

Taxonomy of the Muscidae (Diptera) of Namibia: A Key to Genera, Diagnoses, New Records and Description of a New Species

Authors: Couri, Márcia Souto, Carvalho, Claudio J. B. de, and Pont, Adrian C.

Source: African Invertebrates, 53(1) : 47-67

Published By: KwaZulu-Natal Museum

URL: <https://doi.org/10.5733/afin.053.0103>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Taxonomy of the Muscidae (Diptera) of Namibia: a key to genera, diagnoses, new records and description of a new species

Márcia Souto Couri^{1,2}, Claudio J. B. de Carvalho^{2,3} and Adrian C. Pont⁴

¹Museu Nacional, Quinta da Boa Vista, São Cristóvão, Rio de Janeiro, 20.940–040, RJ, Brazil; courimarcia@gmail.com

²Research Fellow, CNPq, Brazil

³Departamento de Zoologia, Universidade Federal do Paraná, 81531–980, P.O. Box 19020 Curitiba, PR, Brazil; cjbcarva@ufpb.br

⁴Oxford University Museum of Natural History, Parks Road, Oxford OX1 3PW, United Kingdom; pont.muscidae@btinternet.com

ABSTRACT

The Muscidae (Diptera) of Namibia were previously known to comprise 42 species in 16 genera. The study of material from the Namibia National Insect Collection, National Museum of Namibia and the Albany Museum (South Africa) loaned to the authors enabled this paper to be written, in which three new generic records and 14 new species records are provided and one new species is described. With the present contribution, the muscid fauna of Namibia is now known to comprise 57 species in 19 genera, with *Musca* L. being the most species-rich genus. A key to the identification of all recorded genera is provided and diagnoses of the genera and species found in the material studied are provided when pertinent. *Musca fragilis* sp. n. is described from the Khorixas District.

KEY WORDS: Afrotropical, Namibia, Diptera, Muscidae, diversity, identification key, new species.

INTRODUCTION

The muscid fauna of the Afrotropical Region was last catalogued by Pont (1980). More recent contributions include those by Deeming (1987) and Dike (1989, 1990) for Afrotropical *Atherigona* Rondani, and Couri *et al.* (2006), with a partial revision of the muscid fauna of Madagascar.

Forty-two muscid species in 16 genera are recorded from Namibia in the published literature. Pont (1980) specifically cited only five species for Namibia—*Atherigona falcata* (Thomson, 1869); *Musca lasiophthalma* Thomson, 1869; *M. transvaalensis* Zielke, 1971; *Lispe barbipes* Stein, 1908; and *Spilogona aristalis* Zielke, 1971—as individual countries were only cited in the Afrotropical Catalogue if distribution was limited. The other records from Namibia are covered in the catalogue collectively as “Eastern to southern Africa”, “Congo Basin to South Africa”, *etc.*

This study is based on material loaned from the Namibian National Insect Collection, National Museum of Namibia (Windhoek, Namibia) and the Albany Museum (Grahamstown, South Africa). As a result of the study the number of recorded species is raised to 57 species in 19 genera. The present paper also provides a key for the identification of genera, diagnoses of genera and species when pertinent and the description of one new species.

MATERIAL AND METHODS

This review is largely based on material from Namibia deposited in the National Museum of Namibia, Windhoek, Namibia (NMNW) and the Albany Museum, Grahamstown, South Africa (AMGS), kindly loaned at different periods to MSC and CJBC by Ashley H. Kirk-Spriggs (now National Museum, Bloemfontein, South Africa). Some

specimens are deposited in the Museu Nacional, Universidade Federal do Rio de Janeiro (MNRJ) and Pe. Jesus Santiago Moure Entomological Collection in Curitiba, Paraná, Brazil (DZUP).

Dissected terminalia have been placed in glycerine in microvials pinned beneath the respective specimens.

Terminology follows McAlpine (1981), and for the special characters of *Atherigona*, such as the trifoliate process, Pont (1986) and Pont & Magpayo (1995). "Postpedicel" is used for "antennal flagellomere", following Stuckenberg (1999).

Data on the distributions of the species are mainly taken from the Afrotropical catalogue (Pont 1980). Genera, and species within genera, are listed alphabetically. Comments on genera or species are added when pertinent. Material examined sections are arranged alphabetically by region.

TAXONOMY

Key to the genera of Muscidae from Namibia (modified from Couri *et al.* 2006)

- 1 Proboscis adapted for piercing: elongate, strongly sclerotised and non-retractile, tapering from a broad base to a slender apex, with labella atrophied2
- Proboscis not adapted for piercing: moderately or weakly sclerotised and retracted into head, not tapering strongly to apex, with labella well developed, often fleshy4
- 2 Palpus shorter than half length of proboscis; 1 species**Stomoxys** Geoffroy
- Palpus about as long as proboscis3
- 3 Arista with dorsal branches only; notopleuron without setulae; 1 species**Haematobia** Le Peletier & Serville
- Arista with dorsal and ventral branches; notopleuron setulose; 1 species**Haematobosca** Bezzi
- 4 Head angular in profile, with long face and postpedicel; antenna long, inserted above mid level of eye; presutural dorsocentral setae very short and fine, almost indistinct from ground setulae; 11 species**Atherigona** Rondani
- Head shape not as above; antenna short or long, inserted below mid level of eye; presutural dorsocentral setae well developed, very rarely not differentiated from ground setulae5
- 5 Anepimeron setulose6
- Anepimeron bare12
- 6 Lower calypter of the *Musca*-type, *i.e.*, inner margin at first following margin of scutellum then diverging abruptly outward into more-or-less broadly truncated apical margin7
- Lower calypter of the *Phaonia*-type, *i.e.*, inner margin diverging immediately and at right-angles from supra-squamal ridge; tongue-like in shape10
- 7 Body black or bluish black, not metallic shiny green or blue; mid tibia without ventral seta8
- Body shiny metallic green or blue; mid tibia with strong ventral seta9
- 8 Vein *M* with an angular forward bend towards vein R_{4+5} ; 18 species**Musca** Linnaeus

- Vein *M* with a smoothly rounded forward curve towards vein R_{4+5} ; 1 species
..... **Morellia** Robineau-Desvoidy
- 9 Suprasquamal ridge setulose (Fig. 2); greater ampulla setulose; 2 species
..... **Neomyia** Walker
- Suprasquamal ridge bare; greater ampulla bare; 3 species
..... **Pyrellia** Robineau-Desvoidy
- 10 Palpus greatly enlarged in apical part, spoon-like; parafacial with setulae; prosternum
bare; all wing veins bare; 4 species **Lispe** Latreille
- Palpus not enlarged, narrow; parafacial bare; prosternum setulose or, if bare, base
of vein R_{4+5} with setulae on lower wing surface 11
- 11 Prosternum bare; 3 or 4 pairs of postsutural dorsocentral setae; acrostichals 3:3,
strongly developed; 1 species **Pseudohelina** Vockeroth
- Prosternum setulose; 2, 3 or 4 pairs of postsutural dorsocentral setae; acrostichals
1:2, developed; 2 species **Dichaetomyia** Malloch
- 12 Wing with subcosta running in smooth even curve from humeral cross-vein to costa;
body colour metallic black or blue; gena with a strong differentiated upcurved seta;
♀ ocellar triangle shiny, long or short, almost reaching lunule; ♀ frons with one pair
of proclinate orbital setae and one pair of inclinate interfrontal setae; 2 species
..... **Hydrotaea** Robineau-Desvoidy
- Wing with subcosta with a slightly sinuous course from humeral cross-vein to
costa, not smoothly bowed; body colour not metallic black or blue; gena without a
differentiated upcurved seta; ♀ ocellar triangle short and dusted; ♀ frons without
proclinate orbital or inclinate interfrontal setae 13
- 13 Wing with at least 1 setula on ventral surface of *Rs* node or base of R_{4+5} 14
- Wing without setulae on ventral surface of *Rs* node and on base of vein R_{4+5} 16
- 14 Prosternum with many lateral setulae; proboscis with labella reduced; prealar seta
absent; anterior katapisternal seta present; 4 species
..... **Limnophora** Robineau-Desvoidy
- Prosternum bare or only with 1–2 setulae on either side; proboscis with labella
developed; prealar seta present or absent; katapisternal seta present or absent... 15
- 15 Anterior katapisternal seta absent; lower calypter broad and truncated, of the *Musca*-
type (see couplet 6 for description); vein R_{4+5} without dorsal setulae; 1 species.....
..... **Graphomya** Robineau-Desvoidy
- Anterior katapisternal seta present; lower calypter not broad and truncated, tongue-
shaped, of the *Phaonia*-type (see couplet 6 for description); R_{4+5} with a few dorsal
setulae basally [other characters: veins *Sc*, *Rs* and *M* setulose, usually as follows:
vein *R* before humeral cross-vein, on both surfaces; basal part of *Sc*, on both sur-
faces; ventral surface of R_{4+5} almost to cross-vein *r-m*; both surfaces of *M* to beyond
cross-vein *dm-cu*; ventral surface of *Cu*]; 1 species **Dimorphia** Malloch
- 16 Proboscis with labella not reduced and prestomal teeth barely developed, and pre-
mentum dusted; prealar seta present; katapisternal setae not 1:1:1 17
- Proboscis with labella usually reduced and/or prestomal teeth strongly developed,
and prementum shiny, undusted; prealar seta absent; katapisternal setae 1:1:1, placed
at the angles of an imaginary equilateral triangle 19

- 17 Hind tibia with 1 strong posterodorsal seta (calcar) in apical third; anterior postsutural intra-alar seta placed behind level of supra-alar seta; 1 species..... **Muscina** Robineau-Desvoidy
- Hind tibia without calcar; anterior postsutural intra-alar seta placed differently... 18
- 18 Arista bare; sternite 1 with row of setulae along posterior margin; prealar seta absent; ♂ eye large in profile, occupying most of head; 1 species..... **Gymnodia** Robineau-Desvoidy
- Arista plumose, with longest individual branches longer than width of postpedicel; sternite 1 bare; ♂ eye in profile not markedly large; 4 species..... **Helina** Robineau-Desvoidy
- 19 Katepisternal setae 1+1–3; ovipositor of *Mydaea*-type, short, with spinose hypoproct; 1 species..... **Spilogona** Schnabl
- Katepisternal setae 1:1:1, placed at angles of imaginary equilateral triangle; ovipositor elongated, with setulose hypoproct; 1 species..... **Coenosia** Meigen

Fifteen species of Muscidae are added to the 42 species previously recorded from Namibia, including one new species. The Namibian muscid fauna is now known to contain 57 species and subspecies assigned to 19 genera (Appendix).

Genus *Atherigona* Rondani, 1856

Atherigona (see Couri *et al.* 2006, for diagnosis) contains 126 species in the Afrotropical Region, 14 in the subgenus *Acritochaeta* Grimshaw, 1901 and 112 in the subgenus *Atherigona s.str.* (Pont 1980). Deeming (1971, 1979) studied the species from Nigeria and Comoros Archipelago, respectively. Dike (1989) presented a key for the identification of the Afrotropical species and described new species from Africa. One year later (Dike 1990) described two new species from Nigeria and presented a key for the Afrotropical species of the subgenus *Acritochaeta*. More recently, Couri *et al.* (2006) described three new species of the subgenus *Atherigona* and presented two new records, one of each subgenus from Madagascar.

Nine species of *Atherigona* have previously been recorded from Namibia; eight from subgenus *Atherigona*: *A. bedfordi* Emden, 1940 (Deeming 2000: 284, Brandberg Massif); *A. falcata* (Thomson, 1869) (Deeming 1975: 2, Ongeama); *A. hyalinipennis* Emden, 1959 (Deeming 2000: 284, Brandberg Massif); *A. lineata ugandae* Emden, 1940 (Deeming 2000: 284–285, Brandberg Massif); *A. naqvii* Steyskal, 1966 (Deeming 1975: 2, Daan Viljoen; Deeming 2000: 285, Brandberg Massif); *A. rubicornis* Stein, 1913 (Deeming 2000: 286, Brandberg Massif); *A. tetrastigma* Paterson, 1956 (Lindner 1976: 79, Krumhuk and Daan Viljoen); *A. theodori* Hennig, 1963 (Deeming 2000: 286, Brandberg Massif) and one from *Acritochaeta* subgenus: *A. orientalis* Schiner, 1868 (Pont 1992: 64, Otjikoko Süd Farm 33 miles ENE Omaruru).

Among the studied material, only one species was found, *A. mitrata*, which represents a new record for Namibia.

Atherigona mitrata Séguy, 1955

Diagnosis: Frons strongly projecting; markedly yellow; palpus pale yellow; pedicel yellow, postpedicel grey pollinose, scutum grey; postpronotum and legs yellow, except fore femur brown on apical third of dorsal and anterior surfaces, fore tibia and tarsus light brown.

Material examined: NAMIBIA: *Oshikoto*: 6♂ 2♀ Tsumeb Dist., Ghaub 47, 19°28'S 17°00'E, 16–26.vii.1986, J. Irish, Malaise trap (1♂ MNRJ, 1♂ DZUP, other NMNW).

Distribution: Cameroun, Namibia, Nigeria, Zimbabwe and Zambia.

Genus *Coenosia* Meigen, 1826

Coenosia is the largest muscid genus occurring in the Afrotropical Region, with 110 described species (Pont 1980). Couri *et al.* (2006) recently described a new species from Madagascar and Pont (2009) described a new species from the Seychelles. See Couri *et al.* (2006) for generic diagnosis. *Coenosia strigipes* Stein, 1916 is the only species recorded from Namibia (Emden 1958: 7, “S. W. Africa”). This species was found in the material examined.

Coenosia strigipes Stein, 1916

Diagnosis: Legs yellow, including coxae; arista extremely short, plumose; postpedicel black (yellow in some ♂); small species, <4 mm in length.

Material examined: NAMIBIA: *Caprivi*: 1♂ 22♀ [10 specimens without abdomen] Katima Mulilo Dist., Ndopu village, 1 km SE Bukalo, SE1724Da, 14–20.iv.2006, A.H. Kirk-Spriggs, Malaise trap (AMGS).

Distribution: Widespread in Afrotropical Region (including Aldabra, Astove, Cape Verde and Madagascar Is.), Namibia and the Palearctic Region.

Genus *Dichaetomyia* Malloch, 1921

Dichaetomyia is a species-rich genus in the Afrotropical Region, with 35 species in the subgenus *Dichaetomyia s.str.* and 30 in the subgenus *Panaga* Curran, 1928 (Pont 1980; Couri *et al.* 2006). Both subgenera are widespread in the Afrotropical Region, and *Panaga* is restricted to it. The subgenus *Panaga* can be distinguished by the presence of setulae or stiff setulae on the greater ampulla (infra-alar bulla), which is bare in the subgenus *Dichaetomyia*. See Couri *et al.* (2006) for generic diagnosis. *Dichaetomyia cuthbertsoni* Emden, 1942 was recorded by Zielke (1971a: 176, Otjiwarongo, Farm Abechaus), whilst *D. luteiventris* (Rondani, 1873) represents a new record for Namibia.

Dichaetomyia luteiventris (Rondani, 1873)

Diagnosis: Scutum grey pollinose, scutellum and abdomen dark yellow; dorsocentral setae 2+3; scutellum with setulae on lateral wall; fore tibia without median posterior seta.

Material examined: NAMIBIA: *Caprivi*: 1♂ 2♀ Katima Mulilo Dist., Ndopu village, 1 km SE Bukalo, SE1724Da, 14–20.iv.2006, A.H. Kirk-Spriggs, Malaise trap (AMGS). *Erongo*: 5♀ Namib-Naukluft Park, Namib desert Research Station, Kuiseb River, 23°33'45"S 15°02'38"E, 420 m, 15–23.i.1997, I. Kapofi & M.E. Irwin, Malaise trap in riparian vegetation (1♀ MNRJ, 1♀ DZUP, other NMNW). *Kavango*: 1♀ Kaudon Game Reserve, 6 km E Soncana, 19°08'S 20°39'E, 18–21.i.1991, E. Marais. *Omaheke*: 1♂ Kehoro Witvlei, i.1968, Pack. *Oshikoto*: 3♂ 10♀ Etosha Nat. Park, Helio, 19°01'S 16°30'E, 27.iv–24.v.1988, E. Griffin, pitfall traps; 1♂ Etosha Nat. Park, Kaneseb, 19°04'S 16°41'E, 9.viii–14.ix.1987, E. Griffin, pitfall traps; 1♂ 1♀ Etosha Nat. Park, S Mushara, 18°37'S 16°53'E, 6.iii–11.iv.1987, E. Griffin, pitfall traps; 1♀ Etosha Nat. Park, 19°03'S 15°52'E, 12.ii–16.iii.1987, E. Griffin, pitfall traps; 1♂ Etosha Nat. Park, Bloubokdraai, 18°50'S 16°57'E, 15.ii–13.iii.1987, E. Griffin, pitfall traps. *Ojozondjupa*: 1♂ 1♀ Okahandja, 17.xii.1968, F. Gaerdes Collection; 1♀ Waterberg Plateau Park, Restcamp Fountain, 20°30'S 17°14'E, 18.iv.1993, M. Pusch & E. Marais, light trap (all NMNW).

Distribution: Widespread continental Afrotropical Region, Oriental Region to Indonesia (Java, Sumatra and Sulawesi).

Genus *Dimorphia* Malloch, 1922

Known only from the Afrotropical Region, with five recorded species (Pont 1980). *Dimorphia tristis* (Wiedemann, 1819) was recorded from Namibia by Zielke (1971a: 180, “Südwestafrika, Port Elizabeth”) but this is clearly erroneous as Port Elizabeth is in the Eastern Cape Province of South Africa. No species of *Dimorphia* was found among the studied material.

Genus *Graphomya* Robineau-Desvoidy, 1830

Thirteen species of *Graphomya* have been recorded from the Afrotropical Region. See Couri *et al.* (2006) for generic diagnosis. The genus and the species *G. maculata* (Scopoli, 1763) represent new records for Namibia.

Graphomya maculata (Scopoli, 1763)

Diagnosis: With characteristic pattern on scutum different in each sex. Male scutum dark brown, including median area, with 2 silvery white vittae along dorsocentral rows of setae and 2 silvery white lateral vittae; scutellum with median triangular brown macula, wider at base, with grey pollinose areas laterally; abdomen predominantly yellow, with brown median marks and brown tergite 5. Female scutum with silver areas more extensive than in ♂ including median area; abdomen grey with brown median and lateral marks.

Material examined: NAMIBIA: *Kavango*: 1 ♀ Popa Falls, 18°07'S 21°33'E, 26–31.viii.1971, [State Museum staff] (NMNW).

Distribution: Widespread in the Afrotropical, Neotropical, Oriental, Australasian-Pacific and Palaearctic Regions.

Genus *Gymnodia* Robineau-Desvoidy, 1863

Twenty-two species are recorded from the Afrotropical Region (Pont 1980). *Gymnodia flexa* (Wiedemann, 1830), was recorded from Namibia by Pont (1977: 367, Omaruru), but was not found among the studied material.

Genus *Haematobia* Le Peletier & Serville, 1828

Represented by six species in the Afrotropical Region. The genus and one species are here recorded from Namibia for the first time. Zumpt (1973) revised the Afrotropical fauna.

Diagnosis: General colouration dark greyish, with yellowish tinge; head 1.25× as wide as high; arista plumose only on dorsal surface; palpus spatulate, slightly narrowed in basal ¼ to ½, reaching tip of haustellum when proboscis flexed; prosternum setulose; proepisternal depression and postalar wall bare; prealar seta differentiated or vestigial; lower calypter *ca* 2× as long as upper calypter.

Haematobia thirouxi (Roubaud, 1906)

Diagnosis: Overall length 2–3.5 mm; prosternum bare; anal vein short, ending abruptly about half distance to wing margin; palpus club-shaped; fore tibia without submedian ventral seta.

Material examined: NAMIBIA: *Kavango*: 1♂ 2♀ Mahango Game Park, Okavango River, 18°13'19"S 21°45'10"E, 18–19.x.1999, A.H. Kirk-Spriggs, T. Pape & W. Hauwanga, Malaise trap (NMNW).

Distribution: Widespread continental Afrotropical and southern Palearctic regions.

Genus *Haematobosca* Bezzi, 1907

Eleven species of *Haematobosca* are recorded from the Afrotropical Region. A key to world species was provided by Pont & Dsouli (2009). The genus and one species are recorded from Namibia for the first time.

Diagnosis: General coloration dark; palpus long, as long as proboscis, grooved internally and dilated apically; arista with setulae on dorsal and ventral surfaces.

Haematobosca uniseriata (Malloch, 1932)

Diagnosis: Overall length 3–5 mm; wing veins without setulae; meron and proepisternal depression bare; prosternum with lateral setulae.

Material examined: NAMIBIA: *Erongo*: 1♀ Brandberg, below Wasserfallfläche, 21°10'43"S 14°32'51"E, 18–22.iii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap. *Oshikoto*: 2♂ Etosha Nat. Park, 18°43'S 14°35'E, 5.v.1987, J. Irish & E. Marais. *Kavango*: 1♂ Rundu Dist., Sovo, Mile 46 camp, 18°18'06.7"S 19°15'30"E, 21–24.iv.2001, E. Marais, S. Kasch & K. Vohland (all NMNW). *Omaheke*: 6♂ 6♀ Gobabis District, Somerkoms 521, 22°01'59"S 18°57'22"E, 6–8.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap (1♀ MNRJ, 1♀ DZUP, other NMNW); 1♂ 2♀ Gobabis Dist., De Hoek 878, 21°56'26"S 20°58'55"E, 3–6.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap. *Otjozondjupa*: 2♂ Tsumkwe Dist., Nama, 19°54'34"S 20°44'08"E, 20–22.xii.1998, A.H. Kirk-Spriggs, E. Marais & D.J. Mann, Malaise trap; 2♂ Gautsche Pan, Bushmanland, 19°48'S 20°35'E, 9–13.vi.1971, [State Museum staff] (all NMNW).

Distribution: Southern Africa.

Genus *Helina* Robineau-Desvoidy, 1830

Helina is one of the most species-rich genera of Afrotropical Muscidae, with 99 species (Pont 1980; Couri *et al.* 2006). See Couri *et al.* (2006) for generic diagnosis. Two species are recorded from Namibia: *H. coniformis* (Stein, 1903) (Lindner 1976: 79, Ongeama) and *H. lucida* (Stein, 1913) (Lindner 1976: 79, Krumhuk). Both species were found among the material examined, and *H. icterica* (Séguy, 1937) and *H. usitata* Emden, 1951 represent new records for Namibia.

Helina coniformis (Stein, 1903)

Diagnosis: Femora predominantly yellow, tibiae yellow, tarsi brown; fore tibia with posterior seta; mid tibia with 3 posterior setae, without anterodorsal setae; hind tibia with 3 anterodorsal setae, 2 anteroventral, with short posterodorsal setae in apical ¼; wing without maculae.

Material examined: NAMIBIA: *Caprivi*: 1♂ 2♀ Katima Mulilo Dist., Salambala campsite, 17°50'01"S 24°36'09"E, 1–4.iii.2001, A.H. Kirk-Spriggs, Malaise trap; 1♀ Katima Mulilo Dist., 4 km NE of Salambala, 17°49'21"S 24°36'07"E, 25.ii–1.iii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap (all NMNW).

Distribution: Widespread in East and central Africa to southern Africa, Annobon I., eastern Mediterranean and South Yemen.

Helina icterica (Séguy, 1937)

Diagnosis: 1 postsutural intra-alar; meron with short setulae on dorsal part; legs yellow, tarsi brown; fore tibia with posterior seta; mid tibia with 2 posterior setae, without

anterodorsal setae; hind tibia with 2 anterodorsal, 1 or 2 anteroventral, without posterodorsal setae; wing with brown maculae on crossveins *r-m* and *dm-cu*.

Material examined: NAMIBIA: *Oshikoto*: 11♀ Tsumeb Dist., Ghaub 47, 19°28'S 17°00'E, 16–26.vii.1986, J. Irish, Malaise trap (1♀ MNRJ, ♀1 DZUP, other NMNW).

Distribution: Cameroun, Namibia and Nigeria.

Helina lucida (Stein, 1913)

Diagnosis: Scutum with an *Anthomyia*-pattern, with a transverse brown band just behind suture, partially or entirely interrupted by grey dust along the dorsocentral rows of setae; fore tibia with posterior seta; mid tibia with 2 posterior setae, without anterodorsal setae; hind tibia without posterodorsal setae; wing hyaline, without brown maculae.

Material examined: NAMIBIA: *Erongo*: 8♂ 2♀ Brandberg, below Wasserfallfläche, 21°10'43"S 14°32'51"E, 18–22.iii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap (NMNW); 4♂ 2♀ Brandberg Dist., Mason Shelter, 21°04'39"S 14°05'43"E, 1750 m, 5–14.iii.2002, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed (1♂ MNRJ, 1♂ DZUP, other NMNW). *Kunene*: 5♂ Khorixas Dist., Leeukop 664, 19°53'15"S 14°21'44"E, 26–30.x.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed; 1♂ Opuwo Dist., Sesfontein Fort, 18°07'15"S 13°37'03"E, 1–3.i.2000, E. Marais, D.J. Mann & D. Newman, sweeping. *Omaheke*: 1♀ Gobabis Dist., De Hoek 878, 21°56'26"S 20°58'55"E, 3–6.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap (all NMNW).

Distribution: East Africa to southern Africa.

Helina usitata Emden, 1951

Diagnosis: Antenna, palpus and femora brown; tibiae predominantly yellow; fore tibia without posterior seta; mid tibia with 2 posterior setae, without anterodorsal setae; hind tibia with 2 anterodorsal, 1 anteroventral and posterodorsal setae; wing with brown maculae on crossveins *r-m* and *dm-cu*.

Material examined: NAMIBIA: 1♂ Lüderitz [District], Skorpion area, 27°49'S 16°36'E, 9–12.viii.1997, E. Marais & A.H. Kirk-Spriggs, Malaise trap (NMNW).

Distribution: Kenya, Namibia and Uganda.

Genus *Hydrotaea* Robineau-Desvoidy, 1830

Represented by 22 species in the Afrotropical Region, one of which has been recorded from Namibia. For generic diagnosis, see Couri *et al.* (2006). *Hydrotaea capensis* (Wiedemann, 1818) was recorded from Namibia by Emden (1948: 170, Windhoek); Zielke (1971a: 176, Otjiwarongo, Farm, Abechaus); and Lindner (1976: 79, Ongeama) and was also found among material examined here. *Hydrotaea jeanneli* Séguéy, 1938 represents a new record for Namibia.

Hydrotaea capensis (Wiedemann, 1818)

Diagnosis: Body with strong bluish gloss; eye emarginate at middle of posterior margin; lower calypter white, with whitish border; male fore tarsi entirely black; mid femur with 1 or 2 setae near base.

Material examined: NAMIBIA: *Caprivi*: 1♀ Katima Mulilo Dist., Ndopu village, 1 km SE Bukalo, SE1724Da, 14–20.iv.2006, A.H. Kirk-Spriggs, Malaise trap (AMGS); 2♂ Riverside 135, Bethanie SE2626Ca, 23–16.x.1971, [State Museum staff] (all NMNW).

Distribution: Widespread in Afrotropics (incl. Fernando Póo, St Helena and Socotra Is.); Palaearctic Region to China, India, Sri Lanka; USA; Chile, Argentina and Brazil.

Hydrotaea jeanneli Ségué, 1938

Diagnosis: Eye bare; acrostichal setulae forming 2 rows; prealar seta absent; male fore femur concave at anteroventral apex; mid tibia with anteroventral seta near apical third; hind tibia without distinct posterodorsal seta; abdominal syntergite 1+2 grey-dusted in posterior half.

Material examined: NAMIBIA: *Kavango*: 1♂ 11♀ Mahango Game Pk., Okavango River, 18°13'19"S 21°45'10"E, 18–19.x.1999, A.H. Kirk-Spriggs, T. Pape & W. Hauwanga, Malaise trap (1♀ MNRJ, 1♀ DZUP, other NMNW); 1♂ West Caprivi Pk., Susuwe, Kwando R., 17°45'37"S 23°20'55"E, 28.ix–2.x.1999, A.H. Kirk-Spriggs, Malaise trap dry woodland; 1♀ West Caprivi Park., B8 rest-stop, 17°48'56"S 24°16'31"E, 13–15.xii.1999, E. Marais, D.J. Mann & D. Newman, elephant dung. *Omaheke*: 2♀ Gobabis Dist., Somerkoms 521, 22°01'59"S 19°57'22"E, 6–8.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap. *Caprivi*: 1♀ Katima Mulilo Dist., Salambala campsite, 17°50'01"S 24°36'09"E, 1–4.iii.2001, A.H. Kirk-Spriggs, Malaise trap. *Otjozondjupa*: 3♀ Tsumkwe Dist., 1 km of Nhoma River, 19°10'00"S 20°36'09"E, 28.xii.1998, E. Marais, A.H. Kirk-Spriggs & D.J. Mann, Malaise trap; 1♂ Tsumkwe Dist., 2 km W of Xawasha pan, 19°09'57"S 20°52'55"E, 26–27.xii.1998, E. Marais, A.H. Kirk-Spriggs & D.J. Mann, Malaise trap; 1♀ Tsumkwe Dist., Xawasha pan, 19°09'58"S 20°54'40"E, 27.xii.1998, A.H. Kirk-Spriggs, Malaise trap; 1♀ Tsumkwe Dist., Aha Hills, 19°47'36"S 20°59'51"E, 21–25.xii.1998, E. Marais, A.H. Kirk-Spriggs & D.J. Mann, Malaise trap (all NMNW).

Distribution: Cameroun, Democratic Republic of Congo, Kenya, Namibia, Tanzania, Uganda and Zimbabwe.

Genus *Limnophora* Robineau-Desvoidy, 1830

Limnophora is another species-rich Afrotropical muscid genus, with 76 described species (Pont 1980; Couri *et al.* 2006). See Couri *et al.* (2006) for generic diagnosis. Three species are recorded from Namibia: *L. quaterna* (Loew, 1852) (Emden 1951: 409, "S.W. Africa", as *L. notabilis* Stein in Becker 1903; Emden 1956: 517, "S.W. Africa", as *L. notabilis*; Lindner 1976: 79, Ongeama, as *L. notabilis*); *L. simulans* Stein, 1913 (Lindner 1976: 79, Ongeama); *L. thomasseti* Emden, 1951 (Emden 1951: 423, Hoffnung).

None of the three recorded species was found among the studied material. *Limnophora obsignata* (Rondani, 1866) is newly recorded for Namibia.

Limnophora obsignata (Rondani, 1866)

Diagnosis: Male holoptic; arista plumose, with individual branches longer than width of postpedicel; scutum with postsutural transverse brown fascia, not extending back medially as brown vitta that reaches scutellum, scutellum pale-dusted at apex; postsutural dorsocentrals 4; mid tibia with 2 or 3 posterior setae.

Material examined: NAMIBIA: *Caprivi*: 1♂ 2♀ Katima Mulilo Dist., Salambala campsite, 17°50'01"S 24°36'09"E, 22–24.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap. *Erongo*: 1♂ 2♀ Brandberg, below Wasserfallfläche, 21°10'43"S 14°32'51"E, 18–22.iii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap (all NMNW). *Kunene*: 11♂ 63♀ Khorixas Dist. Leeukop 664, 19°53'15"S 14°21'44"E, 26–30.x.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed (1♂ 1♀ MNRJ, 1♂ 1♀ DZUP, other NMNW).

Distribution: Widespread throughout Africa, including Madagascar and Socotra I.; and southern Europe, east to Iran.

Genus *Lispe* Latreille, 1797

Lispe is represented by 50 species in the Afrotropical Region, four of which have been recorded from Namibia: *L. barbipes* Stein, 1908 (Zielke 1974: 43, 10 miles SE Namutoni and 10 miles N Marienthal, Hardap Dam); *L. irvingi* Curran, 1937 (Lindner 1976: 79, Windhoek, identification queried by the author); *L. leucospila* (Wiedemann,

1830) (Zielke 1971a: 178, Windhoek; Lindner 1976: 79, Ongeama and Daan Viljoen); *L. zumpti* Paterson, 1953 (Paterson 1953: 175, Outjo). See Couri *et al.* (2006) for generic diagnosis. Only *L. leucospila* was included in the examined material.

Lispe leucospila (Wiedemann, 1830)

Diagnosis: Frontal triangle reaching lunule; palpus yellow; dorsocentral setae 1+3; crossvein *dm-cu* straight; femora brownish grey, tibiae yellow; fore tibia with posteroventral seta; mid tibia with 1 posterodorsal seta; hind tibia with 1 or 2 anteroventral setae; abdomen with dark brown lateral maculae, strongly grey-pollinose on median vitta and laterally, around the maculae.

Material examined: NAMIBIA: *Caprivi*: 2♂ 11♀ Katima Mulilo Dist., Salambala pan, 17°50'01"S 24°36'09"E, 1–4.iii.2001, A.H. Kirk-Spriggs, Malaise trap; 3♂ 4♀ same except 17°50'00"S 24°35'58"E; 3♀ Katima Mulilo Dist., Salambala, 4 km NE of, 17°49'21"S 24°36'07"E, 25.ii–1.iii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap (all NMNW). *Erongo*: 34♂ 26♀ Brandberg Dist., Mason Shelter, 21°04'39"S 14°05'43"E, 1750 m, 5–14.iii.2002, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed (1♂ 1♀ MNRJ, 1♂ 1♀ DZUP, other NMNW); 3♂ 1♀ Brandberg, below Wasserfallfläche, 21°10'43"S 14°32'51"E, 18–22.iii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap; 1♀ Brandberg, Sonusib Ravine, 1435 m, 21°04.546'S 14°36.958'E, 2.xii.2000, E. Marais & W. Mey, Malaise trap. *Kavango*: 1♂ 2♀ Takuasa [= Takwasa], SE1720Cd, 14–19.viii.1971, [State Museum staff]; 1♂ Kaudom Game Reserve, Leeupan, 18°40'S 20°52'E, 25.xi.1992, E. Marais & M. Pusch. *Khomas*: 3♂ 10♀ Windhoek District, Regenstein 32, 22°43'04"S 17°01'54"E, 1–8.iii.1999, E. Marais & A.H. Kirk-Spriggs, Malaise trap; 1♀ Windhoek, Koreangab Dam, SE2217Ca, 12.ii.1971, [State Museum staff]. *Kunene*: 1♀ Khorixas Dist., Leeukop 664, 19°53'15"S 14°21'44"E, 26–30.x.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed. *Oshikoto*: 10♂ 4♀ Tsumeb Dist., Ghaub 47, 19°28'S 17°00'E, 16–26.vii.1986, J. Irish, Malaise trapping; 1♂ 5♀ Tsumeb, Otjikoto Lake, SE1917Ba, 17.ii.1972, [State Museum staff]; 1♂ 4♀ Etosha Nat. Park, Narawandu road, 18°51'04"S 15°32'55"E, 24–25.xii.1999, E. Marais, D.J. Mann & D. Newman, MMN22.MV/UV light; 1♂ 2♀ Etosha Nat. Park, Okondeka plains, 19°02'06"S 15°49'47"E, 23.xii.1999, E. Marais, D.J. Mann & D. Newman, MMN18.MV/light; 1♂ Etosha Nat. Park, Sprokieswoud, 19°05'S 15°37'E, 11.ii–13.iii.1987, E. Griffin, pitfall traps; 3♀ Etosha Nat. Park, Klippan, 19°04'S 14°26'E, 8.v.1987, E. Marais & J. Irish; 1♂ 1♀ Etosha Nat. Park, Dorsland, 18°43'S 14°52'E, 4.v.1987, E. Marais & J. Irish; 1♀ Etosha Game Park, Dorsland, 18°43'S 14°52'E, 11.v–16.vi.1986, E. Marais & J. Irish, preservation pitfall traps; 2♀ Etosha Nat. Park, Vredkoppies Perdekamp, 19°20'S 16°54'E, 15.i.1987, J. Irish & E. Marais; 1♀ Etosha Nat. Park, Okaukuejo, 19°10'S 15°53'E, 12.iv.1989, E. Marais & J. Irish; 1♀ Etosha Nat. Park, Halali, 19°02'S 16°58'E, 18–20.i.1987, E. Marais & J. Irish; 1♀ Etosha Nat. Park, Starkberg, 18°57'S 14°32'E, 9–10.v.1987, E. Marais & J. Irish; 1♀ Etosha Nat. Park, Kaross, 19°23'S 14°33'E, 6.v.1987, J. Irish & E. Marais; 2♀ Etosha Nat. Park, Otjovasandu, 19°15'S 14°30'E, 7.v.1987, J. Irish & E. Marais. *Ojozondjupa*: 1♀ Bushmanland, Gautsche Pan, 19°48' S 20°35'E, 9–13.vi.1971, [State Museum staff]; 4♂ 3♀ Otjiwarongo, Otjihaenamaparero 92, SE2116Ab, 16.xi.1971, [State Museum staff] (all NMNW).

Distribution: Widespread in the Afrotropical Region (including Cape Verde, Socotra Is., South Yemen), Mediterranean subregion, Oriental Region and New Guinea.

Genus *Morellia* Robineau-Desvoidy, 1830

Sixteen species of the genus are recorded from the Afrotropical Region (Pont 1980, 2006). *Morellia nilotica* (Loew, 1856) was recorded from Namibia by Zielke (1971c: 68, "Süd-West-Afrika"), but was not included in the material examined.

Genus *Musca* Linnaeus, 1758

Musca is represented by 39 species in the Afrotropical Region 13 of which were previously recorded from Namibia: *M. albina* Wiedemann, 1830 (Patton 1936: 480, "South-West Africa"; Emden 1948: 173, "South-West Africa"; Zielke 1970: 501, Zessfontein; Zielke 1971a: 174, Okahandja; Zielke 1971c: 108, "Sud-West-Afrika"); *M. alpesa* Walker, 1849 (Bezzi 1908: 190, Rooibank in the hinterland of Walfischbay);

M. conducens Walker, 1860 (Lindner 1976: 78, Ongeama, Okahandja, Swakopmund, Walvis Bay and Gobabeb); *M. confiscata* Speiser, 1924 (Zielke 1971c: 124, "Sud-West-Afrika", as *M. fasciata* Stein, 1910); *M. domestica calleva* Walker, 1849 (Zielke 1974: 4–5, 10 miles NW Windhoek); *M. domestica domestica* Linnaeus, 1758 (Bezzi 1908: 190, Prince of Wales Bay and Lüderitz Bay; James 1947: 140, "South-West Africa"; Paterson 1960: 397, Outjo; Zielke 1971a: 173, Otjiwarongo, Farm Abechaus; Lindner 1976: 78, Ongeama); *M. freedmani* Paterson, 1957 (Paterson 1957: 108, Kalahari; Zielke 1970: 502, Kalahari); *M. lasiophthalma* Thomson, 1869 (Malloch, 1929: 114, Windhoek, actually labelled Farm Otjitueza, 66 km NE of Windhuk, as *Lissasterna polita* Malloch; West 1951: 144, "SW Africa", as *M. albina* ssp. *polita*; Hennig 1964: 986, Farm Otjitueza, 66 km NE Windhoek, as *M. polita*); *M. lusoria* Wiedemann, 1824 (Lindner 1976: 78, Ongeama, Daan Viljoen and Krumhuk; Zielke 1971a: 175, Otjiwarongo, Farm Abechaus; Zielke 1971c: 125, "Süd-West-Afrika"; Zielke 1974: 10–11, Tsiabab Cyn [Canyon], Brandberg Mt and 15 miles NW Okahandja); *M. sorbens* Wiedemann, 1830 (Peris & Llorente 1963: 233, Grootfontein; Zielke 1970: 504, Ohopoho; Zielke 1971c: 130, "Sud-West-Afrika"; Lindner 1976: 79, Gobabeb); *M. tempestatum* Bezzi, 1908 (Zielke 1971a: 174, Otjiwarongo, Farm Abechaus; Zielke 1971c: 117, "Sud-West-Afrika"); *M. xanthomelaena* Wiedemann, 1824 (Zielke 1970: 504, Aminuis and Karibib; Zielke 1971c: 128, "Sud-West-Afrika"). *Musca autumnalis* De Geer, 1776 was also recorded by Bezzi (1908: 190, Rooibank in the hinterland of Walfischbay, as *M. corvina* Fabricius, 1781), but was later stated by Bezzi (1911: 90) probably to be *M. lusoria*.

The following species are new for Namibia: *M. crassirostris*, *M. hugonis*, *M. patersoni*, *M. ventrosa* and *M. fragilis* sp. n. No specimens of *M. alpesa*, *M. confiscata*, *M. domestica domestica* or *M. freedmani* were included in the material examined.

Musca albina Wiedemann, 1830

Diagnosis: Eye bare; anterior spiracle white; postalar ridge without setulae; proepisternal depression bare; dorsocentral setae 0+1; katapisternal setae absent; fore tibia without posterior seta in apical half, mid tibia with 2 or 3 posterior setae.

Material examined: NAMIBIA: *Caprivi*: 1♀ West Caprivi Park, Nova, 5 km N, 18°09'56"S 21°44'31"E, 16–18.xii.1999, E. Marais, D.J. Mann & D. Newman. *Erongo*: 2♀ Brandberg Dist., Mason Shelter, 21°04'39"S 14°05'43"E, 1750 m, 5–14.iii.2002, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed. *Kavango*: 1♀ Hereroland East, Eiseb River, Western Veterinary Fence, 20°38'S 20°05'E, 17.xi.1988, E. Marais. *Kunene*: 1♂ Opuwo Dist., Sesfontein Fort, 18°07'15"S 13°37'03"E, 1–3.i.2000, E. Marais, D.J. Mann & D. Newman, sweeping; 1♂ Khorixas Dist., Leeukop 664, 19°53'15"S 14°21'44"E, 26–30.x.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed (all NMNW). *Omaheke*: 4♀ Gobabis Dist., Somerkoms 521, 22°01'59"S 19°57'22"E, 6–8.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap (1♀ MNRJ, ♀1 DZUP, other NMNW); 1♀ Gobabis Dist., De Hoek 878, 21°56'26"S 20°58'55"E, 3–6.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap sample; 1♀ Hereroland East, Epukiro River, 30 km NE Steenboklagte, 21°18'S 20°35'E, 23.xi.1988, E. Marais (all NMNW).

Distribution: In xeric areas of the Afrotropical and southern Palaearctic regions and the Indian subregion.

Musca conducens Walker, 1859

Diagnosis: Eye bare; scutum brown with grey pollinosity, with four dark brown vittae; dorsocentral setae 2+4; proepisternal depression bare; anterior spiracle white; legs dark brown; fore tibia with posterior seta; mid tibia with about 4 posterior setae.

Material examined: NAMIBIA: *Caprivi*: 1♂ 4♀ Katima Mulilo Dist., Salambala pan, 17°50'00"S 24°35'58"E, 1–4.iii.2001, A.H. Kirk-Spriggs, Malaise trap; 4♀ Katima Mulilo Dist., Salambala campsite, 17°50'01"S 24°36'09"E, 22–24.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap; 1♂ 2♀ same except 1–4.iii.2001, A.H. Kirk-Spriggs (all NMNW). *Erongo*: 3♀ Brandberg Dist., Mason Shelter, 21°04'39"S 14°05'43"E, 1750 m, 5–14.iii.2002, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed (MNRJ, DZUP, NMNW). *Kavango*: 3♀ Rundu Dist., Sovo, 18°18'37.2"S 19°15'36.7"E, 21–24.iv.2001, E. Marais, S. Kasch & K. Vohland, Malaise trap, deciduous woodland (NMNW). *Kunene*: 3♂ 1♀ Khorixas Dist., Leeukop 664, 19°53'15"S 14°21'44"E, 26–30.x.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed (1♂ MNRJ, 1♂ DZUP, other NMNW).

Distribution: Widespread in the Afrotropical and Oriental regions, Middle East, eastwards to China and Melanesia.

Musca crassirostris Stein, 1903

Diagnosis: Eye bare; proboscis swollen, boat-shaped, with strongly developed prestomal teeth; palpus yellow; anterior spiracle dark brown; postalar ridge without setulae; proepisternal depression bare; scutum brown, with grey pollinosity and 4 dark brown vittae behind suture; dorsocentral setae 2+4; fore tibia without posterior seta in apical half; mid tibia with strong anteroventral seta on middle third.

Material examined: NAMIBIA: *Caprivi*: 1♂ 8♀ Katima Mulilo Dist., Ndopu village, 1 km SE Bukalo, SE1724Da, 14–20.iv.2006, A.H. Kirk-Spriggs, Malaise trap (AMGS); 1♀ Katima Mulilo Dist., Salambala campsite, 17°50'01"S 24°36'09"E, 22–24.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap. *Kavango*: 1♂ Rundu Dist., Katara, 17°48'56"S 18°53'38"E, 20–23.i.1998, A.H. Kirk-Spriggs & E. Marais, sweeping marginal grasses & reeds; 1♂ same, except 17°48'56"S 18°53'38"E, Malaise trap. *Khomas*: 1♂ 2♀ Windhoek Dist., Kupferberg 33, 22°40.65'S 16°59.18'E, 20.xii.2000, Malaise trap, Marais & S. Kasch (NMNW).

Distribution: Widespread in the Afrotropical Region (including Cape Verde and Socotra Is.); North Africa, Middle East; Oriental Region to Taiwan and Lombok.

Musca domestica calleva Walker, 1849

Diagnosis: *Musca domestica* L., 1758, *sensu lato*, differs from all other species recorded from Namibia in having fine setulae on the proepisternal depression. The subspecies *M. d. calleva* differs from *M. d. domestica* and *M. d. curviforceps* Saccà & Rivosecchi, 1956, by having the presutural and first few postsutural dorsocentral setae reduced and barely half the length of the posterior two pairs of postsutural dorsocentral setae.

Material examined: NAMIBIA: *Caprivi*: 1♀ West Caprivi Park, Nova, 5 km N, 18°09'56"S 21°44'31"E, 16–18.xii.1999, E. Marais, D.J. Mann & D. Newman, Warthog burrows. *Erongo*: 1♂ 1♀ Brandberg Dist., below Wasserfallfläche, 21°10'43"S 14°32'51"E, 18–22.iii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap; 3♀ Brandberg Dist., Mason Shelter, 21°04'39"S 14°05'43"E, 1750 m, 5–14.iii.2002, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed. *Kavango*: 1♂ Kuring-Kuru, 6.vii.1965, S. Stein; 1♀ Rundu Dist., Mile 46 Agric. Research Station, 18°18'22"S 19°15'24"E, 21–24.iv.2001, E. Marais, S. Kasch & K. Vohland. *Khomas*: 1♀ Windhoek, 22°34'S 17°05'E, iii.1985, [State Museum staff]. *Kunene*: 2♀ Khorixas Dist., Leeukop 664, 19°53'15"S 14°21'44"E, 26–30.x.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed; 1♀ Khorixas Dist., Hoanib R near Dubis, 19°13'36"S 13°22'84"E, 28.xii.1999, E. Marais, D.J. Mann & K. Vohland, elephant dung (all NMNW).

Distribution: Widespread and common in the Afrotropics (incl. Aldabra, Astove, Madagascar, Seychelles and Socotra Is.), North Africa and Middle East, Azores, Canary Is.

Musca fragilis sp. n.

Figs 1–5

Etymology: From Latin *fragilis* (fragile).

Diagnosis: *Musca fragilis* sp. n. is very small with a shiny brown scutum, contrasting markedly with the shiny translucent yellow abdominal tergites 1+2–4.

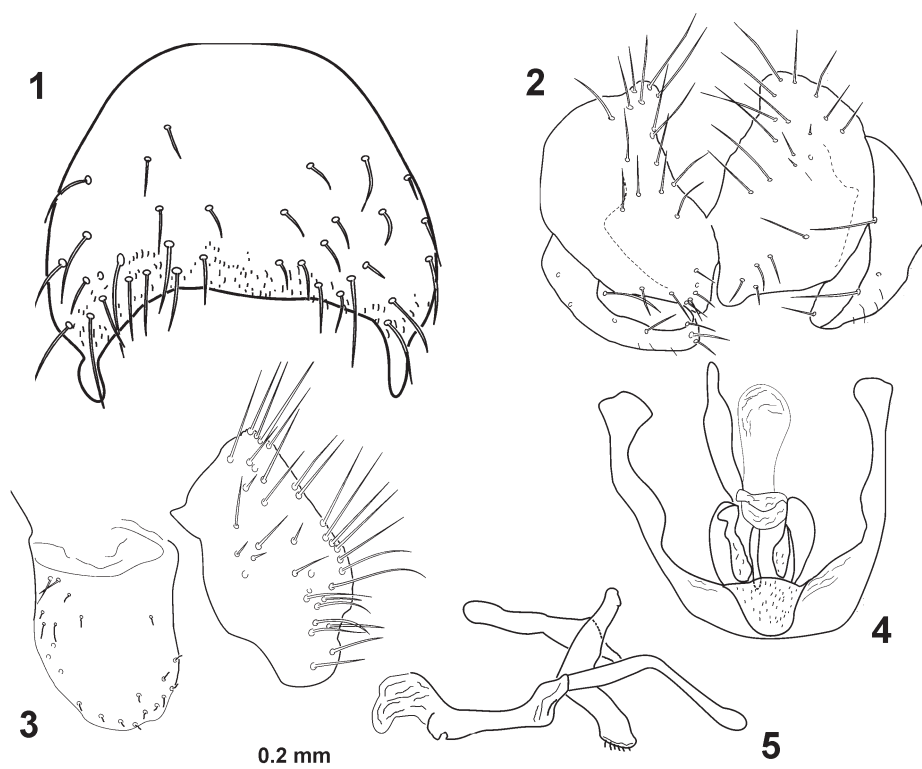
Description (based on holotype):

Overall length: 3.8 mm.

General colouration: Scutum shiny brown, abdomen shiny yellow, with translucent tergites 1+2–4, tergite 5 brown, with grey pollinosity; fronto-orbital plate and parafacial brown, silver pollinose from certain angles; lunule reddish brown; antenna, arista and palpus dark brown; anterior spiracle brown; calypters whitish; haltere with yellow knob. Wing hyaline. Legs uniformly brown, pulvilli white.

Head: Eyes well developed, closely approximated, separated at vertex by distance slightly wider than diameter of ocellar triangle. Fronto-orbital plate narrow. Vertical setae short. Frontal row with series of very fine pairs of setae, pair closest to lunula slightly more distinct. Antenna inserted below mid level of eye; postpedicel about 1.8× as long as pedicel. Arista with long plumes. Palpus filiform, of equal diameter throughout its length.

Thorax: Acrostichals 0+1; dorsocentrals 2+4, first two postsutural setae short, last long; 2 postpronotals; 1 presutural; 2 intra-alars; 1 supra-alar; prealar absent. Notopleuron with 2 setae, similar in size, disc without setulae. Postalar ridge bare. Scutellum with



Figs 1–5. *Musca fragilis* sp. n., male: (1) sternite 5; (2, 3) cercal plate and surstyli, dorsal (2) and lateral (3) views; (4, 5) phallic complex, dorsal (4) and lateral (5) views.

basal and apical pair of long setae and short preapical pair. Anepisternum with series of 5 fine setae. Katepisternals 1+2, all of similar size; disc of katepisternum with some fine setulae. Anepimeron setulose; meron bare. Lower calypter of the *Musca*-type. Wing veins bare. Fore femur with complete rows of posterodorsal and posteroventral setae; fore tibia without posterior median seta. Mid femur with 1 anterior median seta; 1 ventral seta in basal third and 2 subapical posterior setae; mid tibia with 2 posterior setae on mid third and one strong apical ventral seta. Hind femur with complete rows of setae on anterodorsal and anteroventral surfaces, the setae on anteroventral row are stronger on apical half than on basal half; hind tibia with long dorsal preapical seta.

Abdomen: All tergites clothed in fine setae, the setae are a little longer on marginal rows and on discal row of tergite 5.

Terminalia: Cercal plate as high as wide; surstylus large (Figs 2, 3). Aedeagus as in Figs 4, 5.

Holotype: ♂ NAMIBIA: Khorixas District, Leeukop 664, 19°53'15"S 14°21'44"E, 26–30.x.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap sample riverbed (NMNW).

Paratype: ♂ same data as holotype (MNRJ).

Musca hugonis Pont, 1980

Diagnosis: Eye bare; postalar ridge without setulae; proepisternal depression bare; scutum brown with grey pollinosity and 4 dark brown vittae; fore tibia with 1 posterior seta in apical ½; mid tibia with anteroventral setae in apical half.

Material examined: NAMIBIA: *Caprivi*: 8♂ Katima Mulilo Dist., Salambala pan, 17°50'00"S 24°35'58"E, 1–4.iii.2001, A.H. Kirk-Spriggs, Malaise trap (1♂ MNRJ, 1♂ DZUP, other NMNW); 5♂ Katima Mulilo Dist., Salambala campsite, 17°50'01"S 24°36'09"E, 1–4.iii.2001, A.H. Kirk-Spriggs, Malaise trap. *Hardap*: 2♂ Mariental Dist., Viljoenskroon 507, 26°08'39"S 19°57'11"E, 7–9.ii.1998, E. Marais & A.H. Kirk-Spriggs. *Kunene*: 4♂ Khorixas Dist., Leeukop 664, 19°53'15"S 14°21'44"E, 26–30.x.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed. *Omaheke*: 1♂ Gobabis Dist., Somerkoms 521, 22°01'59"S 19°57'22"E, 6–8.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap (all NMNW).

Distribution: Botswana, Namibia and South Africa.

Musca lasiophthalma Thomson, 1869

Diagnosis: Eye densely hirsute; scutum brown, with grey pollinosity and 4 dark brown vittae; presutural dorsocentral setae absent or setula-like, postsutural setae 1 pair; proepisternal depression bare; anterior spiracle white; legs dark brown; fore tibia with posterior seta; mid tibia with *ca* 4 posterior setae.

Material examined: NAMIBIA: *Caprivi*: 2♀ Katima Mulilo Dist., Ndopu village, 1 km SE Bukalo, SE1724Da, 14–20.iv.2006, A.H. Kirk-Spriggs, Malaise trap (AMGS).

Distribution: Democratic Republic of Congo, Nigeria, eastern and southern Africa, Yemen.

Musca lusoria Wiedemann, 1824

Diagnosis: Eye bare; fronto-orbital plate and gena silvery pollinose; anterior spiracle white; dorsocentral setae 2+4; proepisternal depression bare; scutum dark brown, with grey pollinosity and 4 dark brown vittae; dorsocentral setae 2+4; vein R_{4+5} with row of ventral setulae extending at least to *r-m* crossvein; fore tibia without posterior seta in apical half.

Material examined: NAMIBIA: *Caprivi*: 2♂ 15♀ Katima Mulilo Dist., Ndopu village, 1 km SE Bukalo, SE1724Da, 14–20.iv.2006, A.H. Kirk-Spriggs, Malaise trap (AMGS); 3♀ Katima Mulilo Dist., Salambala pan, 17°50'00"S 24° 35'58"E, 1–4.iii.2001, A.H. Kirk-Spriggs, Malaise trap; 3♀ Katima Mulilo, Salambala, 4 km NE, 17°49'21"S 24°36'07"E, 25.ii–1.iii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap (all NMNW); 1♂ 10♀ Katima Mulilo Dist., Salambala campsite, 17°50'01"S 24°36'09"E, 22–24.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap (1♀ MNRJ, 1♀ DZUP, other NMNW); 15♀ same except 1–4.iii.2001, A.H. Kirk-Spriggs; 1♀ Mudumu Game Reserve, Nakatwa, 18°11'S 23°25'E, 8–13.iii.1992, E. Marais & M. Pusch. *Erongo*: 2♂ Namib-Naukluft Park, Namib Desert Research Station, Kuiseb River, 23°33'45"S 15°02'38"E, 420 m, 15–23.i.1997, I. Kapofi & M.E. Irwin, Malaise in riparian vegetation; 1♀ Brandberg, below Wasserfallfläche, 21°10'43"S 14°32'51"E, 18–22.iii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap; 2♀ Brandberg, Mason Shelter, 21°04'39"S 14°05'43"E, 1750 m, 5–14.iii.2002, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed. *Hardap*: 1♀ Mariental Dist., Viljoenskroon 507, 25°10'S 19°58'E, 24–25.xii.1995, E. Marais; 1♀ Rehoboth, Ella West 427, 4.ix.1972, [State Museum staff]; 1♀ Fischersbrunn, Diamond Area 2, 24°39'S 14°43'E, 20–21.v.1984, J. Irish & H. Liessner. *Karas*: 1♀ Bethanie, Riverside 135, 23–16.x.1971, [State Museum staff]; 1♀ Bethanie, Riverside 135, 23–16.x.1971, [State Museum staff]; 1♀ Keetmanshoop, Noachabeb 97, 7–12.i.1972, [State Museum staff]. *Kavango*: 1♀ Popa Falls, 18°07'S 21°33'E, 26–31.viii.1971, [State Museum staff]; 2♀ Andara, 20–25.viii.1971, [State Museum staff]; 1♀ Shadkongora, 24.viii.1971, [State Museum staff]; 1♀ Rundu Dist., Mile 46 Agricultural Research Station, 18°18'22"S 19°15'24"E, 21–24.viii.2001, E. Marais, S. Kasch & K. Vohland, Malaise trap; 1♀ Rundu, Sovo, 18°18'37.2"S 19°15'36.7"E, 21–24.iv.2001, E. Marais, S. Kasch & K. Vohland, Malaise trap. *Komas*: 1♀ Windhoek, Avis Dam, 27–28.ii.1974, [State Museum staff]; 1♀ Windhoek, Opembamewa, 22°30'S 17°30'E, 2–7.ii.1984, H. Liessner; 1♀ Windhoek Dist., 22°34'S 17°05'E, i.1984, [State Museum staff]; 1♀ Windhoek Dist., Wasservallei 382, 21–23.xii.1973, [State Museum staff]; 4♀ Windhoek, Arnhem 222, 23–27.x.1972, [State Museum staff]. *Kunene*: Khorixas Dist., Leeukop 664, 19°53'15"S 14°21'44"E, 26–30.x.2001, 2♂ 1♀ Kirk-Spriggs & Marais, Malaise trap, riverbed. *Omaheke*: 2♀ Gobabis Dist., Somerkoms 521, 22°01'59"S 19°57'22"E, 6–8.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap; 1♀ Gobabis Dist., De Hoek 878, 21°56'26"S 20°58'55"E, 3–6.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap. *Oshikoto*: 2♂ Tsumeb, Ghaub 47, 19°28'S 17°00'E, 16–26.vii.1986, J. Irish, Malaise trapping; 1♂ Etosha N.P., Ondundo Hills, 19°15'S 15°43'E, 8.viii–16.ix.1987, E. Griffin, preservation pitfall traps; 1♀ Omaruru Dist., Okatjerute 66/Otjikete 07, 17.xi.1971, [State Museum staff] (all NMNW).

Distribution: Widespread in the continental Afrotropical Region, Indian subregion, Egypt and Iran.

Musca patersoni Zielke, 1971

Diagnosis: Eye bare; anterior spiracle white; postalar ridge without setulae; proepisternal depression bare; scutum dark brown with grey pollinosity and 4 dark brown vittae; dorsocentral setae 2+4; vein R_{4+5} with 1 ventral seta at base; fore tibia without posterior seta in apical half.

Material examined: NAMIBIA: *Oshikoto*: 1♂ Etosha Game Park, 18°30'S 16°45'E, 19.v–26.vi.1986, E. Griffin, pitfall traps (NMNW).

Distribution: Democratic Republic of Congo, Namibia and Rwanda.

Musca sorbens Wiedemann, 1830

Diagnosis: Eye bare; postalar ridge without setae; proepisternal depression bare; scutum brown with grey pollinosity and 2 dark brown vittae behind suture; dorsocentral setae 2+4; meron setulose below spiracle; anterior spiracle white or pale yellow; fore tibia without posterior seta in apical half; mid tibia with *ca* 4 posterior setae.

Material examined: NAMIBIA: *Erongo*: 5♀ Brandberg Dist., Mason Shelter, 21°04'39"S 14°05'43"E, 1750 m, 5–14.iii.2002, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed (1♀ MNRJ, 1♀ DZUP, other NMNW). *Karas*: 1♂ 1♀ Lüderitz [District], Rooiberg, 27°38'S 16°28'E, 22–24.ix.1997, A.H. Kirk-Spriggs & E. Marais, Malaise trap; 1♀ Lüderitz [District], Klinghardt Mnts., 27°20'04"S 15°46'00"E, 27.vii–3.ix.1998, A.H. Kirk-Spriggs & E. Marais, Malaise trap; 1♀ Lüderitz [District], Obib Waters, 28°00'08"S 16°38'46"E, 25–26.viii.1998, A.H. Kirk-Spriggs & E. Marais, Malaise trap. *Kavango*: 1♂ Rundu Dist., Sovo, 18°18'37.2"S 19°15'36.7"E, 21–24.iv.2001, E. Marais, S. Kasch & K. Vohland, Malaise trap. *Kunene*: 2♂ 2♀ Khorixas Dist., Leeukop 664, 19°53'15"S 14°21'44"E, 26–30.x.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap,

riverbed; 2♂ Khorixas Dist., Huab River at Krone 721, 20°37'09"S 13°54'31"E, 23–26.x.1998, A.H. Kirk-Spriggs, reared from *Panthera pardus* (Felidae) dung on sand. *Omaheke*: 5♀ Gobabis Dist., Somerkoms 521, 22°01'59"S 19°57'22"E, 6–8.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap (all NMNW).

Distribution: Widespread and abundant in the Afrotropical Region (incl. Aldabra, Astove, Coetivy, Cosmoledo, Madagascar, Mauritius, Réunion, Seychelles, Socotra Is.), the southern Palaearctic and Oriental regions.

Musca tempestatum (Bezzi, 1908)

Diagnosis: Eye bare; proboscis with long labella; *ca* 7 pairs of frontal setae; anterior spiracle dark brown; dorsocentral setae 1+3; postalar ridge without setulae; proepisternal depression bare; scutum brown with grey pollinosity and 2 dark brown vittae behind suture; dorsocentral setae 1+3; fore tibia with 1 posterior seta in apical half.

Material examined: NAMIBIA: *Kunene*: 1♂ Opuwo, Ondjamu Hill, 17°48'S 12°50'E, 28.ii.1996, E. Marais & A.H. Kirk-Spriggs (NMNW).

Distribution: Widespread in continental Afrotropical Region, except Congo Basin.

Musca ventrosa Wiedemann, 1830

Diagnosis: Eye bare; *ca* 13 pairs of frontal setae; anterior spiracle white; postalar ridge without setae; proepisternal depression bare; scutum dark brown, with grey pollinosity and 4 dark brown vittae; dorsocentral setae 2+4; fore tibia without posterior seta in apical half; abdomen predominantly orange-red.

Material examined: NAMIBIA: *Caprivi*: 2♂ 2♀ Katima Mulilo Dist., Ndopu village, 1 km SE Bukalo, SE1724Da, 14–20.iv.2006, A.H. Kirk-Spriggs, Malaise trap (AMGS); 2♀ Salambala campsite, 17°50'01"S 24°36'09"E, 22–24.ii.2001, A.H. Kirk-Spriggs, Malaise trap (NMNW).

Distribution: Throughout the continental Afrotropical Region, Oriental Region, east to Melanesia, Australia and Vanuatu.

Musca xanthomelaena Wiedemann, 1824

Diagnosis: Eye bare; anterior spiracle white; postalar ridge without setulae; proepisternal depression bare; scutum dark brown, with grey pollinosity and 4 dark brown vittae; dorsocentral setae 4+5; vein R_{4+5} with *ca* 4 ventral setulae at base; fore tibia without posterior seta on apical half; abdominal sternites orange.

Material examined: NAMIBIA: *Caprivi*: 7♂ 1♀ Katima Mulilo Dist., Ndopu village, 1 km SE Bukalo, SE 1724Da, 14–20.iv.2006, A.H. Kirk-Spriggs, Malaise trap (AMGS); 1♂ Katima Mulilo Dist., Salambala campsite, 17°50'01"S 24°36'09"E, 1–4.iii.2001, A.H. Kirk-Spriggs, Malaise trap; 5♂ 1♀ Katima Mulilo Dist., Salambala campsite, 17°50'01"S 24°36'09"E, 22–24.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap. *Erongo*: 2♀ Brandberg Dist., Mason Shelter, 21°04'39"S 14°05'43"E, 1750 m, 5–14.iii.2002, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed; 1♂ Brandberg, below Wasserfallfläche, 21°10'43"S 14°32'51"E, 18–22.iii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap; 1♀ Gobabeb 21.xi.1978, Pool, [?] Wharton. *Kavango*: 2♂ 1♀ Rundu Dist., Sovo, 18°18'37.2"S 19°15'36.7"E, 21–24.iv.2001, E. Marais, S. Kasch & K. Vohland, Malaise trap. *Komas*: 1♂ Windhoek, Kupferberg 33, 22°40.65'S 16°59.18'E, 20.xii.2000, E. Marais & S.S. Kasch, Malaise trap. *Kunene*: 5♂ Khorixas Dist., Leeukop 664, 19°53'15"S 14°21'44"E, 26–30.x.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed (all NMNW); 6♂ Khorixas Dist., Leeukop 664, 19°53'15"S 14°21'44"E, 26–30.x.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed (1♂ MNRJ, 1♂ DZUP, other NMNW). *Omaheke*: 1♀ Gobabis Dist., Somerkoms 521, 22°01'59"S 19°57'22"E, 6–8.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap. *Oshikoto*: 1♂ Etosha N.P., Ekuma river, 18°34'S 15°59'E, 30.iv.1987, E. Marais & J. Irish; 1♀ Etosha N.P., Kaross, 19°23'S 14°32'E, 9–10.v.1987, J. Irish & E. Marais (all NMNW).

Distribution: Widespread in the Afrotropical Region (including Cape Verde, Comoros, Madagascar, Mauritius, Réunion and Rodriguez Is.); Palaearctic Region (Egypt).

Genus *Muscina* Robineau-Desvoidy, 1830

Two species are known from the Afrotropical Region (Pont 1980). *Muscina stabulans* (Fallén, 1817) was recorded from Namibia by Bezzi (1908: 191, Rooibank in the hinterland of Walfischbay) and Lindner (1976: 78, Swakopmund). The species was not found among the material examined.

Genus *Neomyia* Walker, 1859

Forty-three species of the genus are recorded from the Afrotropical Region (Pont 1980), only one is recorded from Namibia: *N. splendida* (Adams, 1905) (Bezzi 1908: 191, Kubub and Aar, as *Pyrellia boersiana* (Bigot, 1877); Zielke 1971a: 175, Otjiwarongo, Farm Abechaus). For generic diagnoses see Couri *et al.* (2006), Emden (1939) and Zielke (1971c). *Neomyia splendida* was found among the material examined here.

Neomyia splendida (Adams, 1905)

Diagnosis: Overall length *ca* 6–7 mm; anterior pair of presutural dorsocentral setae setula-like; wing membrane with at least basal part of discal cell without microtrichiae; abdominal tergite 5 pollinose or not.

Material examined: NAMIBIA: *Karas*: 2♂ Bethanie, Vogelstrasskluft 87, 24–29.ix.1974, [State Museum staff]; 2♀ Lüderitz [District], Skerpioenkop, 27°46'00"S 16°29'56"E, 20–22.ix.1997, A.H. Kirk-Spriggs & E. Marais, yellow trays; 1♀ Lüderitz, Tsaus, 27°10'29"S 16°07'06"E, 24–26.ix.1997, A.H. Kirk-Spriggs & E. Marais, yellow trays. *Hardap*: 1♂ Mariental Dist., Viljoenskroon 507, 25°10'S 19°58'E, 3–9.xii.1998, G. Oliver, Malaise trap (all NMNW).

Distribution: Widespread in the continental Afrotropical Region.

Genus *Pseudohelina* Vockeroth, 1972

An Afrotropical genus containing nine species (Pont 1980). *Pseudohelina rufina* (Stein, 1906) was recorded from Namibia by Zielke (1974: 35–36, 12 miles NW Namutoni), but was not found among the material examined.

Genus *Pyrellia* Robineau-Desvoidy, 1830

Twelve species of the genus are known from the Afrotropical Region (Pont 1980). Couri *et al.* (2006) described a new species from Madagascar. See Couri *et al.* (2006) for generic diagnosis. Zielke (1971c) revised the Afrotropical species. Only *Pyrellia scintillans* (Bigot, 1888) (Paterson 1960: 400, Anabib (Orupembe), 100 miles W of Ohopoho) is recorded from Namibia. *Pyrellia spinthera* (Bigot, 1878) and *P. natalensis* Paterson, 1958 represent new records.

Pyrellia natalensis Paterson, 1958

Diagnosis: Prescutum with median white pollinose vitta; anterior spiracle dark brown; greater ampulla bare; mid tibia with 4–6 posterior setae, 1 strong ventral apical seta, without apical anterodorsal seta; vein R_{4+5} almost bare with few setulae only at base.

Material examined: NAMIBIA: *Caprivi*: 1♀ Katima Mulilo Dist., Salambala campsite, 17°50'01"S 24°36'09"E, 1–4.iii.2001, A.H. Kirk-Spriggs, Malaise trap (NMNW).

Distribution: Namibia and South Africa.

Pyrellia spinthera (Bigot, 1878)

Diagnosis: Prescutum without median white pollinose vitta; anterior spiracle dark brown; greater ampulla bare; mid tibia with 4 posterior setae and 1 long posteroventral seta.

Material examined: NAMIBIA: *Caprivi*: 1♂ Katima Mulilo Dist., Salambala campsite, 17°50'01"S 24°36'09"E, 22–24.ii.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap; 3♂ same except 1–4.iii.2001, A.H. Kirk-Spriggs; 1♂ West Caprivi Park, Ougali River, 18°01'S 22°18'E, 7.iv.1990, E. Marais. *Karas*: 1♀ Bethanien, Vogelstrausskluff 87, 24–29.ix.1974, [State Museum staff]; 1♂ Bethanien District, Aukam 104, 26°49'1"S 16°56'E, 7–19.viii.1990, C. Roberts & E. Marais, preservation pitfall traps. *Komas*: 1♂ Windhoek Dist., Kupferberg 33, 22°40.65'S 16°59.18'E, 20.xii.2000, E. Marais & S.S. Kasch, Malaise trap (all NMNW). *Kunene*: 2♀ Khorixas Dist., Leeukop 664, 19°53'15"S 14°21'44"E, 26–30.x.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed (MNRJ, NMNW).

Distribution: Cameroun, Democratic Republic of Congo, Mozambique, Namibia, South Africa, Tanzania and Uganda.

Genus *Spilogona* Schnabl, 1911

Seventeen species are known from the Afrotropical Region (Pont 1980). *Spilogona aristalis* Zielke, 1971 was described from Namibia (Zielke 1971b: 294, Walvis Bay and Windhoek), but was not found among material studied here.

Genus *Stomoxys* Geoffroy, 1762

Fourteen species are known from the Afrotropical Region, but this is the first record of the genus from Namibia. Emden (1939) studied Afrotropical material and Zumpt (1973) revised the Afrotropical species. For generic diagnosis see Couri *et al.* (2006). Bezzi (1908: 191) recorded *S. korogwensis* Grünberg, 1906 from Rooibank in the hinterland of Walfischbay, but *S. korogwensis* is a junior synonym of *Stomoxys calcitrans* (Linnaeus, 1758) and it appears certain that Bezzi's specimens must represent *S. niger* Macquart, 1851.

Stomoxys niger Macquart, 1851

Diagnosis: Frons subparallel in posterior half; width of ♂ frons at narrowest point about quarter or less than eye-length; width of ♀ frons <0.5 of eye length; abdomen with dark brown transverse band on hind margin of syntergite 1+2, and transverse band on posterior third of tergites 3 and 4, abutting posterior margin; median dark maculae on basal half of tergites 3–5.

Material examined: NAMIBIA: *Caprivi*: 8♀ Katima Mulilo Dist., Ndopu village, 1 km SE Bukalo, SE1724Da, 14–20.iv.2006, A.H. Kirk-Spriggs, Malaise trap (AMGS). *Erongo*: 1♀ Blinkpan Saltworks, 22°57'S 29°19'E, 14.i.1988, E. Holm & E. Marais, fruit bait traps. *Karas*: 5♀ Karasburg Dist., Aussenkehr, Fountain 2, 28°26.1'S 17°36.2'E, 25.viii.2000, E. Marais, at light. *Kunene*: 4♂ 9♀ Khorixas Dist., Leeukop 664, 19°53'15"S 14°21'44"E, 26–30.x.2001, A.H. Kirk-Spriggs & E. Marais, Malaise trap, riverbed (all NMNW).

Distribution: Widespread in the Afrotropical Region, including Cape Verde, Madagascar, Mauritius, Réunion, Rodriguez, Seychelles Is. and South Yemen.

ACKNOWLEDGEMENTS

The authors are very grateful to Ashley Kirk-Spriggs (National Museum, Bloemfontein, South Africa) for the loan of the material; to John Irish (Windhoek, Namibia) who kindly checked some localities in Namibia; to Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq, processes 3013012007-7 and 300873/2008-5, respectively) for research grants and financial support; and to Kiany Tomita de Mira (Universidade Federal do Paraná, Brazil) for laboratory support.

REFERENCES

- BECKER, T. 1903. Aegyptische Dipteren. *Mitteilungen aus dem Zoologischen Museum in Berlin* **2**: 67–195.
- BEZZI, M. 1908. Zoologische und Anthropologische Ergebnisse einer Forschungsreise im westlichen und zentralen Südafrika ausgeführt in den Jahren 1903–1905 mit Unterstützung der Kgl. Preussischen Akademie der Wissenschaften zu Berlin von Dr. Leonhard Schultze, Professor der Erdkunde an der Universität Jena. Erster Band: Systematik und Thiergeographie. 6. Simuliidae, Bombyliidae, Empididae, Syrphidae, Tachinidae, Muscidae, Phycodromidae, Borboridae, Trypetidae, Ephyridae, Drosophilidae, Geomyzidae, Agromyzidae, Conopidae. *Denkschriften der medizinisch-naturwissenschaftlichen Gesellschaft zu Jena* **13**: 179–201.
- 1911 (1912). Miodarii superiori raccolti dal signor C.W. Howard nell’Africa australe orientale. *Bollettino del Laboratorio di Zoologia Generale e Agraria ella R. Scuola Superiore d’Agricoltura in Portici* **6**: 45–104.
- COURI, M.S., PONT, A.C. & PENNY, N.D. 2006. Muscidae (Diptera) from Madagascar: identification keys, descriptions of new species, and new records. *Proceedings of the California Academy of Sciences* (4) **57**: 799–923.
- DEEMING, J.C. 1971. Some species of *Atherigona* Rondani (Diptera, Muscidae) from northern Nigeria, with special reference to those injurious to cereal crops. *Bulletin of Entomological Research* **61**: 133–190.
- 1975. Some species of *Atherigona* (Diptera, Muscidae) collected by Prof. E. Lindner in Africa. *Stuttgarter Beiträge zur Naturkunde (A)* **279**: 1–4.
- 1979. Diptera Muscidae Atherigonini from the Comoros Archipelago. *Mémoires du Muséum National d’Histoire Naturelle* **109**: 367–370.
- 1987. Some new and little known species of *Atherigona* Rondani (Diptera: Muscidae) from the Malagasian subregion. *Entomologist’s Monthly Magazine* **123**: 15–25.
- 2000. Muscidae: Atherigonini (Diptera: Muscoidea). In: Kirk-Spriggs, A.H. & Marais, E., eds, *Daures – biodiversity of the Brandberg Massif, Namibia. Cimbebasia Memoir* **9**: 283–287.
- DIKE, M.C. 1989. A key for the identification of Afrotropical species of the shoot-fly subgenus *Atherigona* of *Atherigona* (Diptera: Muscidae), with a description of some new species from Africa. *Bulletin of Entomological Research* **79**: 545–566.
- 1990. Two new species of *Atherigona* from Nigeria with a key for the identification of Afrotropical species of the subgenus *Acritochaeta* (Diptera: Muscidae). *Systematic Entomology* **15**: 297–303.
- EMDEN, F.I., VAN. 1939. Muscidae: A – Muscinae and Stomoxydinae. In: *Ruwenzori Expedition 1934–35*. Vol. 2. London: British Museum (Natural History), pp. 49–89.
- 1948. Diptera: Muscidae. In: *Expedition to South-West Arabia 1937–38*. Vol. 1. London: British Museum (Natural History), pp. 161–175.
- 1951. Muscidae: C. – Scatophaginae, Anthomyiinae, Lispinae, Fanniinae and Phaoniinae. In: *Ruwenzori Expedition 1934–35*. Vol. 2. London: British Museum (Natural History), pp. 325–710.
- 1956. Contributions à l’étude de la faune entomologique du Ruanda-Urundi (Mission P. Basilewsky 1953). CVIII. Diptera Muscidae. *Annales du Musée Royal du Congo Belge, Série in 8°, Sciences Zoologiques* **51**: 506–531.
- 1958. Results of the Zoological Expedition of Professor Dr. Håkan Lindberg to the Cape Verde Islands in the winter 1953–54. No 24. Muscidae collected on the Cape Verde Islands. *Commentationes Biologicae* **20** (1): 1–18.
- HENNIG, W. 1964. Muscidae. [Part, Lieferung 248.] In: Lindner, E., ed., *Die Fliegen der palaearktischen Region*. B. 63b. Stuttgart: Schweizerbart, pp. 961–1008.
- JAMES, M.T. 1947. The flies that cause myiasis in man. *Miscellaneous Publications of the United States Department of Agriculture* **631**: 1–175.
- LINDNER, E. 1976. Zur Kenntnis der Dipterenfauna Südwestafrikas, VI–VIII. *Journal of the South-West Africa Scientific Society* **30**: 75–82.
- MALLOCH, J.R. 1929. Exotic Muscaridae (Diptera). XXVIII. *Annals and Magazine of Natural History* (10) **4**: 97–120.
- MCALPINE, J.F. 1981. Morphology and terminology—Adults. In: McAlpine, J.F., Peterson, B.V., Shewell, G.E., Teskey, H.J., Vockeroth, J.R. & Wood, D.M., eds, *Manual of Nearctic Diptera*. Vol. 1. Monograph 27. Ottawa: Research Branch, Agriculture Canada, pp. 9–63.
- PATERSON, H.E. 1953. New *Lispe* species (Dipt., Muscidae) from southern Africa. *Journal of the Entomological Society of South Africa* **16**: 168–178.
- 1957. Three new species of *Musca* from southern Africa (Dipt., Muscidae). *Journal of the Entomological Society of South Africa* **20**: 106–113.
- 1960. Diptera (Brachycera, Muscidae): Muscinae and Lispinae. In: Hanström, B., Brinck, P. & Rudebeck, G., eds, *South African Animal Life*. Vol. 7. Uppsala: Almqvist & Wiksell, pp. 397–401.

- PATTON, W.S. 1936. Studies on the higher Diptera of medical and veterinary importance. A revision of the species of the genus *Musca*, based on a comparative study of the male terminalia. III. A practical guide to the Ethiopian species. *Annals of Tropical Medicine and Parasitology* **30**: 469–490.
- PERIS, S.V. & LLORENTE, V. 1963. Notas sobre Muscini paleárticos y revisión de las especies españolas (Diptera, Muscidae). *Boletín de la Real Sociedad Española de Historia Natural (Sección Biológica)* **61**: 209–269.
- PONT, A.C. 1977. The Australian and some other species of *Gymnodia* Robineau-Desvoidy (Diptera: Muscidae). *Australian Journal of Zoology* **25**: 347–369.
- 1980. Family Muscidae. In: Crosskey, R.W., ed., *Catalogue of the Diptera of the Afrotropical Region*. London: British Museum (Natural History), pp. 721–761.
- 1986. Studies on the Australian Muscidae (Diptera). VII. The genus *Atherigona* Rondani. *Australian Journal of Zoology*, Supplementary Series **120**: 1–90.
- 1992. Appendix 1. The world distribution, host range and abundance of *Atherigona orientalis* Schiner, 1868 (Insecta, Diptera, Muscidae). A report prepared for the Bureau of Rural Resources, Department of Primary Industries and Energy, Canberra, Australia. In: Cahill, M., *Eco-climatic assessment of Atherigona orientalis (Diptera) and its pest potential in New Zealand*. Bureau of Rural Resources, Information Paper no. **18/1/92**: 21–65.
- 2006. A new species of *Morellia* Robineau-Desvoidy, 1830 from the Seychelles Islands (Insecta, Diptera: Muscidae). *Phelsuma* **14**: 37–43.
- 2009. A new species of *Coenosia* Meigen, 1826 from the Seychelles Islands (Insecta, Diptera: Muscidae). *Phelsuma* **17**: 9–11.
- PONT, A.C. & DSOUILI, N. 2009 (2008). A new species of *Haematobosca* Bezzi from Gabon (Diptera, Muscidae). *Studia dipterologica* **15**: 259–266.
- PONT, A.C. & MAGPAYO, F.R. 1995. Muscid shoot-flies of the Philippine Islands (Diptera: Muscidae, genus *Atherigona* Rondani). *Bulletin of Entomological Research*, Supplement Series **3**: 1–123.
- STUCKENBERG, B.R. 1999. Antennal evolution in the Brachycera (Diptera), with a reassessment of terminology relating to the flagellum. *Studia dipterologica* **6**: 33–48.
- WEST, L.S. 1951. *The Housefly. Its natural history, medical importance, and control*. Ithaca, New York: Comstock.
- ZIELKE, E. 1970. Fundorte afrikanischer Muscinae (Diptera, Muscinae). *Zeitschrift für Angewandte Zoologie* **57**: 499–510.
- 1971a. Beitrag zur Kenntnis der Verbreitung afrikanischer Musciden (Muscidae; Diptera). *Entomologische Mitteilungen aus dem zoologischen Staatsinstitut und zoologischen Museum in Hamburg* **4** (73): 173–181.
- 1971b. New species of Muscidae from the Ethiopian region (Diptera). *Journal of the Entomological Society of South Africa* **34**: 289–304.
- 1971c. Revision der Muscinae der äthiopischen Region. *Series entomologica* **7**: 1–199.
- 1974. Beitrag zur Kenntnis der Verbreitung afrikanischer Musciden (Muscidae; Diptera). Teil III: Sammlung der California Academy of Sciences. *Zeitschrift für Angewandte Zoologie* **61** (1): 1–44.
- ZUMPT, F. 1973. *The Stomoxyine biting flies of the world. Diptera: Muscidae. Taxonomy, biology, economic importance and control measures*. Stuttgart: Gustav Fisher.

Appendix. List of genera and species of Muscidae recorded from Namibia. New records for Namibia are indicated with an asterisk (*).

***Atherigona* Rondani, 1856**

A. bedfordi Emden, 1940
A. falcata (Thomson, 1869)
A. hyalinipennis Emden, 1959
A. lineata ssp. *ugandae* Emden, 1940
A. mitrata Séguy, 1955*
A. naqvii Steyskal, 1966
A. orientalis Schiner, 1868
A. rubricornis Stein, 1913
A. tetrastigma Paterson, 1956
A. theodori Hennig, 1963

***Coenosia* Meigen, 1826**

C. strigipes Stein, 1916

***Dichaetomyia* Malloch, 1921**

D. cuthbertsoni Emden, 1942
D. luteiventris (Rondani, 1873)*

Graphomya* Robineau-Desvoidy, 1830

G. maculata (Scopoli, 1763)*

***Gymnodia* Robineau-Desvoidy, 1863**

G. flexa (Wiedemann, 1830)

Haematobia* Le Peletier & Serville, 1828

H. thirouxii (Roubaud, 1906)*

***Haematobosca* Bezzi, 1907**

H. uniseriata (Malloch, 1932)

***Helina* Robineau-Desvoidy, 1830**

H. coniformis (Stein, 1903)
H. icterica (Séguy, 1937)*
H. lucida (Stein, 1913)
H. usitata Emden, 1951*

***Hydrotaea* Robineau-Desvoidy, 1830**

H. capensis (Wiedemann, 1818)
H. jeanneli Séguy, 1938*

***Limnophora* Robineau-Desvoidy, 1830**

L. obsignata (Rondani, 1866)*
L. quaterna (Loew, 1852)
L. simulans Stein, 1913
L. thomasseti Emden, 1951

***Lispe* Latreille, 1797**

L. barbipes Stein, 1908
L. irvingi Curran, 1937
L. leucospila (Wiedemann, 1830)
L. zumpti Paterson, 1953

***Morellia* Robineau-Desvoidy, 1830**

M. nilotica (Loew, 1856)

***Musca* Linnaeus, 1758**

M. albina Wiedemann, 1830
M. alpesa Walker, 1849
M. conducens Walker, 1860
M. confiscata Speiser, 1924
M. crassirostris Stein, 1903*
M. domestica calleva Walker, 1849
M. domestica domestica Linnaeus, 1758
M. fragilis sp. n.*
M. freedmani Paterson, 1957
M. hugonis Pont, 1980*
M. lasiophthalma Thomson, 1869
M. lusoria Wiedemann, 1824
M. patersoni Zielke, 1971*
M. sorbens Wiedemann, 1830
M. tempestatum Bezzi, 1908
M. ventrosa Wiedemann, 1830*
M. xanthomelaena Wiedemann, 1824

***Muscina* Robineau-Desvoidy, 1830**

M. stabulans (Fallén, 1817)

***Neomyia* Walker, 1859**

N. splendida (Adams, 1905)

***Pseudohelina* Vockeroth, 1972**

P. rufina (Stein, 1906)

***Pyrellia* Robineau-Desvoidy, 1830**

P. natalensis Paterson, 1958*
P. scintillans Bigot, 1888
P. spinthera Bigot, 1878*

***Spilogona* Schnabl, 1911**

S. aristalis Zielke, 1971

Stomoxys* Geoffroy, 1763

S. niger Macquart, 1851*

