMSA)*; 5♂ 'Madagascar / Perinet [*c.* 18°55'40"S 48°24'52"E, *c.* 935 m] 500m / 6–12.v.1968 / K.M. Guichard' (BMNH); 3♂ 2♀ 'Perinet [*c.* 18°55'40"S 48°24'52"E, *c.* 935 m] / Madagascar / Dec. 1955 / B. Stuckenberg' (NMSA)*; 1♂ 'Perinet / Madagascar / Dec. 1955 / B. Stuckenberg' (BMNH); 1♀ 'Madagascar, Antananarivo Prov / Mandraka 18°56'S / 47°56'E [1230 m], 10 Mar 94 / coll. M. Wasbauer' (CAS); 1♂ 'Madagascar / Mandraka [18°57'S 47°53'E] 75km E / Antananarivo / 16.iv.1991 Rt2 / A. Freidberg / & Fini Kaplan' (NMSA); 1♂ 3♀ 'Madagascar / Moramanga [*c.* 18°57'S 48°14'E, *c.* 925 m] / Km. 18 *c.* 500m / 1.v.1968 / K.M. Guichard' (BMNH); 1♀ 'Madagascar / near Moramanga [*c.* 18°57'S 48°14'E, *c.* 925 m] / forest / 12.iii.1968 / D.J. Greathead' (BMNH); 4♂ 'Madagascar Toamagina Prov. / Parc Nacional Andasibe (Perinet) / 19km W Moramanga, [18°57'S 48°14'E, *c.* 960 m] 1000m / in forest, colls: E.I. Schlinger, / M.E. Irwin, & H.H. Rasolondalao / MEI.99-MA-3 24-xii-1999' (CAS); 2♂ 6♀ same data but 24.xii.1999 (CAS); 1♀ 'Madagascar Toamagina Prov. / Parc Nacional Andasibe (Perinet) / 19km W Moramanga, 1000m / 5.xii.1999; forest; ME Irwin, / EI Schlinger, HH Rasolondalao' (CAS); 1♂ 'Sandrangato [*c.* 19°06'S 48°14'E, *c.* 960 m]', 'Institut / Scientifique / Madagascar' (BMNH); 4♂ 4♀ 'Madagascar: Tam. [Toamasina] / Morarano [*c.* 19°26'S 47°29'E, *c.* 1550 m] - Chrome / forêt 25km W, 1200m / 17°45'S 47°59'E [?] / xii.1991, A. Pauly leg' (GULB); 3♂ 3♀ same data but i.1992 (GULB); 1♂ 'Madagascar: Tam. / Morarano-Chrome / xii.1991 / A. Pauly col' (GULB); 1♂ 1♀ same data but i.1992 (GULB); 12♂ 7♀ 'Madagascar: Tam. / Morarano-Chrome / xii.1991. Forêt / A. Pauly col' (GULB); 6♂ 3♀ 'Madagascar: Tam. / Morarano-Chrome / 1 – 25.x.1991 / A. Pauly col' (GULB); 42♂ 30♀ 1? 'Madagascar: Tam. / Morarano- / Chrome, / ii.1991 / Leg. A. Pauly' (GULB); 2♂ 'Madagascar / Mararano [= Morarano *c.* 19°26'S 47°29'E, *c.* 1550 m], 25km W / i.1992 / Rec. A. Pauly' (GULB); 2♀ 'Ankaratra [*c.* 19°34'27"S 46°55'04"E, *c.* 2005 m] massif / Madagascar / Jan. 1956 / B. Stuckenberg', 'Manjakatompa / forest station' (BMNH); 1♂ 'Madagascar, Menabe Region / Morondava Dist, 7 km E Beroboka / Antsarongaza forest. Elev 45m. Ex / malaise trap, 25.xi. – 3.xii.2008/ 19°58.65'S 44°39.92'E [19°58'39"S 44°39'55"E, *c.* 55 m], colls M. / Irwin, R. Harin'Hala MG-45B-48' (CAS); 1♂ 1♀ same data but 20 – 28.i.2009, MG-45B-55 (CAS); 1♀ same data but 9 – 17.v.2009, MG-45B-69 (CAS); 1♀ 'Maroantsetra / Ambodivoangy [*c.* 20°38'29"S 47°31'32"E, *c.* 635 m]', 'Institut / Scientifique / Madagascar' (BMNH); 1♂ 'Ambohimitombo Forest [*c.* 20°43'S 47°26'E, *c.* 1220 m] / Madagascar / Jan. 1895 / Dr Forsyth-Major / 98.46' (BMNH); 1♂ 2♀ 'Madagascar, Vatovavy / Fitovinany Region, Ifanadiana / District, Ranomafana Nat'l Pk / Vohiparara bridge, 17km W of / Ranomafana, ex malaise trap', 'elev 1109m, 1 – 19.ix.2002 / 21°13.57'S 47°22.19'E' [21°13'34"S 47°22'11"E, *c.* 1200 m] / colls M. Irwin & R. Harin'Hala / MA-02-D9A-40' (CAS); 1♀ 'Madagascar, Fianarantsoa Prov. 17km / W Ranomafana, Vohiparara / Ranomafana Natl Park, malaise in / rainforest, 5 – 15.vii.2002 / 1110m, R. Harin'Hala, M.E. Irwin / 21°13.57'S 47°22.19'E, MG 9A-34' (CAS); 1♂ 1♀ 'Madagascar, Fianarantsoa / Prov. Parc Nacional Ranomafana / 14km W of Park headquarters / Vohiparara 8.xii.1999', '21.2263°S 47.3702°E [21°13'34"S 47°22'12"E, *c.* 1150 m] 1150m / M.E. Irwin, E.I. Schlinger & H.H. / Rasolondalao, in cloud forest / MEI 99-MA-5' (CAS); 1♂ 'Madagascar, Fianarantsoa Prov. / Parc Nat'l Ranomafana / Vohiparara, at broken bridge, elev / 1110m, 1 – 19.ix.2002', '21°13.57'S 47°22.19'E [21°13'34"S 47°22'12"E, *c.* 1150 m]' / coll M. Irwin, R. Harin'Hala / Ex malaise trap MA-02-09A-40' (CAS); 1♀ 'Madagascar / Fianarantsoa Province / Ranomafana National / Park, Vohiparara area / 1050m, 12 April 1998', '21°13.6'S 047°24.0'E [21°13'36"S 47°24'00"E, *c.* 1180 m] / swept from foliage / along tourist trail / J.S. Schweikert coll' (CAS); 1♂ 'Madagascar / Fianarantsoa

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Province / Ranomafana National / Park, Vohiparara area / 1050m, 19 April 1998', '21°13.6'S 047°24.0'E / swept from foliage / along tourist trail / J.S. Schweikert coll' (CAS); 1♂ 'Madagascar / Fianarantsoa Province / Ranomafana National / Park, Talatakely area / 900m 6 April 1998', '21°14.9'S 047°25.6'E [21°14'54"S 47°25'36"E, *c.* 910 m] / swept along trails / near research cabins / J.S. Schweikert coll' (CAS); 1♂ same data but 17 April 1998 (CAS); 8♂ 9♀ 'Madagascar Fianarantsoa / Prov. Parc Nacional Ranomafana / Bell Vue Trail, tropical forest / 21°15.6'S 47°25.6'E [21°15'36"S 47°25'36"E, *c.* 935 m] 1000m / M.E. Irwin and E.I. Schlinger / MEI 99-MA-7 21.xii.1999' (CAS); 4♂ 1♀ 'Madagascar Fianarantsoa / Prov. Parc Nacional Ranomafana / Bell Vue Trail, tropical forest / 21°15.6'S 47°25.6'E 1000m / M.E. Irwin and E.I. Schlinger / MEI 99-MA-7 8.xi.1999' (CAS); 1♀ 'Madagascar, Fianarantsoa / Pr. Parc Nat Ranomafana / Belle Vue at Talatakely, 1020m / 13 – 23 June 2003, 21°15.99'S 47°25.21'E [21°15'59"S 47°25'13"E, *c.* 1065 m]', coll R. Harin'Hala / CAS, Mal. Trap MA-02-09C-32' (CAS); 1♂ 'Madagascar / Fianarantsoa Province / Ranomafana National / Park, Talatakely area / 1000m, 27 April 1998', '21°15.3'S 047°25.9'E [21°15'18"S 47°25'54"E, *c.* 810 m] / swept in sunny gap in / mixed tropical forest / near small creek / J.S. Schweikert coll' (CAS); 1♂ 'Madagascar / Fianarantsoa, Ranomafana / National Park, Talatakely / 13 – 22 April 1998, 655m', '21°15'S 47°27'E [*c.* 936 m] / M.E. Irwin, E.I. Schlinger / Malaise trap in tropical / forest. 98-MAD-6' (CAS); 1♀ 'Madagascar / Fianarantsoa, Ranomafana / National Park, Talatakely / 21°15'S 47°25'E [*c.*1120 m]', '11 April 1998, 850m elev / M.E. Irwin, E.I. Schlinger / hand netted in tropical / forest. 98-MAD-2' (CAS); 1♂ 1♀ 'Madagascar Fianarantsoa Province / Ranomafana National Park,/ Talatakely area, 900m / 2 – 22 January 2001', '21.25041°S 47.41945°E [21°15'01"S 47°25'10"E, *c.* 1025 m] / mixed tropical forest / D.H & K.M. Kavanaugh, R.L. / Brett, E. Elsom and F. Vargas' (CAS); 1♂ 'Madagascar, Fianarantsoa Prov. / 12km W Ranomafana Natl Pk / entrance, radio tower, malaise in / montane tropical forest, 26 – 31.iii.02, R. H'Hala, M.E. Irwin, 1215m / 21°15.05'S 47°24.43'E [21°15'03"S 47°24'26"E, *c.* 1165 m], MG 9B-22' (CAS); 1♀ 'Madagascar, Fianarantsoa / Province. Ranomafana Hotel / Domaine Nature, at light / 21.2576°S 47.4415°E [21°15'27"S 47°26'29"E, *c.* 650 m] 335m / M.E. Irwin and E.I. Schlinger / MEI 99-MA-13 11.xii.1999' (CAS); 1♂ 'Madagascar, Fianarantsoa Prov. / Belle Vue, 1.2km S Ranomafana / Nat'l Park entrance, Malaise / in rain forest, 23.iv. – 4.v.2003 / 1095m, R. Harin'Hala M.E. Irwin / 21°15.99'S 47°25.21'E MG 9C-59' (CAS); 2♂ same data but 16 – 28.v.2003, MG 9C-61' (CAS); 1♀ 'Madagascar: Prov. / Fianarantsoa, 7 km / W Ranomafana [National Park 21°19'S 47°23'E, *c.* 1515 m], 1100m / 15 – 24 September 1988 / C. Kremen, collr.' (USNM); 2♂ 'Madagascar: Prov. / Fianarantsoa, 7km / W Ranomafana, 1100m / 1 – 3 October 1988 / C. Kremen, R. Van Epps / & L. Rasabo. Collrs.' 'Malaise trap in / small clearing / montane / rain forest' (USNM); 1♂ 1♀ 'Madagascar: Prov. / Fianarantsoa, 7km / W Ranomafana, 1100m / 8 – 21 October 1988 / W. E. Steiner' [pinned with prey – Tachinidae] (USNM); 3♂ 'Madagascar: Prov. / Fianarantsoa, 7km / W Ranomafana, 1100m / 22 – 31 October 1988 / W. E. Steiner', 'Malaise trap in / small clearing / montane / rain forest' [1♂] (USNM); 1♂ 'Madagascar: Prov. / Fianarantsoa, 7km / W Ranomafana, 1100m / 1 – 7 November 1988 / W. E. Steiner' (USNM); 1♀ 'Madagascar: Prov. / Fianarantsoa, 7km / W Ranomafana, 900m / 20 – 31 January 1990 / W. E. Steiner' (USNM); 1♀ 'Madagascar: Prov. / Fianarantsoa, 7km / W Ranomafana, 900m / 23 – 28 February 1990 / W. E. Steiner', 'Malaise trap in / small clearing / montane / rain forest' (USNM); 1♀ 'Madagascar: Prov. / Fianarantsoa, 7km / W Ranomafana, 1000m / 8 – 13 March 1990 / W. E. Steiner' [pinned with prey – Cercopidae] (USNM); 2♂ 2♀ 'Coll. Mus. Tervuren / Madagascar: Fia. / Ranomafana [National Park 21°19'S 47°24'E, *c.* 1215 m], forêt / 15.iii.1994, bac jaune / A. Pauly réc' (GULB); 13♂ 7♀ 'Madagascar: Fia. / Ranomafana / 19.i.1992 / A. Pauly réc' (GULB); 1♂ 'Madagascar, Antana / Prov. Manjakatompa / 21°21'S 47°19'E [*c.* 1230 m] / 12 March 1994 / coll. M. Wasbauer' (CAS); 1♂ 'Madagascar Centre / Vakoana 1520m / Andringitra [22°13'S 46°55'E] Ambalavao / 21 – 24.i.58 B. Stuckenberg' (NMSA)*; 2♂ 3♀ 'Madagascar Sud-Ouest / Lambomakandro [22°42'S 44°42'E, *c.* 525 m] 550m / dct Sakaraha / 4 – 10.ii.57 B. Stuckenberg' (NMSA)*; 2♀ 'Madagascar Sud-Ouest / Lambomakandro 550m / dct Sakaraha / 4 – 10.ii.57 B. Stuckenberg' (BMNH); 2♂ 1♀ 'Madagascar, Tulear / Prov. Zombitse National / Park, near Angap office / 22°53.19'S 44°41.53'E / 11 – 16 April 2002 / California Acad of Sciences / coll, R. Harin'Hala, malaise / trap. Deciduous spiny forest / elev 840m, MA 02-13A-24' (CAS); 1♂ 'Madagascar, Tulear Prov / Mikea Forest, NW of Manombo / el 30m, 14 – 28 Nov 2002 / 22°53.22'S 43°28.53'E [22°53'13"S 43°28'32"E, *c.* 30 m]', CAS / Irwin, Parker, Harin'Hala colls / M.t. transit. For. MA-02-18A-40' (CAS); 2♂ 'Madagascar, Tulear Prov. / Zombitse Nature Reserve / 16km E Sakaraha 825m / MEI 99-MA-14 18.xii.1999', '22.8823°S 44.7006°E [*c.* 22°52'56"S 44°54'02"E, *c.* 820 m] / tropical forest on sand / M.E. Irwin and E.I. Schlinger' (CAS); 2♂ 1♀ same data but 16.xi.1999 (CAS); 1♀ 'Madagascar, Fianarantsoa / Prov. 7km W Manombo [22°57'11"S 43°28'20"E, *c.* 15 m] 10m / Ambinany, beach vegetation / M.E. Irwin and E.I. Schlinger / MEI 99-MA-10, 10.xii.1999' (CAS); 1♂ 2♀ 'Madagascar, Fianarantsoa / Prov. 20km SSW Farafangana / Manombo Special Reserve / MEI 99-MA-9, 10.xii.1999', '23.028°S 47.730°E [23°01'41"S 47°43'48"E, *c.* 25 m] 60m / malaise in tropical forest / M.E. Irwin and E.I. Schlinger' (CAS); 1♂ 'Madagascar, Tulear / Province, Beza Mahafaly / Reserve, Parcelle 1 near / research station / 29 April – 19 May 2002, 23°41.19'S 44°35.46'E [23°41'11"S 44°35'28"E, *c.* 155 m] / California Acad of Sciences / coll. R. Harin'Hala, malaise / trap in dry deciduous forest / elev 165m, MA-0214A-24' (CAS); 1♂ same data but 18 – 28 July 2002, MA-0214A-30' (CAS); 1♂ same data but 20 – 28 October 2002, MA-0214A-38' (CAS); 1♂ 'Madagascar, Tulear Prov. / Andohahela N.P. Tsimelahy /Parc. 11, 15 – 26

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Feb 2003, 180m / 24°56.21'S 46°37.60'E [24°56'13"S 46°37'36"E, *c.* 190 m], CAS / Irwin, Parker, Harin'Hala colls / M.t. transit. For. MA-02-20-16' (CAS); 1♀ 'Madagascar', '[? Illegible]' (BMNH). MALAWI: 5♂ 3♀ 'Malawi Ntchisi forest / reserve [*c*. 13°19'S 34°03'E, *c.* 1155 m] 1334Ac 1500m / Londt & Stuckenberg / 3 – 4.xii.1980 Montane / forest & woodland' (NMSA); 7♂ 5♀ 'Malawi Zomba Plateau [*c*. 15°19'38"S 35°19'15"E, *c.* 1055 m] / 24 – 27.xi.1980 1500m / Stuckenberg & Londt Riverine / 1535Ad Montane forest' (NMSA); 1♂ 'Nyasaland / Mt. Mlanje [*c*. 15°56'S 35°38'E, *c.* 2420 m] / 19.xi.1912 / S.A. Neave' (BMNH); 1♂ same data but 25.xi.1912 (BMNH); 1♀ same data but 26.xi.1912 (BMNH); 1♀ 1? same data but 28. xii.1912 (BMNH); 1♂ 2♀ same data but 31.xii.1912 (BMNH); 1♀ same data but 9.i.1913 (BMNH); 1♂ 1♀ 'Malawi Mulanje Mtn. / Likabula river valley [*c*. 15°56'38"S 35°30'08"E, *c.* 885 m] / 28 – 30.xi.1980 1535Dc / 1000m Stuckenberg & / Londt Riverine / *Brachystegia* woodland' (NMSA). MAURITIUS: 1♀ 'Mauritius / Trou aux biches [*c*. 20°01'54"S 57°32'49"E, *c.* 10 m] / 17.8.1938 / C.M. Courtois' (NMSA); 1♂ 'Mauritius / Hollywood [*c*. 20°05'57"S 57°34'52"E, *c.* 50 m] / 25.2.1955 / C.M. Courtois' (NMSA); 1♀ 'Mauritius / Roche Bois [*c*. 20°08'57"S 57°30'44"E, *c*.20 m] / 25.7.1955 / C.M. Courtois' (NMSA); 1♀ 'Mauritius / La Pouce Mtn [*c*. 20°12'S 57°31'E, *c.* 690 m] / 30.ii.1962 / C.M. Courtois' (NMSA)*; 1? same data but 20.i.1961 (NMSA)*; 1♀ same data but 29.ii.1962 (NMSA)*; 1♂ 'Mauritius / La Pouce / 10.vi.1971 / A.M. Hutson / B.M. 1971-346' (BMNH); 1♂ 1♀ 'Mauritius / Le Pouce [La Pouce] / 11.xii.1937 / J. Vinson' (BMNH); 1♂ 'Mauritius / N. Mannders' (BMNH); 1♂ 'Mauritius' (BMNH). MOZAMBIQUE: 1♂ holotype, 2♂ paratypes (*africana*) 'Gorongoza Mountain [*c*. 18°41'25"S 34°18'49"E, *c.* 125 m]/ Manica Sofala Dist. / Port East Africa / 840m. Gallery forest / Sept 1957 Stuckenberg' (NMSA)*. RÉUNION: 1♂ 'La Réunion / Gros Piton Rond [21°09'S 55°36'E, *c*. 1375 m] / 5.iii.2000 1000m / G. Delvave' (NMSA); 3♀ 'La Réunion / Notre Dame de la / Paix [21°14'S 55°36'E, *c.* 1840 m] 20.ii.1999 / J.F. Vayssieres', 'Sur vegetation / indigens' (NMSA); 1♂ 'Réunion [locality not stated] / 5.iii.2013 / D. Martiré / DM015799' (NMSA); 1♂ 2♀ 'Réunion 1000m / 1.i.2013 / D. Martiré (NMSA); 2♀ 'Réunion 900m / 29.xi.2012 / D. Martiré / DM013357' (NMSA). TANZANIA: 1♂ 'Tanganyika / W. Usambara Mts. / 1600m / Lushoto [*c*. 04°34'S 38°24'E, *c.* 715 m] / ii.1962' (CNC); 1♂ 'Tanganyika: / Amani [*c*. 05°06'S 38°38'E, *c.* 905 m] / iii.1959 / J.D. Phipps / B.M. 1962-453' (BMNH); 1♀ 'Amani Tang. Terr. / E. Usambara / March 1950 / E. Pinhey' (BMNH); 1♂ 1♀ 'Tanganyika: / Amani 1957 / J.G. Halcrow / In cowshed' (BMNH); 1♀ 'Tanganyika / W. Usambara Mts. / 2100m / Magamba [*c*. 06°25'08"S 31°05'17"E, *c.* 1090 m] / iii.1962' (CNC); 1♂ 'Tanganyika / Ulguru Mts [*c*. 07°14'S 37°33'E, *c.* 1015 m] / 1500 – 1800m' (CNC). UGANDA: 1♂ 'Kayonza Forest / Kigezi Dist. [*c*. 00°16'N 31°37'E, *c.* 1260 m] Uganda / 2135m May 1972 / E. Babyetagara' (CNC); 1♀ 'Uganda Prot. / Western Ankole [*c*. 00°37'S 30°40'E, *c.* 1400 m] / 4500–5000ft / 10–14, Oct. 1911 / S.A. Neave' (BMNH). ZIMBABWE: 1♀ paratype (*africana*) 'N. Vumba [Bvumba Mountains *c.* 19°06'S 32°47'E, *c.* 1250 m] / S. Rhodesia / 19.11.1964 / D. Cookson' (NMSA)*; 1♀ paratype (*africana*) 'Mt Selinda [*c*. 20°25'S 32°42'E, *c.* 1150 m] / 5.2.54 / N.J. Myers' (NMSA)*; 1♀ paratype (*africana*) same data but 3.2.54 (NMSA)*.

Other material (i.e. published records not studied):

coerulescens: Macquart's (1834) type material from 'De l'Ile-de-France' (Mauritius).

albimaculata: Macquart's (1838) type material from 'Du Cap et de l'Ile Bourbon' (The Cape, South Africa, and Réunion).

breonii: Macquart's (1838) type material from 'l'Ile Bourbon' (Réunion).

cyaneogaster: Macquart's (1838) type material from 'De l'Ile-de-France' (Mauritius).

submetallica: Macquart's (1838) type material from 'De l'Ile-de-France' (Mauritius).

macra: Bigot's (1859) type material from Madagascar.

nusoides: Bromley's (1931) type material (♂ & ♀) from 'Tananarive', Madagascar.

macra: Oldroyd (1960) provided the following details relating to studied material: 'Comores: Anjouan, Bimbini [12°11'32"S 44°14'03"E, *c.* 10 m]; Pamanzi [Mayotte – 12°47'54"S 45°16'31"E, *c.* 15 m], lac Dziani [12°46'14"S 45°17'19"E, *c*. 20 m]. Madagascar Centre et Centre-Est: Moramanga, Sandrangato; Perinet; La Mandraka; Ankaratra. Madagascar Est: Maroantsetra, Ambodivoangy et Ambohitsitondrona. Madagascar Ouest: foret de I'Ankarafantsika; Analavelona. Décembre à juin' [some material, now in NMSA, has been seen].

nusoides: Oldroyd (1960) provided the following details relating to studied material: 'Comores: Mayotte, Mamoutzou [Mamoudzou – 12°46'41"S 45°13'40"E, *c.* 50 m]. Madagascar Est: Maroantsetra, Ambodivoangy et Ambohitsitondrona; Sahafanjana; Manambato sur l'Anove. Décembre à février; août.' [some material in NMSA has been studied].

macra: Londt (1977) recorded material which has not been reexamined i.e. '5♂ 4♀ E. Madagascar, Forest, 600-1200m, xii.1930 – ii.1931, C. H. Lamberton (DMSA.)'.

Distribution, phenology and biology: This is by far the most widely distributed species, occurring on at least five Indian Ocean Islands (Madagascar, Mauritius, Réunion and the Comoros islands of Anjouan and Mayotte) as well as on the African mainland (Fig. 34). Collected throughout the year on Madagascar (no record for August) and the

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African mainland (no records for April or June) (Table 1). The species inhabits mainly indigenous tropical or montane forest (eg. Fig. 4) and can be found over a wide range of altitudes (8–2040 m). Many specimens were malaise trapped and only two prey records are known (Diptera: Tachinidae, Hemiptera: Cercopidae), both captured by female individuals.

The wide distribution and great range in size requires comment. It is my contention that this species has been carried to many of the Indian Ocean islands and to the African mainland by oceanic currents, possibly aided by cyclonic activity, as proposed for 'rafting' mammals (Stankiewicz *et al.* 2006). Although the life cycle of *Notiolaphria* species has not been studied, it is known that adult flies settle on tree trunks and decaying logs in forest environments. Like many robber flies of the subfamily Laphriinae, species of *Notiolaphria* probably oviposit in holes in wood, the larvae probably being predaceous on wood burrowing insects and associated invertebrates. This being true, the possibility exists that pieces of wood containing developing larvae can be swept down rivers and out to sea and land up on distant shores. Clearly, the period at sea cannot exceed the time it takes for larvae to metamorphose, as adults emerging at sea would certainly have little chance of survival.

Although I have not encountered any published work directly supporting of my suggestions above, Dr Eric Fisher expressed similar thoughts on what he called 'over-water dispersal' in his unpublished dissertation on *Andrenosoma* Rondani, 1856 (Fisher 1986) when he wrote 'The biology of the immature stages seems to me the obvious

Fig. 4. *Notiolaphria coerulescens* (Macquart, 1834), habitat at Bururi Forest, Burundi (Photo: R. Copeland).

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reason for this group's success in colonizing islands. The larvae and pupae of Laphriinae all live in wood, so logs carrying still living laphriine larvae must occasionally wash-up on beaches of even distant islands'. Clearly, this interesting matter needs further investigation.

The considerable size variation displayed by this species also requires comment and possible explanation. I believe that it may be a response to the degradation of forests over much of the species' distribution. As trees are felled and wood is removed from forests for a variety of purposes it is highly probable that the resources available to developing larvae have been negatively impacted upon with respect to both quantity and quality. This would in turn certainly impact on the success of larval development and probably influence the size to which larvae are able to grow. Dr M. Mansell (pers. comm.) informs me that predatory antlion larvae frequently produce smaller adults when poorly fed. The same may well be true of predacious robber fly larvae. It is my impression that flies collected some years ago (eg. those collected by Stuckenberg in the 1950s) are generally larger than those pinned from more recent collections. Clearly, forests have been greatly degraded over the last 50 or more years and so it is plausible that this degradation is being reflected in the size of these forest inhabiting flies.

Notiolaphria dimidiatifemur Oldroyd, 1960, **comb. n.**

Figs 6, 13, 20, 35

Laphria dimidiatifemur Oldroyd, 1960: 282; 1980: 351 (catalogue).

Etymology: The name is derived from the Latin words *dimidius* (half, halved), *ater* (black) and *femur*, descriptive of the coloration of the femora.

Redescription: Based on material examined. No apparent sexual dimorphism exists.

Head: Black, silver and gold pruinose, black and white setose. Antenna: Black, scape and pedicel black setose. Segmental ratios (scape as 1) — 1 : 0.7 : 2.8. Style absent, postpedicel tipped with a pit-enclosed spine-like sensory element. Face black, ventral mystical area dull silver pruinose, dorsal area between mystax and antennal sockets bright gold pruinose. Mystax with long black and white setae and two dorsolaterally situated groups of silver, glistening, scale-like setae. Dorsal region of face with 1 or two pairs of tiny black or white setae situated close to antennal bases. Frons black, dull silver pruinose with a few fine black setae laterally adjacent to eye margin. Ocellar tubercle with a pair of long, strong, black macrosetae. Vertex black, gold pruinose. Postocular (occipital) region black, shiny silver pruinose, black setose dorsally, fine white setose ventrally. Palpi and proboscis dark red-brown to black, white setose.

Thorax: Black, with areas of silver and gold pruinescence, black and white setose. Pronotum black. Mesonotum black, extensively shiny apruinose, but with areas of fine silver-gold pruinescence situated mainly laterally and posteriorly. Acrostichals black, poorly developed to absent. Dorsocentrals black, poorly developed, extending both anterior and posterior of transverse suture. Mesonotal macrosetae: Black, 1 npl, 2 spal, 2 pal. Scutellum shiny blue-black with narrow gold pruinose anterior margin, disc with few isolated tiny black setae, 4 long black apical macrosetae (accompanied by 2 small setae). Pleura: Black, entirely gold-silver pruinose, black and white setose. Anepisternum with two black macrosetae posteriorly. Katatergal macrosetae black (dorsally) and white (ventrally). Anatergites uniformly gold-silver pruinose, asetose. Legs (Fig. 20): Coxae

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black, silver pruinose, fine white setose. Trochanters shiny black, apruinose, white setose. Femora somewhat inflated, orange except for narrow black distal tip, black and yellow setose. Tibiae and tarsi shiny blue-black, macrosetae black, fine setae mostly yellowish. Claws black, pulvilli and empodia well developed. Wings: ♂ 7.3×2.5 mm, ♀ 8.3×2.9 mm. Veins blackish, cell r_5 open, m_3 and cua closed and stalked, membrane unstained, transparent, microtrichia largely absent from proximal half of wing and extensive in distal half (Fig. 6). Halter pale yellow to orange.

Abdomen: Shiny blue-black, apruinose except for terga that have tiny posterolateral areas of silver pruinescence and sterna that have narrow posterior margins silver pruinose. T1 with 2–4 laterally situated white macrosetae, T2 and T3 with 1–2 white macrosetae, T4 with or without a single white macroseta laterally. Fine setae white, short on terga, longish on sterna.

Male terminalia (Fig. 13): Rotated through 90°. Epandrium as a single shield-like plate, showing no indication of bifurcation distally but tapering slightly to broad apex. Proctiger jutting out beyond distal end of epandrium, dorsal and ventral lobes of similar development. Gonocoxites composed of external and internal lobes. External lobe broader proximally (broader than epandrium in lateral view), tapering gradually to about three-quarters of length before rapidly tapering to fairly narrowly rounded apex in lateral view. Internal lobe laterally compressed, jutting out distally well beyond level achieved by external lobe, broader proximally, clearly dorsally hooked terminally. Gonostylus projecting to about the same distance as internal lobe of gonocoxite, laterally compressed, somewhat parallel-sided, apex clearly dorsally hooked. Hypandrium, reduced to a subtriangular sclerite less than half the length of gonocoxites, with moderately rounded terminal lobe. Aedeagus of moderate length with three terminal prongs.

Female terminalia: Simple, slightly telescopic, setaceous and lacking spines.

Material examined: MADAGASCAR: 1♂ 'Madagascar: Province / Fianarantsoa; Parc National / Ranomafana; Vohiparara; / at broken bridge; el 1110m; / 21°13.57'S, 47°22.19'E;', 'ex malaise trap in high altitude / rain forest; 12–19.ii.2002 / California Acad of Sciences; / coll: M. Irwin, & R. Harin'Hal / MA-02-09A-16' (CAS); 1♂ 'Madagascar, Tulear Prov. / Zombitse Nature Reserve / 16km E Sakaraha 825m / tropical forest on sand / 22.8823°S 44.7006°E [22°50'23"S 44°43'44"E, *c.* 860 m] / M.E. Irwin and E.I. Schlinger / MEI.99-MA-14, 13.xii.1999' 'CASENT / 8019485' (CAS); 1♀ 'Madagascar: Prov. / Fianarantsoa, 7km / W Ranomafana [National Park 21°19'S 47°23'E, *c.* 1515 m], 900m / 1 – 9 February 1990 / W. E. Steiner' (USNM).

Other material: Oldroyd (1960) listed only the ♀ holotype housed in the MNHN. Data supplied are 'Madagascar Est: Maroantsetra, Ambohitsitondrona [? = Ambohitsitondroinan 15°34'32"S 50°00'41"E, *c.* 750 m] (J. Vadon)', 'Décembre'.

Remarks: Both specimens studied by me and listed above have all femora almost entirely orange; only the distal ends are narrowly black. Photographs of Oldroyd's type, provided by Dr E. Fisher show that the femora are half black and half orange. This suggests that there are either two different species involved or that there is some variation. For the present I consider this difference to represent variation.

Distribution, phenology and biology: Known only from the three widely separated Madagascan localities, each in a different province (Fig. 35). Collected in the summer months of December and February (Table 1). Associated with tropical forest on sandy substrate at Zombitse Nature Reserve and so assumed to occupy similar environmental conditions elsewhere. Records suggest an association with forests between altitudes of 750–900 m. No prey records are available.

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Notiolaphria microtheres sp. n.

Figs 7, 14, 15, 22, 35

Etymology: The name is derived from the Greek words *mikros* (little, small) and *therao* (hunt, hunter), descriptive of the small size of this predatory fly.

Description: Based on all examined material. A small species with glistening setae and clear sexual dimorphism. The description is based primarily on male specimens, with notes on sexual differences.

Males:

Head: Black, dull silver pruinose, yellow, black and white setose. Antenna: Black, scape with strong yellow macrosetae ventrally and smaller black setae dorsally. Pedicel black setose distally. Segmental ratios (scape as 1) somewhat variable — 1 : 0.8–1.0 : 2.1–2.5. Style absent, postpedicel tipped with a pit-enclosed spine-like sensory element. Face slightly gibbose ventrally, black, dull silver pruinose. Mystax extensive, with fine, long yellow setae almost entirely overlaid by long, gold (or silver). glistening scale-like setae. Frons black, dull silver pruinescence, fine yellow and black setose adjacent to eye margin. Ocellar tubercle with a pair of long, pale yellow or black macrosetae. Vertex black, dull silver pruinescence. Postocular (occipital) region black, silver pruinose, yellow and black setose dorsally, fine white setose ventrally. Palpi and proboscis dark red-brown to black, white setose.

Thorax: Black, with small areas of silver pruinescence, yellow, black, and white setose. Pronotum black. Mesonotum shiny black, with few areas of fine silver pruinescence (adjacent to postpronotal lobes; lateral and posterior margins; pair of small spots on transverse suture). Acrostichals not evident. Dorsocentrals yellow, poorly developed, extend both anterior and posterior of transverse suture. Mesonotal macrosetae: 1 black npl, 1–2 yellow or black spal, 1–2 yellow or black pal. Scutellum shiny black with at most a narrow silver pruinose anterior margin, disc with many tiny yellow setae, 4–6 moderately long yellow apical macrosetae. Pleura: Black silver pruinose except for parts of anepisternum, katepisternum and anepimeron which are shiny apruinose, black and white setose. Anepisternum with 1 black macroseta (may be accompanied by a weaker yellow seta) posteriorly. Katatergal macrosetae long, fine, white. Anatergites uniformly silver pruinose, asetose.

Legs: Coxae black, silver pruinose, fine white setose. Trochanters shiny black, apruinose, white setose. Femora black, yellow and white setose. Tibiae and tarsi dark red-brown to black, macrosetae black and yellow, fine setae mostly yellowish. Claws black, pulvilli and empodia well developed.

Wings: Holotype 3.7×1.5 mm, range 3.1–5.6 mm×1.2–2.0 mm. Veins dark brown, cells r_5, m_3 and cua closed and stalked, membrane unstained, transparent, microtrichia largely absent from proximal half of wing and extensive in distal half (Fig. 7). Halter white with pale yellow-brown base.

Abdomen: Shiny black, apruinose except for terga that have small posterolateral areas of silver pruinescence and sterna that have narrow weakly silver pruinose posterior margins. T1 with 2 laterally situated yellow macrosetae, T2 and T3 with 1 yellow macrosetae, other terga lacking macrosetae. Fine setae short yellow, especially evident on T1–4.

Male terminalia (Figs 14–15): Rotated through 90°. Epandrium as a single shield-like plate, showing no indication of bifurcation distally, but tapering slightly to broad apex.

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Proctiger jutting out beyond distal end of epandrium, dorsal and ventral lobes of similar development. Gonocoxites somewhat shorter than epandrium, composed of external and internal lobes. External lobe broad proximally (as broad as epandrium in lateral view), tapering gradually to about three-quarters of length before rapidly tapering to narrowly rounded apex in lateral view. Internal lobe laterally compressed, fairly broad at base, jutting out distally well beyond level achieved by external lobe, clearly dorsally hooked terminally. Gonostylus projecting to about the same distance as internal lobe of gonocoxite, laterally compressed, almost parallel-sided for much of length, with pointed apex directed slightly ventrally. Hypandrium, reduced to a subtriangular sclerite, longer than wide in ventral view, less than half length of gonocoxites, with acutely rounded terminal lobe. Aedeagus of moderate length with three terminal prongs.

Females (essentially similar to males except for the following obvious differences): Head with black and white setae only. Antennal scape with black and white setae. Mystax largely confined to gibbosity, with long black macrosetae (few white may be present) together with a pair of clearly dorsolaterally situated groups of short silver scale-like setae. Ocellar macrosetae black. Postocular macrosetae black and white. Mesonotal macrosetae all black. Scutellum with black apical macrosetae. Abdomen generally dark red-brown to black.

Female terminalia: Simple, slightly telescopic, setaceous and lacking spines.

Holotype: MADAGASCAR: ♂ 'Madagascar, Tulear Prov / Mikea Forest, NW of Manombo / el 30m, 4 – 14 Dec 2003 / 22°53.22'S 43°28.53'E [22°53'13"S 43°28'32"E, *c.* 30 m]', CAS / Irwin, Parker, Harin'Hala colls / M.t. transit. For. MA-02-18A-76' (CAS).

Paratypes: MADAGASCAR: 1♂ same data as holotype but 12 Oct – 12 Nov 2001 MA-02-18A-01' (CAS); 1♂ same data but 6 – 16 Dec 2001, MA-02-18A-05 (CAS); 1♂ 1♀ same data but 8 – 18 March 2002, MA-02-18A-16 (NMSA); 4♂ 1♀ same data but 8 – 18 April 2002, MA-02-18A-19 (CAS); 1♀ same data but 30 Oct – 14 Nov 2002, MA-02-18A-39 (CAS); 2♂ same data but 6 – 17 March 2003, MA-02-18A-48 (CAS); 1♀ same data but 27 April – 5 May 2003, MA-02-18A-53 (CAS); 1♂ same data but 29 June – 6 July 2003, MA-02-18A-60 (CAS); 2♂ same data but 21 – 31 August 2003, MA-02-18A-66 (CAS); 1♂ 2♀ same data but 21 Sept – 2 Oct 2003, MA-02-18A-69 (CAS); 2♂ 1♀ same data but 12 – 23 Nov 2003, MA-02-18A-74 (CAS); 1♂ 'Madagascar, Tulear / Province, Beza Mahafaly / Reserve, Parcelle 1 near / research station / 23 March – 2 April 2002, 23°41.19'S 44°35.46'E [23°41'11"S 44°35'28"E, *c.* 155 m] / California Acad of Sciences / coll. R. Harin'Hala, malaise / trap in dry deciduous forest / elev 165m, MA-0214A-54' (CAS); 1♂ same data but 21 – 29 April 2002, MA-0214A-57 (CAS); 1♂ 1♀ same data but 29 April – 19 May 2002, MA-0214A-24 (NMSA); 1♂ 2♀ same data but 20 – 24 December 2002, MA-0214A-45 (CAS); 1♀ same data but 28 June – 7 July 2002, MA-0214A-28 (CAS); 1♀ same data but 20 – 28 October 2002, MA-0214A-35 (CAS); 1♀ 'Madagascar, Tulear Prov. Beza / Mahafaly Reserve, malaise in dry / deciduous gallery forest / 7 – 14.iii.02 / R. Harin'Hala, M.E. Irwin, 165m / 23°41.19'S 44°35.46'E, MG 14A-19' (CAS); 1♂ 'Madagascar, Tulear Prov. / Andohahela N.P. Tsimelahy /Parc. 11, 9 – 16 Dec 2002, 180m / 24°56.21'S 46°37.60'E [24°56'13"S 46°37'36"E, *c.* 190 m], CAS / Irwin, Parker, Harin'Hala colls / M.t. transit. For. MA-02-20-16' (CAS).

Distribution, phenology and biology: Distribution as in Fig. 35, known mainly from the Mikea Forest and Beza Mahafaly Reserve in the generally drier Tulear Province of Madagascar. Habitat described as 'dry deciduous gallery forest' and collected at relatively low altitudes (30–190 m). Collected in virtually every month of the year (no records for January or February) (Table 1). No prey records are available.

Notiolaphria miltothorax sp. n.

Figs 8, 16, 17, 23, 35

Etymology: The name is derived from the Greek words *miltos* (red, red earth) and thorax, descriptive of the coloration of both the thorax (mesonotum and pleura) and legs (parts of both femora and tibiae).

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Description: Based on all examined material. A large, fairly colourful species (Fig. 23) displaying little sexual dimorphism.

Head: Black, gold-silver pruinose, black, yellow and white setose. Antenna: Black, scape with strong yellow macrosetae and many fine white setae. Pedicel with few black setae distally. Segmental ratios (scape as 1) — 1 : 0.5 : 2.5. Style absent, postpedicel tipped with a pit-enclosed spine-like sensory element. Face moderately gibbose in ventral half, black, uniformly gold-silver pruinose. Mystax confined to gibbosity, with long black (many) and white (few) macrosetae and two dorsolaterally situated groups of silver scale-like setae. Dorsal region of face with many fine white setae. Frons black, but masked by strong silver pruinescence. Strongly white setose laterally adjacent to eye margin. Ocellar tubercle with a pair of long, pale yellow macrosetae and a few fine setae. Vertex black, but masked by gold-silver pruinescence. Postocular (occipital) region black, entirely silver pruinose, yellow setose dorsally, fine white setose ventrally. Palpi and proboscis dark red-brown to black, white setose.

Thorax: Red-brown and black, with extensive areas of gold-silver pruinescence, black, orange and white setose. Pronotum black. Mesonotum predominantly red-brown, gold-silver pruinose, with shiny, black, apruinose areas (anterior half of postpronotal lobe; medial band extending from anterior margin to just before posterior margin; a pair of suboval areas situated laterally and separated by transverse suture). Acrostichals fine black and white, poorly developed. Dorsocentrals black and white, poorly developed, extending both anterior and posterior of transverse suture. Mesonotal macrosetae: Black and orange, 1–2 npl, 2 spal, 2 pal. Scutellum red-brown, entirely gold-silver pruinose, disc fine white setose, *c.* 8–10 long yellow (a few may be black) apical macrosetae. Pleura: Mostly red-brown dorsally with dark red-brown to black ventral parts, almost entirely gold-silver pruinose (weak on ventral part of anepisternum), yellow and white setose. Anepisternum with one yellow macroseta posteriorly. Katatergal macrosetae long, white. Anatergites dark red-brown to black, uniformly silver pruinose, asetose. Legs: Coxae black, silver pruinose, fine white setose. Trochanters red-brown, apruinose, fine white setose. Femora somewhat inflated, F1 entirely black (may have a tiny dorsoproximal red-brown area), F2 & 3 extensively black but with a large red-brown area dorsoproximally, macrosetae orange or black, sine setae mostly white. Tibiae extensively red-brown except for broad black distal region, black and white setose. Tarsi shiny blue-black, black setose. Claws black, pulvilli and empodia well developed. Wings (only 2♂ 2♀ measured as others have excessively twisted wings): ♂ holotype 9.9×3.4 mm, ♂ paratype 9.5×2.8 mm, ♀ paratypes 9.6×2.8 mm 10.1×3.1 mm. Veins red-brown, cell r_5 narrowly open, closed on margin or closed and short-stalked, m_3 and cua closed and stalked, membrane slightly yellow stained, transparent, microtrichia almost entirely absent from proximal two-thirds of wing and evenly distributed over distal one-third (Fig. 8). Halter cream with slightly darker base.

Abdomen: Shiny dark red-brown to blue-black, apruinose except for terga that have lateral margins silver pruinose and sterna that are entirely but weakly silver pruinose. Male T1 with 2–3 laterally situated orange macrosetae, T2–5 each with 1–2 orange macrosetae laterally; ♀ T1 with 1–2 orange macrosetae laterally, T2 with 1–2 macrosetae, T3 with 1 macroseta (T4–5 lacking macrosetae). Fine setae white, short on terga, long on sterna.

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Male terminalia (Figs 16–17): Rotated through 90°. Epandrium as a single shield-like plate, showing no indication of bifurcation distally, but tapering slightly to broad apex. Proctiger well-developed jutting out beyond distal end of epandrium, ventral lobes a little better developed than dorsal lobes. Gonocoxites composed of external and internal lobes. External lobe fairly well developed, broad proximally (as broad as epandrium in lateral view), tapering gradually to about two-thirds of length before tapering more rapidly to rounded apex in lateral view. Internal lobe relatively weakly developed, laterally compressed, parallel-sided, jutting out distally well beyond level achieved by external lobe, clearly dorsally hooked terminally. Gonostylus relatively poorly developed, projecting to about the same distance as internal lobe of gonocoxite, laterally compressed, almost parallel-sided for much of length, somewhat pointed distally. Hypandrium, greatly reduced, wider than long in ventral view, with obtusely rounded apical lobe. Aedeagus of moderate length with three terminal prongs.

Female terminalia: Simple, slightly telescopic, setaceous and lacking spines.

Holotype: MADAGASCAR: ♂ 'Madagascar, Tulear / Prov. Zombitse National / Park, near Angap office / 22°53.19'S 44°41.53'E / 9 – 19 May 2002 / California Acad of Sciences / coll, R. Harin'Hala, malaise / trap. Deciduous spiny forest / elev 840m, MA 02-13A-28' (CAS).

Paratypes: MADAGASCAR: 1♂ 'Madagascar, Sofia Region / Port-Berger Distric, 20km N / Ambovomamy, Elev. 86m, ex / malaise trap, 16–18.vii.2008, 15°27.07'S 47°36.80'E [15°27'09"S 47°36'48"E, *c.* 70 m], colls. M. Irwin, R. Harin'Hala MG-33-56' (CAS); 1♀ 'Madagascar, Menabe Region / Morondava Dist, 7km E Beroboka / Antsarongaza forest. Elev 45m. Ex / malaise trap, 17 – 25.xi.2008 / 19°58.65'S 44°39.92'E' [19°58'39"S 44°39'55"E, *c.* 55 m], colls M. / Irwin, R. Harin'Hala MG-45B-47' (CAS); 1♂ 1♀ 'Madagascar, Tulear Prov./ Zombitse N.P., nr. Angap / office, 22°53.19'S 44°41.53'E [22°53'19"S 44°41'32"E, *c.* 810 m] / 840m, 27 March – 3 April 2002 / CAS, coll, R. Harin'Hala, mal. / tr. spiny for. [spiny forest], MA 02-13A-22' (NMSA); 1♀ same data but 3 – 13 July 2002, MA 02-13A-34' (CAS).

Distribution, phenology and biology: Distribution confined to three widely separated localities down the western side of Madagascar (Fig. 35), the Zombitse material being collected in deciduous spiny forest. The species has been collected during the months of March–May, July and November (Table 1). No prey records are available.

Notiolaphria rufitibia Oldroyd, 1960, **comb. n.**

Figs 9, 21, 36

Laphria rufitibia Oldroyd, 1960: 284. (fig. 14 ♂ genitalia).

Etymology: The name was derived from the Latin words *rufus* (red, reddish) and *tibia* (shinbone), being descriptive of the coloration of the tibiae.

Redescription: Based on available material.

Head: Black, silver and gold pruinose, black and white setose. Antenna: Black, scape and pedicel dorsally black setose, ventrally mixed black and white setose. Segmental ratios (scape as 1) — 1 : 0.8 : 2.6. Style absent, postpedicel tipped with a pit-enclosed spine-like sensory element. Face black, hardly gibbose, fine gold pruinose Mystax confined to weakly gibbose ventral half of face, white with a pair of dorsolaterally situated groups of silver, glistening, scale-like setae. Dorsal region of face with 1 pair of small white setae. Frons black, gold-silver pruinose with fine white setae laterally adjacent to eye margin. Ocellar tubercle with a pair of long, strong, black macrosetae. Vertex black, gold pruinose. Postocular (occipital) region black, silver pruinose, black and white setose dorsally, fine white setose ventrally. Palpi and proboscis dark red-brown to black, white setose.

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Thorax: Black, with areas of silver and gold-silver pruinescence, black and white setose. Pronotum black. Mesonotum black, extensively shiny apruinose, but with areas of fine gold-silver pruinescence (dorsomedially on postpronotal lobes, laterally, posteriorly and 2 spots on transverse suture). Acrostichals black, poorly developed. Dorsocentrals tiny black, poorly developed, extending both anterior and posterior of transverse suture. Mesonotal macrosetae: Black, 1 npl, 2 spal, 2 pal. Scutellum shiny blue-black, apruinose, disc with few isolated tiny black setae, 4 long black apical macrosetae. Pleura: Black, entirely silver pruinose, black and white setose. Anepisternum with two black macrosetae posteriorly. Katatergal macrosetae entirely white. Anatergites uniformly silver pruinose, asetose. Legs (Fig. 21): Coxae black, silver pruinose, white setose. Trochanters shiny dark red-brown to black, apruinose, white setose. Femora slightly inflated, black, black and pale yellow setose. Tibiae entirely orange, pale yellow setose, except for a few black setae dorsodistally. Tarsi orange to brown, macrosetae black and yellowish, fine setae mostly yellowish, but some black dorsally. Claws black, pulvilli and empodia well developed. Wings: ♂ 7.4×2.8 mm. Veins red-brown, cell r_5 open, m_3 and cua closed and stalked, membrane unstained, transparent, microtrichia largely absent from proximal half of wing and extensive in distal half (Fig. 9). Halter pale yellow to orange.

Abdomen: Terga shiny blue-black, T2–5 with silver pruinose spots posterolaterally, setae fine, short dorsomedially, loner white laterally, discal macrosetae yellow-white — T1 with 3, T2 with 2, T3 and T4 with 1. Sterna red-brown, uniformly fine silver pruinose, longish white setose.

Male terminalia: The terminalia have been cleared, dissected and stuck onto a strip of clear cellulose making it difficult to illustrate details.

Material examined: MADAGASCAR: 1♀ 'Para / type', 'Coll. Mus. Congo / Madagascar: / Ahitsitondrona [? = Ambohitsitondroinan *c.* 15°34'32"S 50°00'41"E, *c.* 750 m] xi-1949 / J. Vadon', '*Laphria* / *rufitibia* Oldroyd / det. H. Oldroyd 1956' (BMNH); 1♂ 'Madagascar: Tam. / Foulpointe [*c*. 17°41'S 49°30'E, *c.* 10 m] / 12.xi.1993 / marais á Pandanus / bac j. A. Pauly' (GULB).

Other material: Oldroyd (1960) listed three type specimens. as follows: 'Madagascar Est: Maroantsetra, Ambohitsitondrona [see possible details above] (Vadon), ♂ holotype; 1♂ 1♀ paratypes. Novembre'. The ♂ holotype is housed in the MNHN, the ♀ paratype (listed above), is in BMNH while the ♂ paratype is in MRAC and is labelled 'Madagascar: Ahitsitondrona [? = Ambohitsitondrona] / XI-1949 / J. Vadon'. Photographs of the holotype sent to me by Dr Eric Fisher suggests that the male seen by me is conspecific.

Distribution, phenology and biology: Known only from two localities (Fig. 36). Probably inhabits forested areas close to the sea or marshland (ie. 'marais'). All recorded specimens were collected in November (Table 1). No prey records are known.

Notiolaphria stuckenbergi Oldroyd, 1960, **comb. n.**

Figs 10, 18, 19, 36

Laphria stuckenbergi Oldroyd, 1960: 285; 1980: 351 (catalogue).

Etymology: The species was named for the late Dr Brian Stuckenberg, collector of the type specimens.

Redescription: Based on material examined. No apparent sexual dimorphism exists.

Head: Black, silver and gold-silver pruinose, black and white setose. Antenna: Black, scape black and white setose, pedicel black setose. Segmental ratios (scape as 1) — 1 : 0.6 : 2.3. Style absent, postpedicel tipped with a pit-enclosed spine-like sensory element. Face black, strongly gibbose, gold-silver pruinose. Mystax mainly long black

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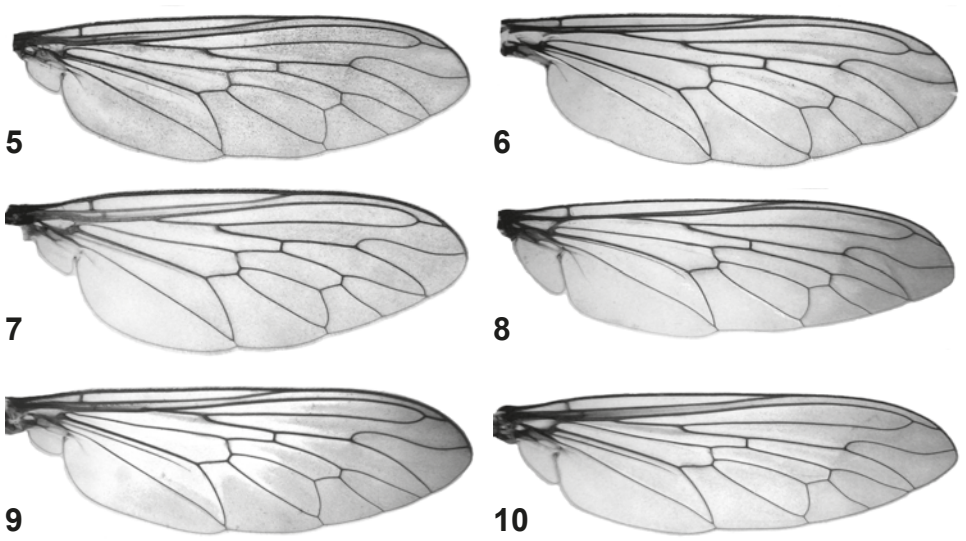
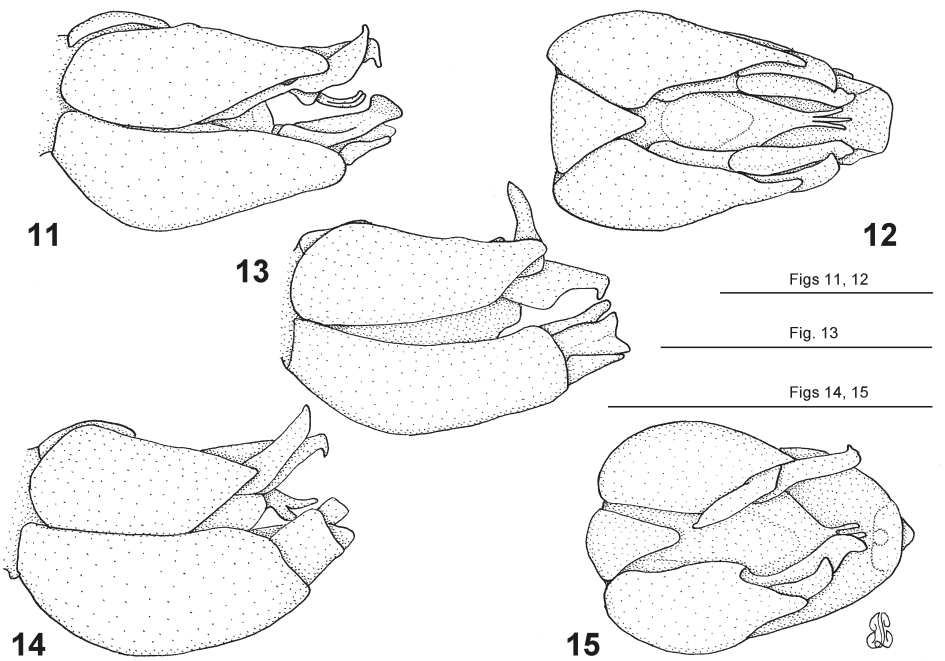


Figs 5–10. *Notiolaphria* species, wings. (5) *No. coerulescens* (Macquart, 1834) (Mauritius, Roche Bois); (6) *No. dimidiatifemur* (Oldroyd, 1960) (Madagascar, 7km W Ranomafana National Park); (7) *No. microtheres* sp. n. (Madagascar, Mikea Forest); (8) *No. miltothorax* sp. n. (Madagascar, 7km E Beroboka, Antsarongaza forest); (9) *No. rufitibia* (Oldroyd, 1960) (Madagascar, Foulpointe); (10) *No. stuckenbergi* (Oldroyd, 1960) (Madagascar, Zombitse National Park).



Figs 11–15. *Notiolaphria* male terminalia (*note*: rotated through 90°). (11, 12) *No. coerulescens* (Macquart, 1834) (Madagascar, Lambomakakandro): (11) lateral and (12) ventral views; (13) *No. dimidiatifemur* (Oldroyd, 1960) (Madagascar, Zombitse Nature Reserve): lateral view; (14, 15) *No. microtheres* sp. n. (Madagascar, Mikea Forest): (14) lateral and (15) ventral views. Scale bars = 1 mm.

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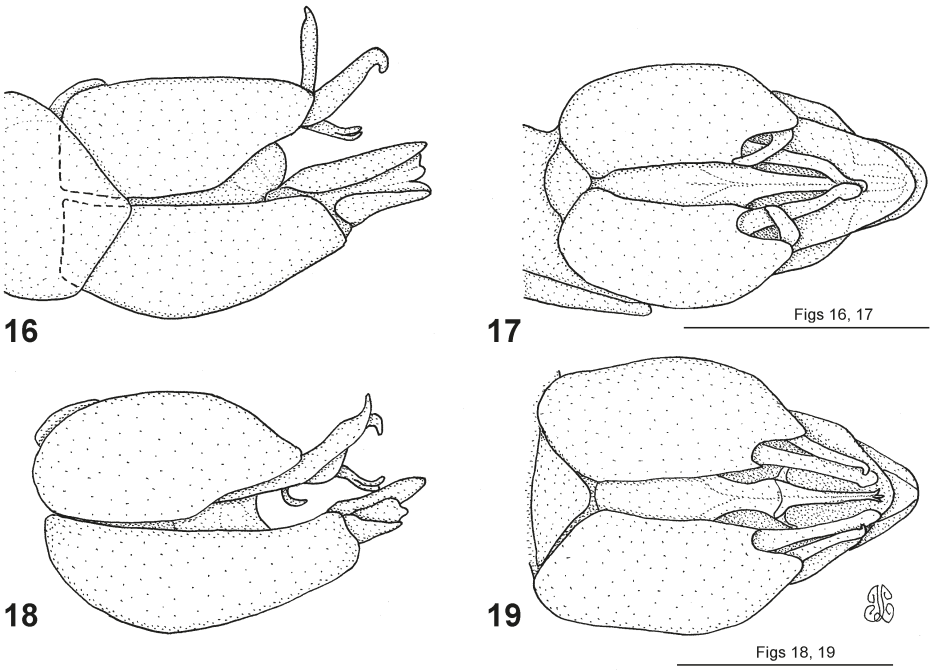

Figs 16–19. *Notiolaphria* male terminalia (*note*: rotated through 90°). (16, 17) *No. miltothorax* sp. n. (Madagascar, Ambovomany): (16) lateral and (17) ventral views. (18, 19) *No. stuckenbergi* (Oldroyd, 1960) (Madagascar, Zombitse National Park): (18) lateral and (19) ventral. Scale bars = 1 mm.

(dorsally) and white (ventrally), with a pair of dorsolaterally situated groups of silver, glistening, scale-like setae. Dorsal region of face, between gibbosity and antennal sockets, with few moderately long fine white (may be few black) setae. Frons black, dull silver pruinose with moderately long black setae laterally adjacent to eye margin. Ocellar tubercle with a pair of long, strong, black macrosetae. Vertex black, silver pruinose. Postocular (occipital) region black, silver pruinose, black setose dorsally, fine white setose ventrally. Palpi and proboscis dark red-brown to black, white setose.

Thorax: Black, with areas of silver pruinescence, black, pale yellow and white setose. Pronotum black. Mesonotum black, extensively shiny apruinose, but with areas of fine silver pruinescence (lateral and posterior margins; dorsomedial parts of postpronotal lobes; lateral parts of transverse suture). Acrostichals and dorsocentrals, poorly developed, black and white. Mesonotal macrosetae: Black, 1–3 npl, 2 spal, 2–3 pal. Scutellum black, disc entirely dull silver pruinose, fine white setose, 6–8 long black apical macrosetae. Pleura: Black, entirely silver pruinose, pale yellow or black and white setose. Anepisternum with few pale yellow or black macrosetae posteriorly. Katatergal macrosetae long white (may also have one black seta dorsally). Anatergites uniformly silver pruinose, asetose. Legs: Coxae black, silver pruinose, fine white setose. Trochanters shiny black or dark red-brown, apruinose, white setose. Femora somewhat inflated, uniformly black or with slight red-brown region proximally, yellow and black setose. Tibiae and tarsi shiny black or dark red-brown (hind tibiae may be partly orange-brown proximally), macrosetae mostly black, fine setae mostly long white.

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Figs 20, 21. *Notiolaphria* species, metathoracic legs: (20) *No. dimidiatifemur* (Oldroyd, 1960) ♀, (Madagascar, 7 km W Ranomafana); (21) *No. rifitibia* (Oldroyd, 1960) ♂, (Madagascar, Foulpointe).

Claws black, pulvilli and empodia well developed. Wings: ♂ 7.4–11.5×2.3–3.9 mm, ♀ 7.8×2.6 mm. Veins red-brown, cell r_5 narrowly open or more widely open on margin, m_3 and cua closed and stalked, membrane unstained, transparent, microtrichia largely absent from proximal half of wing and extensive in distal half (Fig. 10). Halter cream with slightly darker base.

Abdomen: Shiny black (terga) and dark red-brown (sterna), apruinose except for terga that have entire lateral parts silver pruinescence and sterna that are uniformly weakly pruinose. T1–2 with 2–4 laterally situated yellowish macrosetae, T2 with 2 discal macrosetae, T3–5 (♂) or T3–4 (♀) with 1–3 yellowish macrosetae, fine setae short, black dorsomedially on terga, longish white laterally on sterna and laterally on terga.

Male terminalia (Figs 18–19): Rotated through 90°. Epandrium as a single shield-like plate, showing no indication of bifurcation distally, but tapering slightly to broad apex. Proctiger well-developed jutting out beyond distal end of epandrium, ventral lobes better developed than dorsal lobes. Gonocoxites composed of external and internal lobes. External lobe fairly robust, tapering gradually to acutely rounded apex in lateral view.

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Fig. 22. *Notiolaphria microtheres* sp. n. ♂, (Madagascar, Mikea Forest).

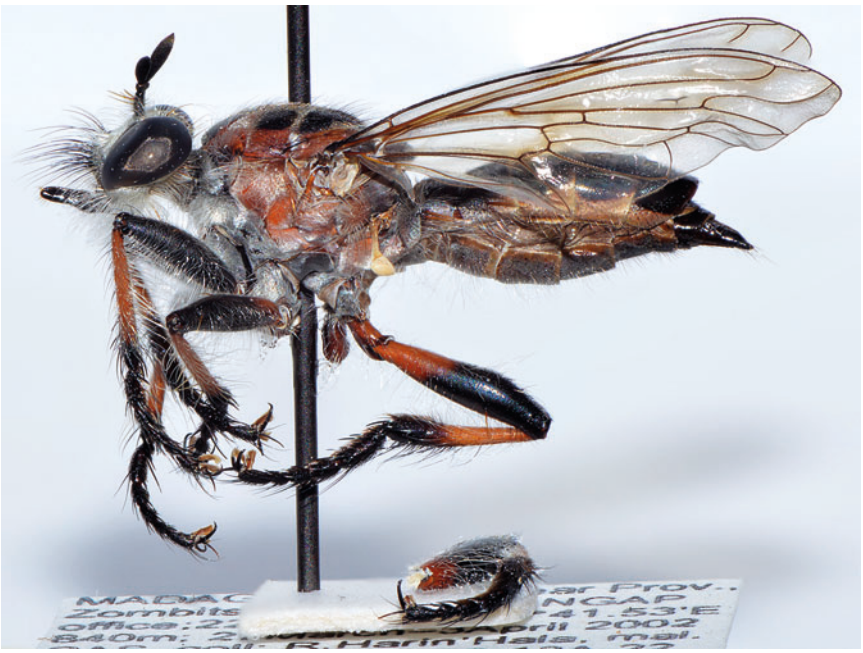

Fig. 23. *Notiolaphria miltothorax* sp. n. ♀, (Madagascar, Zombitse National Park).

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Internal lobe relatively weakly developed, laterally compressed, somewhat sigmoid in lateral view, jutting out distally well beyond level achieved by external lobe, clearly dorsally hooked terminally. Gonostylus projecting to about the same level as achieved by internal lobe of gonocoxite, laterally compressed, almost parallel-sided for much of length, somewhat ventrally curved distally. Hypandrium, poorly developed, wider than long in ventral view, with broadly rounded apical lobe. Aedeagus of moderate length with three terminal prongs and dorsally directed process subapically.

Female terminalia: Simple, slightly telescopic, setaceous and lacking spines.

Material examined: MADAGASCAR: 1♀ 'Madagascar: Tam. [Toamasina] / Morarano [*c*. 19°26'S 47°29'E, *c.* 1550 m] - Chrome / 10 – 20.iv.1992, A. Pauly col.' (GULB); 1♂ 'Madagascar, Tulear Prov. / Zombitse N.P. nr national / road 22°50.43'S 44°43.87'E / 825m, 14 – 21 Feb 2002, CAS / coll, R. Harin'Hala, mal. Trap / spiny forest MA 02-13B-16' (CAS); 1♂ 'Madagascar, Tulear Prov./ Zombitse N.P., nr. Angap / office, 22°53.19'S 44°41.53'E [22°53'19"S 44°41'32"E, *c.* 810 m] / 840m, 27 March – 3 April 2002 / CAS, coll, R. Harin'Hala, mal. / tr. spiny for., MA 02-13A-22' (NMSA); 1♀ 'Madagascar, Tulear Prov./ Zombitse N.P., nr. Angap / office, 22°53.19'S 44°41.53'E [22°53'19"S 44°41'32"E, *c.* 810 m] / 840m, 3 – 13 July 2002 / CAS, coll, R. Harin'Hala, mal. / tr. spiny for., MA 02-13A-34' (CAS).

Additional material: The following specimens were studied and confirmed as *stuckenbergi* by Dr Eric Fisher. MADAGASCAR: 1♀ 'Madagascar, Tulear Province / Zombitse National Park / near national road, elev. 825 m / 22°50.43'S 44°43.87'E / ex. malaise trap in deciduous spiny / forest, 13–20.iii.2002 / California Acad of Sciences / coll: R. Harin'Hala, MA-02-13B-20' (CAS); 1♀ 'Madagascar, Tulear Province / Zombitse National Park; near ANGAP / office, 22°53.19'S 44°41.53'E / el. 840m, ex. Malaise trap in / deciduous spiny forest / 31.x. – 16.xi.2002, California Acad of / Sciences, coll: R. Harin'Hala / MA-02-13A-43' (CAS); 1♀ 'Madagascar, Tulear Prov. / Andohahela Natl Park / Ihazofatsy Parcelle III, el. 80 m / 24°49.85'S 46°32.17'E / ex. malaise trap in dry spiny forest / 19.xii.2003 – 3.i.2004 / California Acad of Sciences / coll: M. Irwin, F. Parker, R. Harin'Hala / MA-02-21-43' (CAS);

Other material: Oldroyd (1960) listed only a unique ♂ holotype housed in the MNHN. Data supplied are 'Madagascar Est: Ifanadiana [21°18'00"S 47°38'00"E, *c.* 435 m], Ranomafana (B. Stuckenberg)', 'Décembre'.

Remarks: Having compared the examined specimens with photographs of the holotype I am confident that the new material has been correctly identified.

Distribution, phenology and biology: Known only from four fairly widely separated areas (Fig. 36). The Zombitse material was collected in spiny forest and so the species appears to inhabit fairly dry places. Known material has been collected between 810–1550 m altitude during the months of January, March, April, July, October, November and December (Table 1), and so the species is apparently active in the adult stage throughout much of the year. No prey records are known.

Key to species of *Notiolaphria*

1 Mesonotum and thoracic pleura extensively pale brownish red (Fig. 23) .... ***miltothorax*** sp. n.
– Mesonotum and thoracic pleura uniformly dark red-brown to black (Fig. 3) 2

2 Femora extensively brownish orange (Fig. 20) (distal and proximal ends may be dark red-brown to black) ..... ***dimidiatifemur*** Oldroyd, 1960
– Femora extensively to entirely dark red-brown to black 3

3 Tibiae and tarsi extensively to entirely brownish yellow (Fig. 21) .... ***rufitibia*** Oldroyd, 1960
– Tibiae and tarsi extensively to entirely dark red-brown to black 4

4 Male with mystax entirely yellow; scutellar macrosetae yellow; mesonotum and T1–4 with obvious fine golden yellow setae; a small species (wing length < 6 mm) (Fig. 22) ..... ***microtheres*** sp. n.

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– Male with mystax black and white; scutellar macrosetae black; mesonotum and T1–4 without obvious fine golden yellow setae; usually larger species (wing length commonly > 6 mm) 5

5 Facial gibbosity strongly protuberant; scutellum extensively pruinose; femora strongly developed; presently confined to Madagascar ..... ***stuckenbergi*** Oldroyd, 1960

– Facial gibbosity weakly to moderately protuberant; scutellum extensively apruinose; femora weakly to moderately developed; widespread on Afrotropical Indian Ocean Islands and the African mainland .....***coerulescens*** (Macquart, 1834)

Genus ***Ericomyia*** gen. n.

Etymology: Named in honour of Dr Eric Martin Fisher whose knowledge, specimens and photographs contributed greatly toward conclusions reached during this review.

Type species: *Laphria atomentosa* (Oldroyd, 1960), by present designation and monotypy.

Diagnosis: Medium-sized (wing length between 5–10 mm) metallic blue-black flies (Fig. 24). *Head*: Antenna with small but distinct terminal style with obliquely positioned terminal pit enclosing a spine-like sensory element. Scape and pedicel subequal in length. Frons approximately same width as face at level of insertion of antennae, vertex hardly if at all diverging. Anterior tentorial pits small, slit-like, inconspicuous ventrally. Face narrower than width of one eye in anterior view. Facial gibbosity moderately developed. Mystax composed of strong macrosetae largely restricted to ventral facial margin (none are dorsoventrally flattened and scale-like). *Thorax*: Prosternum fused to proepisternum. Macrosetae moderately well developed, fine setulae tiny. Anepisternum without obvious strong macroseta on supero-posterior angle. Postmetacoxal area membranous. *Legs*: Prothoracic tibia without an apical spur. Pulvilli well-developed. *Wings*: R2+3 ending in C, cell r_1 thus open on wing margin. Cell r_5 open, m_3 and cua closed and stalked. Alula present. *Abdomen*: T2 wider than long; S1 confined beneath T1. Macrosetae moderately well developed, fine setulae generally poorly developed. Male epandrium deeply incised medially resulting in a pair of widely separated lobes. Female terminalia simple, without acanthophorite spines.

Ericomyia atomentosa (Oldroyd, 1960), **comb. n.**

Figs 24–33, 37

Laphria atomentosa Oldroyd, 1960: 281–2 (fig. 11 ♂ genitalia); 1980: 351 (catalogue).

Redescription: Based on material examined. Little sexual dimorphism exists.

Head (Fig. 25): Black, silver and gold pruinose, black and white setose. Antenna (Fig. 26): Black, scape and pedicel entirely black setose. Segmental ratios (scape as 1) — 1 : 1.1 : 2.3 : 0.2. Pedicel slightly longer than scape, postpedicel a little longer than scape and pedicel combined, tipped with small but clearly defined style. Style scoop-like with pit-enclosed spine-like sensory element visible only in dorsal view. Face black, but colour somewhat masked by strong shiny gold pruinescence, ventrally moderately protruding. Mystax long, black, confined to gibbosity (Fig. 25). Region between mystax and antennal sockets with short black setae arranged in an inverted V pattern (glistening scale like setae as found in *Notiolaphria* completely wanting). Frons black, dull gold pruinose

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Fig. 24. *Ericomyia atomentosa* (Oldroyd, 1960) ♂, (Madagascar, 7 km W Ranomafana).

with a row of small black setae laterally adjacent to eye margin. Ocellar tubercle well developed, with two pairs of moderately developed, black macrosetae. Vertex black, red-gold pruinose. Postocular (occipital) region black, strongly silver pruinose, especially immediately posterior of eyes, strongly black setose dorsally, fine white setose ventrally. Palpi cylindrical, black, while setose. Proboscis subtriangular in cross-section, dark red-brown to black, white setose.

Thorax: Dark red-brown to black, with areas of silver and gold pruinescence, black, white and pale yellow setose. Pronotum black, pale yellow setose. Mesonotum metallic blue-black, almost entirely shiny apruinose (except for small medial areas adjacent to postpronotal lobes and very narrow strips immediately dorsal to wing insertions), fine setulae mostly black (those found on posterior parts of postpronotal lobes appear reddish, but colour may be partly reflective). Acrostichals minute to absent. Dorsocentrals black, poorly developed, extending both anterior and posterior of transverse suture. Mesonotal macrosetae: Black, moderately developed, 3 npl, 5 spal, 1 pal. Scutellum shiny blue-black, entirely apruinose, disc with isolated small black setae, *c.* 6 longish, thin, black apical macrosetae (accompanied by a few smaller setae). Pleura: Black, extensively silver or gold (anterodorsal region of anepisternum) pruinose (except for anteroventral part of anepisternum and region where proepimeron and katepisternum abut, which is entirely shiny apruinose), black and white setose. Anepisternum pale yellow setose except

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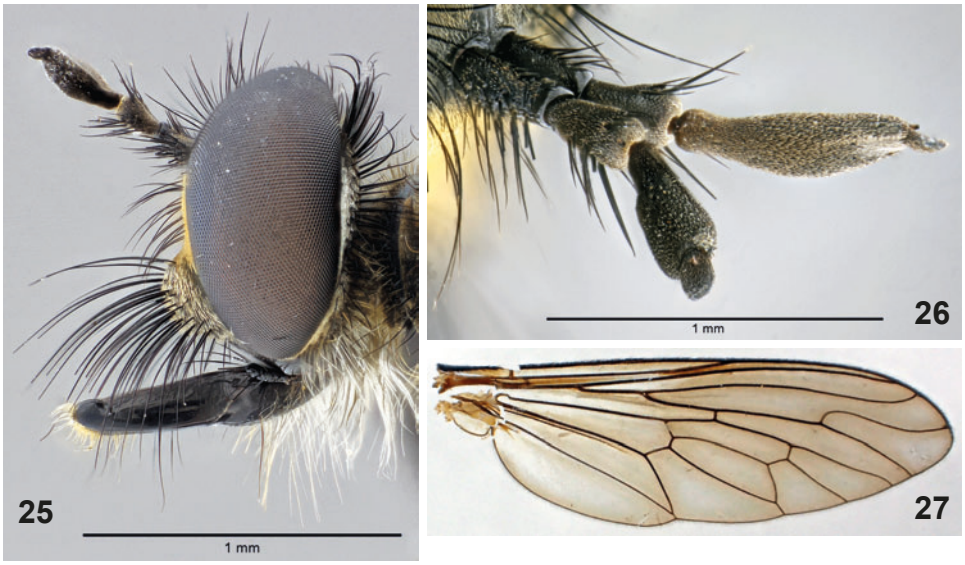

Figs. 25–27. *Ericomyia atomentosa* (Oldroyd, 1960): (25) ♂ head, lateral view (Ranomafana); (26) ♂ antennae (Ranomafana); (27) ♀ wing (Ranomafana). Figs 25 and 26 courtesy Eric Fisher.

for a few weakly developed black setae posteriorly (no clearly defined macrosetae). Katatergal macrosetae almost entirely black (1 white ventrally). Anatergites uniformly, strongly silver pruinose, asetose.

Legs: Coxae black, strongly silver pruinose, white setose. Trochanters shiny dark red-brown to black, apruinose, fine white setose. Femora, tibiae and tarsi all dark red-brown to black. Macrosetae of legs black, setulae black and pale yellow (entirely black on tarsi). Claws (black), pulvilli (pale yellow) and empodia well developed.

Wings (Fig. 27): ♂ 6.3–6.4×2.4 mm, ♀ 7.8×2.8 mm. Veins dark red-brown, cell r_5 open, m_3 and cua closed and stalked, membrane unstained, transparent, microtrichial cover extensive, except along longitudinal veins in basal cells. Halter brown-red.

Abdomen: Terga metallic blue-black, T1 dull silver pruinose and closely associated with T2 (may be fused together), T3–7 well-developed, wider than long, extensively shiny apruinose except for narrow posterolateral margins. T8 highly reduced and withdrawn under T7. Macrosetae weakly developed on T2 and T3 (possibly T3 of ♀), setae dorsally minute, black, laterally longish white. S1–2 closely associated, S3–7 moderately well developed, red-brown, uniformly fine dull silver pruinose, longish white setose, S8 highly reduced, membranous and poorly sclerotized.

Male terminalia (Figs 28–30): Rotated through at least 90°, largely withdrawn beneath T7. Epandrium deeply incised medially resulting in a pair of long epandrial lobes which converge distally. Epandrium broad proximally in lateral view, tapering to a narrowly rounded distal end. Proctiger well-developed, ventral lobes jutting out well beyond dorsal lobes which are clearly separated by an extensive membranous area. Gonocoxites composed of external and internal lobes. External lobe suboval in lateral view, a little

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longer than deep. Internal lobe well-developed slightly sigmoid in shape with upturned distal end. Gonostylus arising from base of internal lobe of gonocoxite, Y-shaped. Upper lobes of gonostylus curved and lying close to epandrial lobes, lower lobes well developed terminating at level of aedeagal tip. Hypandrium, poorly developed, approximately twice as long as broad in ventral view, with broadly rounded medial lobe. Aedeagal sheath broad both in lateral and ventral view, with small bifurcate terminal prongs.

Female terminalia (Figs 31–32): Simple, withdrawn under T7, setae weak, black, spines (acanthophorites) absent. T8 & S8 reduced to narrow rings. T9 about twice as wide as long, equipped with longish black setae laterally. S9 (subgenital plate) U-shaped. Proctiger poorly developed, dorsal lobes (cerci) weak, ventral lobes rounded, weakly defined posteriorly. Egg spherical *c.* 0.5 mm in diameter.

Material examined: MADAGASCAR: 1♂ 'Malaise traps / primary / rainforest', 'Madagascar: Tamatave / Torotorofotsy, Andasibe / (Perinet), 22km NW / 18°46.25'S 48°25.93'E / 23–25.x.2004, 960m. / A.H. Kirk-Spriggs & R. Harin'Hala' (BMSA); 2♂ 1♀ 'Madagascar: Prov. / Fianarantsoa, 7 km / W Ranomafana [National Park 21°19'S 47°23'E, *c.* 1515 m], 1100m / 1 – 7 November 1988 / W. E. Steiner', 'USNMENT / [barcode] / [catalogue number - ♂ 00915297, 00915299, ♀ 00915298]' (USNM, NMSA 1♂).

Type material: Emmanual Delfosse (MNHN) kindly photographed Oldroyd's (1960) unique holotype for me and provided details of all labels as follows: 1♂ holotype 'Coll. Mus. Congo / Madagascar: / Ahitsitondrona XI-1949 / J. Vadon', '*Laphria* / *atomentosa* Oldroyd / det. H. Oldroyd 1956 / Holotype', 'Type' [circular with red border] (MNHN). The genitalia, mounted in canada balsam on a cellulose strip and accompanying the specimen, were also photographed. Although I have not handled the holotype personally there is no doubt that material studied by me is conspecific.

Type locality: There is no certainty surrounding the type locality. While 'Ahitsitondrona' appears on the label Oldroyd (1960) records the locality as 'Ambohitsitondrona'. Both these names do not appear in gazetteers consulted — although Dr Eric Fisher (pers. comm.) has informed me that there is apparently a small mountain peak in Mahajanga Province that bears the name 'Ambohitsitondrona' [15°15'17"S 48°35'25"E, *c.* 1350 m]. Coordinates are also available for a place called 'Ambohitsitondroinan' [15°34'32"S 50°00'41"E, *c.* 740 m] in Toamasina Province, which may also be a possibility as it occurs within the Eastern Evergreen Forest biome along with other known localities. For the present, there is no certainty regarding the precise location of the type locality.

Additional material: Dr Fisher informs me that he has extracted the following conspecific material from samples available to him. He also sent digital images which fully substantiate identification as *E. atomentosa*. MADAGASCAR: 1♂ 'Madagascar Toamagina Prov / Parc Nacional Andasibe (Perinet) / 19km E Moramanga [18°57'S 48°14'E, *c.* 960 m], 1000m / in forest, colls: E.I. Schlinger, / M.E. Irwin, & H.H. Rasolondalao / MEI.99-MA-3 24-xii-1999' (CAS); 1♀ 'Madagascar: Vatovavy / Fitovinany Region, Ifanadiana / District, Ranomafana Nat'l Pk, / Vohiparara bridge, 17 km W of / Ranomafana, ex: malaise trap.', 'elev. 1109m, 1–9.ix.2002, / 21°13.57'S, 47°22.19'E, / colls: M. Irwin & R. Harin'Hala. / MA-02-D9A-40' (CAS); 1♀ 'Madagascar Fianarantsoa / Prov. Parc Nacional Ranomafana / Bell Vue Trail, tropical forest / 21°15.6'S 47°25.6'E [21°15'36"S 47°25'36"E, *c.* 935 m] 1000m / M.E. Irwin and E.I. Schlinger / MEI 99-MA-7 21.xii.1999' (CAS); 1♀ 'Madagascar Fianarantsoa Prov.; / Ranomafana Natl Park; / Belle Vue at Talatakely; el 1020m; / 21°15.99'S 47°25.21'E; / ex. Malaise in secondary tropical forest; 8–15.xi.2001; / California Acad of Sciences; coll: M. Irwin, R. Harin'Hala / MA-02-09C-02' (CAS); 1♀ 'Madagascar Fianarantsoa Prov. / Belle Vue, 1.2 km S Ranomafana / Nat'l Park entrance, malaise / in rainforest, 15/25.vii.2002, / 1095m, R Harin'Hala, ME Irwin, / 21°15.99'S, 47°25.21'E, MG 9C 35' (EMFC).

In addition to the above material Dr Fisher informs me that he has six female specimens that are atypical and may represent two additional species, or perhaps colour variants of *atomentosa*. These atypical specimens, listed below, do not have entirely blackish tibiae, and body setae are not almost entirely black. In the absence of males, I refrain from either including these specimens as *atomentosa* or describing them as new species, but plot their localities (Fig. 37) to show the clearly allopatric nature of the distributions. Further collecting will no doubt provide the evidence needed to explain the variation seen.

MADAGASCAR: 2♀ 'Madagascar: Tulear / Province, Beza Mahafaly / Reserve, Parcelle 1 near / research station / 21–29 April 2003', '23°41.19'S, 44°35.46'E / California Acad of Sciences / coll: R. Harin'Hala,

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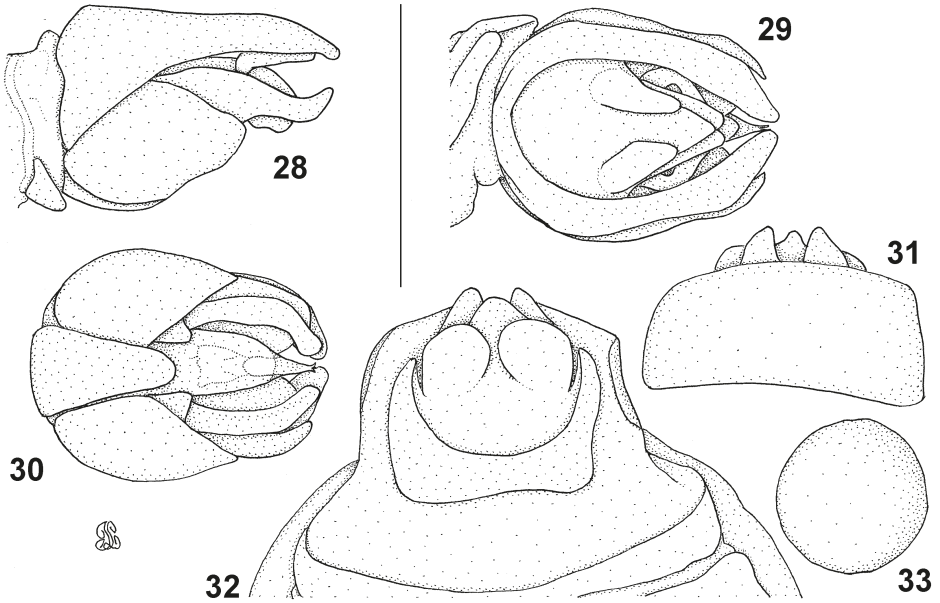

Figs 28–33. *Ericomyia atomentosa* (Oldroyd, 1960) terminalia: (28, 29) ♂ (7 km W Ranomafana): (28) lateral, (29) dorsal and (30) ventral views. (31, 32) ♀: (31) dorsal and (32) ventral views; (33) Egg ventral view. Scale bar (31, 32) = 1 mm.

malaise / trap in dry deciduous forest / elev 165m. MA-02-14A-57' (CAS); 4♀ 'Madagascar, Province / d'Antsiranana. Montaigne / Francais, elev 150m / 30 January 2001', '12°19.5'S 49°20'E [12°19'30"S 49°20'00"E, *c.* 226 m] / California Acad of Sciences / M.E. Irwin coll. hand netted / along forested limestone / ridge. MA-01-06-04' (CAS).

Distribution, phenology and biology: Distributional data for typical *atomentosa* is limited to 7 localities, grouped in two areas along the mountainous and forested eastern mountain range of Madagascar (Fig. 37). Atypical specimens from two places far removed from the known distribution of typical specimens, plotted in Fig. 37, suggest that there may be at least two undescribed species or widely separated colour variants. Typical *atomentosa* have only been collected in July and between September and December (Table 1) and are associated with primary rain forest situations (sometimes sympatric with *No. coerulescens*). Atypical specimens have been collected in January and April and found in 'dry deciduous forest' or 'along forested limestone ridge', further suggesting that these specimens may not be conspecific. No prey records are available. Although nothing is known of the biology, females have short, unspecialized ovipositors, and eggs, found in the macerated female, are spherical, suggesting the existence of no special oviposition strategy; eggs probably being simply dropped to the ground at random.

DISCUSSION

Laphria and *Choerades*: It is now generally accepted that *Laphria* does not occur in the Afrotropical Region. Although all species have now been transferred to *Choerades* or *Notiolaphria* the species of *Choerades* still require modern taxonomic review. Of

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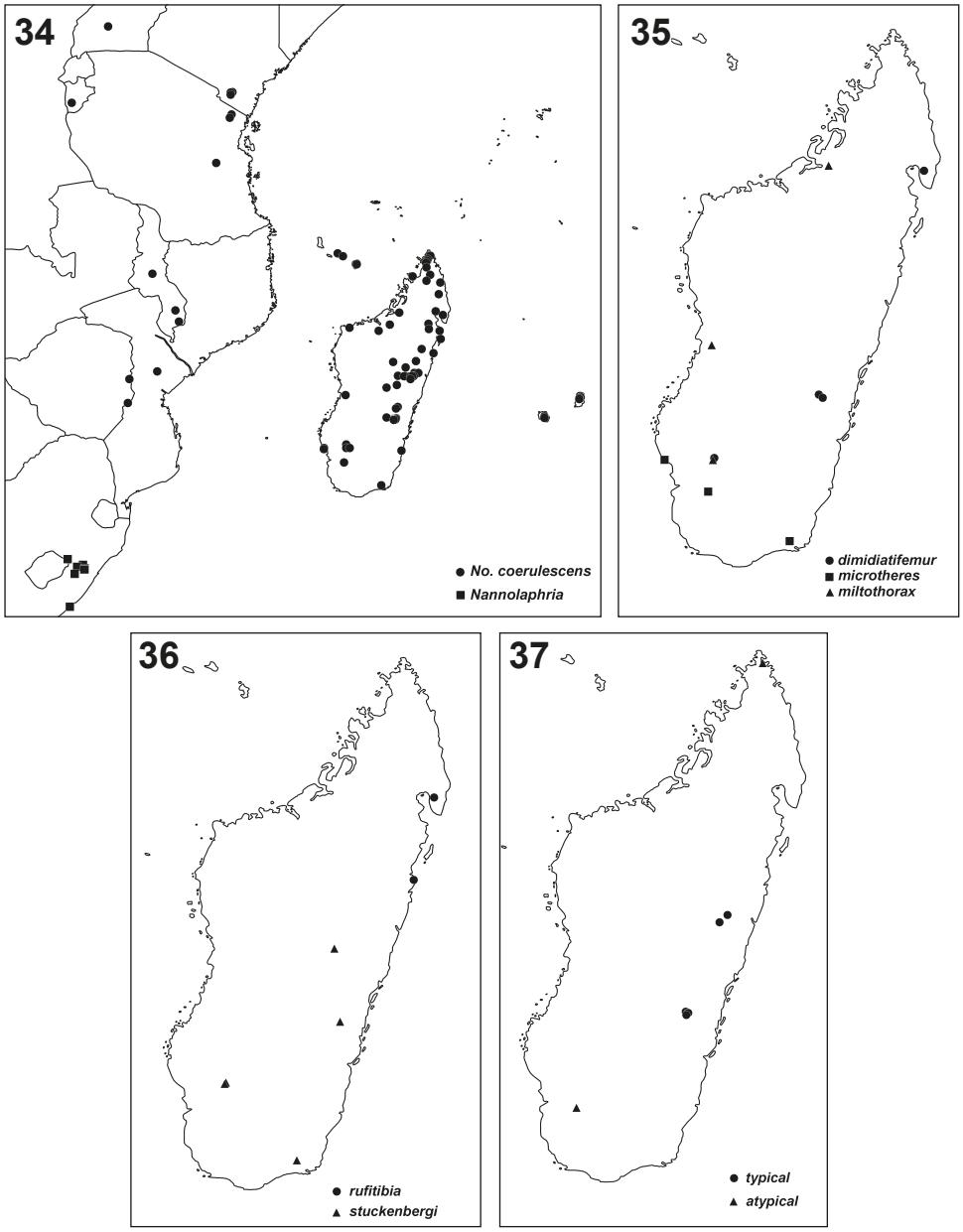

Figs 34–37. (34) Distribution of *Nannolaphria nigra* Londt, 1977 (■) and *Notiolaphria coerulescens* (Macquart, 1834) (●); (35–37) Distributions of *Notiolaphria* species in Madagascar: (35) *No. dimidiatifemur* (Oldroyd, 1960) (●), *No. microtheres* sp. n. (■), *No. miltothorax* sp. n. (▲); (36) *No. rufitibia* (Oldroyd, 1960) (●), *No. stuckenbergi* (Oldroyd) (▲); (37) *Ericomyia atomentosa* (Oldroyd, 1960) typical specimens (●) atypical specimens (▲).

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particular biogeographical interest is the first record of *Choerades* from an Indian Ocean island (Seychelles, Mahé). Not only is more collecting desirable, but it is considered important to include Oriental species in any future revisionary study.

Nannolaphria: This monotypic genus is confined to a small region of South Africa (Fig. 34). While superficially sharing features with both *Choerades* and *Notiolaphria* the genus is otherwise distinctive.

Notiolaphria: Much of this paper is devoted to a review of this genus. Only six species are recognised, and these may be fairly easily separated using external characters such as thoracic and leg coloration. While five are confined to Madagascar, the sixth, *No. coerulescens*, is fairly widely distributed over a number of Indian Oceanic islands and the African mainland. It is believed that this wide distribution can be explained by 'rafting' between land masses. Male and female terminalia do not appear to be of any great value (something that appears to be a fairly common phenomenon within the subfamily), although there are a few characters that may serve to separate species. Genital characters appear to be somewhat variable and, as they can only be appreciated once terminalia have been excised and macerated in KOH, the value of these characters is probably minimal. The widely distributed *No. coerulescens* is remarkably uniformly coloured, but shows considerable variation in size which may be a consequence of environmental degradation. While it remains possible that this is a complex of sibling species it is probably wise to treat the taxonomy conservatively until more refined techniques, such as molecular analysis, can be applied.

Ericomyia: This interesting new genus is clearly distinct from *Laphria*, *Choerades* and *Notiolaphria*, a fact hinted at when Oldroyd (1960) described the only known species (*atomentosa*). While the genus appears to share some characteristics with genera once assigned to the subfamily Laphystiinae (i.e. *Hoplistomerus* Macquart, 1838; *Perasis* Hermann, 1905; *Trichardis* Hermann, 1906) it does not display the venational characteristics of this group, or the great reduction in size of abdominal segment 8 and the structure of the male and female genitalia, relationships with other Laphriinae still require elucidation.

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