



Cixiidae (Hemiptera: Fulgoromorpha) from Namibia, with records from neighbouring countries

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Abstract

The Cixiidae (Hemiptera: Fulgoromorpha) fauna of Namibia and the Cixiidae collection of the National Museum Windhoek are revised. Six species, *Atonurus meridianus* (Van Stalle, 1984), *Eumecurus kibuyanus* (Fennah, 1955), *E. decempunctatus* (Van Stalle, 1984), *E. eryx* (Fennah, 1957), *E. mashonanus* (Van Stalle, 1987) and *E. incompletus* (Van Stalle, 1983), are reported from Namibia for the first time. Thus, 19 Cixiidae species (one Duiliini, 18 Pentastirini) are present in Namibia. In addition, one new species, *Eumecurus skofitschii* Huang & Holzinger nov. spec., is described from Angola, and *Eumecurus zairensis* (Van Stalle, 1987) is recorded from Malawi for the first time.

Key words: Rhynchota, Auchenorrhyncha, Cicadina, Fulgoromorpha, Malawi, Angola, *Atonurus*, *Duilius*, *Eumecurus*, *Pentastiridius*

Zusammenfassung

Die Glasflügelzikaden (Hemiptera: Fulgoromorpha: Cixiidae) von Namibia und jene der Sammlung des Nationalmuseums Windhoek werden revidiert. Sechs Arten, *Atonurus meridianus* (Van Stalle, 1984), *Eumecurus kibuyanus* (Fennah, 1955), *E. decempunctatus* (Van Stalle, 1984), *E. eryx* (Fennah, 1957), *E. mashonanus* (Van Stalle, 1987) und *E. incompletus* (Van Stalle, 1983), werden erstmals aus Namibia gemeldet. In Summe sind bislang 19 Cixiidae aus Namibia bekannt. Zudem wird eine neue Art, *Eumecurus skofitschii* Huang & Holzinger nov. spec., aus Angola beschrieben und *Eumecurus zairensis* (Van Stalle, 1987) erstmals aus Malawi gemeldet.

Introduction

Cixiidae is one of the largest families of planthoppers (Fulgoromorpha), comprising more than 150 genera and more than 2.000 species worldwide (Holzinger *et al.* 2002). First records of cixiids from Namibia were published by Stål (1855, 1858, 1866), and the first survey of known species was provided by Hesse (1925). Hesse's paper included six species, four of which were new to science. A "milestone" in African cixiid taxonomy was provided by Jan van Stalle, who revised and identified almost all material available and published his results in several papers (Van Stalle 1985a, 1985b, 1986a, b, c, 1987, 1988 etc.), Later, Emeljanov (1992) improved the taxonomy of African Pentastirini at the generic level.

Despite the above work, our knowledge on taxonomy and chorology of African Cixiidae remains inadequate. This study provides new data on the fauna of Namibia, with a few records of neighbouring countries.

Material

This study is based mainly on material collected by Eugene Marais in the late 1980s and 1990s (deposited in the Namibian National Insect Collection, National Museum of Namibia, Windhoek, Namibia, abbreviated subsequently as NMNW), and on material collected by Werner and Ingrid Holzinger during a field trip of the Zoological Institute of the Karl-Franzens-University Graz to Namibia in February 2000 (deposited partly in the collection of the Ökoteam Graz, Austria, abbreviated OEKO, and partly in the NMNW). The total number of specimens examined is 114 (68 males, 46 females). In addition, specimens already examined by Jan van Stalle and deposited in the Koninklijk Museum voor Midden-Afrika, Tervuren, Belgium (RMCA), were studied.

Taxonomy and morphology

In the following pages all cixiid species known from Namibia are discussed. Original name and type locality are given for all species, synonyms only if published after Van Stalle (1986a, 1987). Illustrations, mainly of male genitalia, are provided, if they appear to be helpful for species identification, or if specimens from Namibia differ from Van Stalle's descriptions. In addition, most species are presented in colour photographs.

Duiliini Emeljanov, 2002

Genus *Duilius* Stål, 1858

Type species: *D. tenuis* Stål, 1858.

About 25 species, distributed in the Ethiopian and in the Palaearctic realm.

Duilius tenuis Stål, 1858

Figs 1, 14–21

Duilius tenuis Stål, 1858: 319 (Type locality: "Territorium fluvii Svakop Africae meridionalis occidentalis")

Material examined. 4 males 8 females, Namibia, Brandberg, dry river bed near "White Lady" (21°05'S, 14°39'E), on *Tamarix usneoides*, 22.ii.2000 (W. and I. Holzinger) (OEKO); several additional specimens from 3 mls E Swakopmund, 30.i.1972, and nr. Onseepkans, Orange River banks, 8–10.i.1972, kept in The Natural History Museum, London, and in the Institut Royal des Sciences Naturelles de Belgique, Département d'Entomologie.

Description. Small cixiids, about 3.6 mm in length, with cylindrical body. Wings in resting position flat, roof-like. Ground colour of body yellowish to orange dorsally and ochraceous ventrally.

Vertex longer than broad, narrowing towards frons, with median carina reaching posterior margin. Junction of vertex and frons distinct, roundish. Face trapezoid, flat, ivory-coloured. Frons widening towards clypeus, its widest part immediately above the clypeus. Median carina cranially distinct, vanishing towards frontoclypeal suture. Frontoclypeal suture curved. Median ocellus not visible.

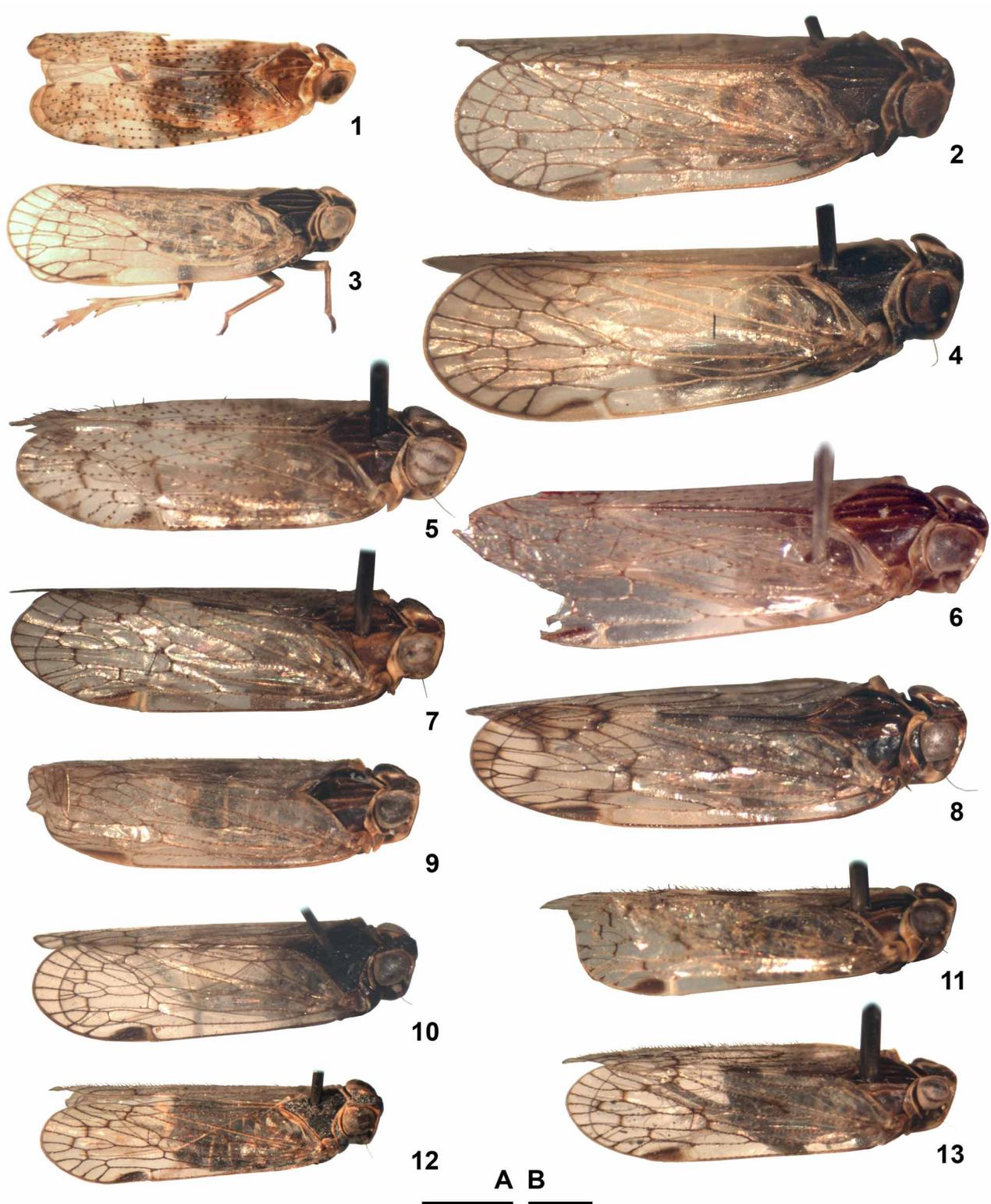
Pronotum small, caudal border with obtuse angle. Mesonotum with three longitudinal keels. Fore wings long, with brown setiferous tubercles along veins. Wing venation as shown in Fig. 21. Legs medium-sized, greenish, tibial spines with dark tips; tarsi with 5+5 apical spines.

Male genitalia as in Figs 14–20: Genital segment slightly asymmetrical, left side broader and shallowly concave. Basal part of aedeagus with one movable spine originating on the right side, then curved cephalo-left and directed ventro-right apically. Flagellum with a thin spine at the apex. Genital styles spoon-shaped, almost symmetrical. Shafts narrowed at midlength, with expanded apex broad and equal to half of the length of each shaft. Anal segment long, symmetrical in lateral view, with stunted finger-like processes at midlength of lateral margin.

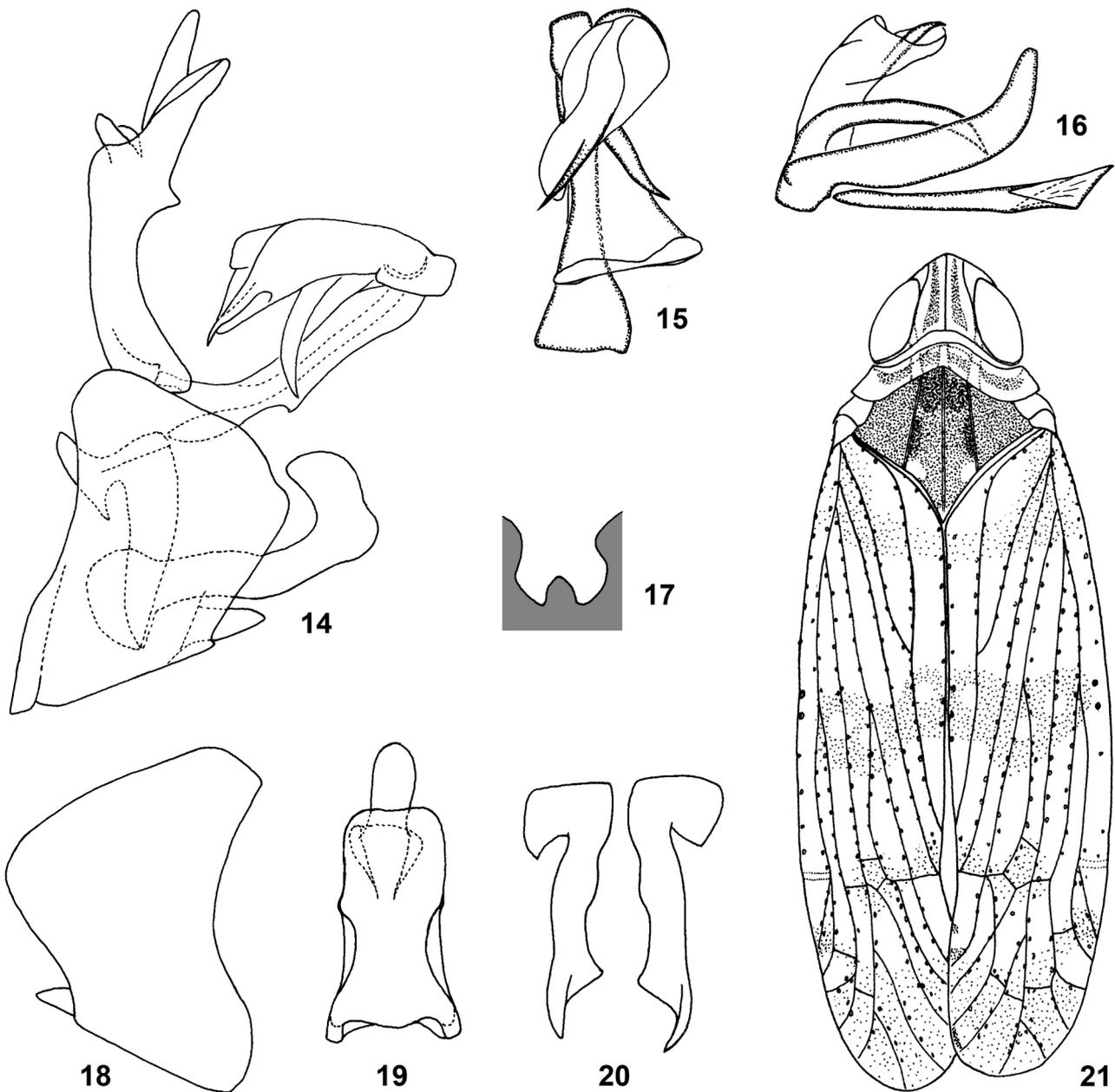
Distribution. Only known from Namibia, probably endemic.

Ecology. Obviously monophagous on *Tamarix usneoides* E. Meyer ex Bunge; this tree is the only indigenous

tamarisk in southern Africa and distributed “along brackish shore lines, river banks and in dry river beds” (Coates Palgrave 2002).



FIGURES 1–13. Habitus photographs, dorsolateral view. 1. *Duilius tenuis*, female; 2. *Pentastiridius moestus*, male; 3. *P. sudanicus*, male; 4. *P. limbifer*, male; 5. *Eumecurus incompletus*, male; 6. *E. kibuyanus*, male; 7. *E. decempunctatus*, male; 8. *E. mashonanus*, male; 9. *E. brachycephalus*, male; 10. *Atonurus meridianus*, male; 11. *E. hottentottus*, female; 12. *A. namibianus*, male; 13. *E. eryx*, female. Scale bar A = 1 mm for figs 1–6, scale bar B = 1 mm for figs 7–13.



FIGURES 14–21. *Duilius tenuis*. 14. male genitalia from the left; 15. aedeagus, dorsal view; 16. same, right lateral view; 17. ventromedian process of the male genital segment; 18. male genital segment from the right; 19. male anal tube, ventral view; 20. male genital styles, inner maximum view; 21. habitus, dorsal view [specimen from Brandberg].

Pentastirini Emeljanov, 1971

Genus *Atonurus* Emeljanov, 1992

Type species: *Cixius natalensis* Stål, 1855

About 45 species in the Ethiopian realm.

***Atonurus gaubi* (Van Stalle, 1987)**

Oliarus gaubi Van Stalle, 1987: 154 (Namibia: Gaub)

Atonurus gaubi (Van Stalle), Emeljanov 1992

Material examined. none.

Description. see Van Stalle (1987: 154; as *Oliarus gaubi*)

Distribution. Namibia (Gaub, Okahandja).

Atonurus meridianus (Van Stalle, 1984)

Fig 10

Oliarus meridianus Van Stalle, 1984: 115 (South Africa: N. Transvaal, M'Pfeu Kraal)

Atonurus meridianus (Van Stalle), Emeljanov 1992

Material examined. Namibia, 4 males, 1 female, Popa Falls (18°07'S, 21°04'E), Kavango, 26.ii.1992, E. Marais and M. Pusch; 1 male, 1 female, Nkasa Island, E. Caprivi, S.W.A. (18°27'S, 23°36'E), 3.x.1987, E. Marais; 1 male, Odila River (17°29'S, 16°51'E), Ovambo, 23.i.1993, E. Marais (all NMNW).

Description. see Van Stalle (1987: 127; as *Oliarus meridianus*)

Distribution. "One of the most common pentastirine species south of the equator together with *O. hottentottus* and *Pentastiridius moestus*" (Van Stalle 1987: 127). Recorded from South Africa, Mozambique, Tanzania, Zimbabwe. Here recorded from Namibia for the first time (Ohangwena, Caprivi).

Ecology. recorded from September to April, probably active during the rainy season (Van Stalle 1987)

Atonurus namibianus (Van Stalle, 1987)

Fig 12

Oliarus namibianus Van Stalle, 1987: 133 (Namibia: Kamanyab)

Atonurus namibianus (Van Stalle), Emeljanov 1992

Material examined. Namibia, 2 males, 4 females, Ondjamu hill (17°48'S, 12°50'E), Opuwo District, 28.ii.1996, E. Marais and AH Kirk-Spriggs, at light (NMNW).

Description. see Van Stalle (1987: 133; as *Oliarus namibianus*)

Distribution. Only known from northwestern Namibia.

Atonurus oleae (Van Stalle, 1987)

Oliarus oleae Van Stalle, 1987: 135 (Namibia: Regenstein, 15 mls SSW Windhoek)

Atonurus oleae (Van Stalle), Emeljanov 1992

Material examined. 1 male paratype, 1 additional male, Namibia: Regenstein, 15 mls SSW Windhoek, 8.ii.1972 (RMCA)

Description. see Van Stalle (1987: 135; as *Oliarus oleae*). "Might possibly be a synonym of *O. synavei*" (Van Stalle 1987)

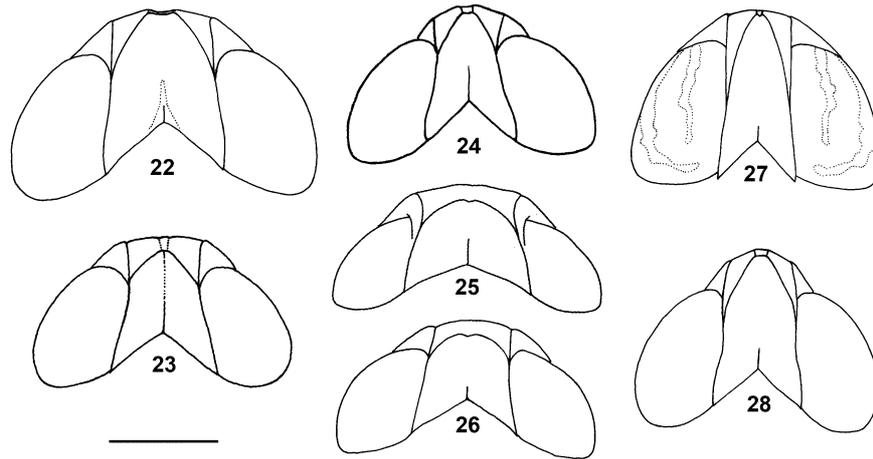
Distribution. Namibia, Mozambique

Ecology. The type series was collected from *Olea africana* (Oleaceae) (Van Stalle 1987: 135)

Genus *Eumecurus* Emeljanov, 1971

Type species: *E. caudatus* Emeljanov, 1971 (= *Oliarus longivertex* Kusnezov, 1937)

More than 100 species in the Ethiopian, Palaearctic and Oriental realms.



FIGURES 22–28. Head in dorsal view. 22. *Eumecurus zairensis* [specimen from Malawi]; 23. *Pentastiridius sudanicus* [specimen from Uniab Delta Area, Skeleton Coast Park]; 24. *Eumecurus hottentottus* [specimen from Starkberg, Etosha Nat. Park]; 25. *Pentastiridius moestus* [specimen from Popa Falls, Kavango]; 26. *P. limbifer* [specimen from 80 km W Rundu, Okavango]; 27. *Eumecurus incompletus* [specimen from 80 km W Rundu, Okavango]; 28. *Eumecurus skofitschii* [holotype]; Scale bar = 1 mm.

***Eumecurus brachycephalus* (Distant, 1907)**

Fig 9

Oliarus brachycephalus Distant, 1907: 193 (South Africa: Transvaal, Pretoria)
Eumecurus brachycephalus (Distant), Emeljanov 1992

Material examined. Namibia: 1 male, 80km W Runda, Otjovasandu (19°15'S, 14°30'E), Etosha Nat. Park, 7.v.1987, J. Irish, E. Marais (NMNW).

Description. see Van Stalle (1987: 73, as *Oliarus brachycephalus*)

Distribution. South Africa, Namibia (Okahandja, Etosha).

Ecology. recorded during the rainy season.

***Eumecurus decempunctatus* (Van Stalle, 1984)**

Figs 7, 29–36

Oliarus decempunctatus Van Stalle, 1984: 120 (Nigeria: Agbabu)
Eumecurus decempunctatus (Van Stalle), Emeljanov 1992

Material examined. Namibia: 1 male, S of Lianshulu (18°10'S, 23°25'E), Eastern Caprivi, 29.xi.–5.xii.1991, M. Griffin and M.A.de Kock, Pitf. traps (NMNW).

Description. See Van Stalle (1987:56, as *Oliarus decempunctatus*). In the specimen examined, the short, right dorsal spine of the periandrium inserts more apically than in Van Stalle's specimens (see fig. 30).

Distribution. Nigeria, Central African Republic, Namibia (first record).

***Eumecurus eryx* (Fennah, 1957)**

Fig. 13

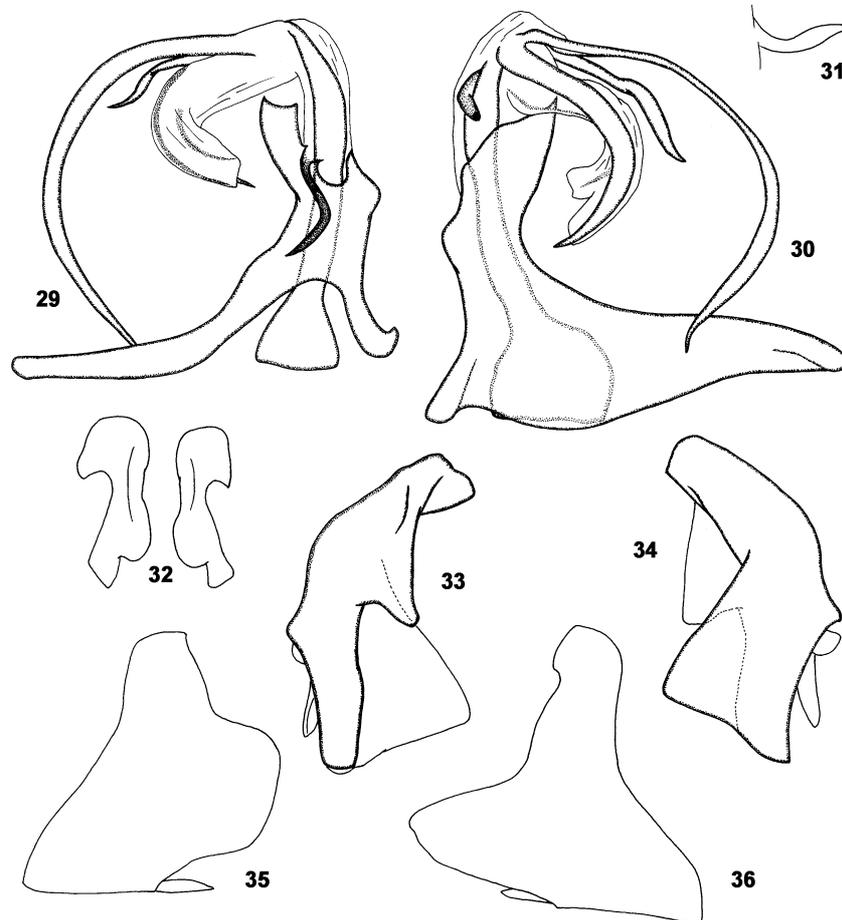
Oliarus eryx Fennah, 1957: 43 (Zaire: Matadi)
Eumecurus eryx (Fennah), Emeljanov 1992

Material examined. Namibia: 4 males, 4 females, Verdekoppies Perdekamp (19°20'S, 16°54'E), Etosha Nat. Park, 15.i.1987, J. Irish and E. Marais; 1 male, 1 female, Nau-Obes (19°19'S, 16°37'E), Etosha Nat. Park, 17.i.1987; 1 female, Tweekoppies (19°02.5'S, 16°59.5'E), Etosha Nat. Park, 19–20.i.1987, J. Irish and E. Marais; 1 female, Aikab (19°21'S, 16°59'E), Etosha Nat. Park, 16.i.1987 E. Marais and J. Irish (all NMNW).

Description. see Van Stalle (1987: 94, as *Oliarus eryx*)

Distribution. Zaire, Congo, Namibia (new record).

Ecology. recorded only in the rainy season (December to February).



FIGURES 29–36. *Eumecurus decempunctatus*. 29. aedeagus from the left; 30. same, from the right; 31. right lateral spine of the periandrium, ventral view; 32. male genital styles; 33. male anal tube from the right; 34. same, from the left; 35. male genital segment from the left; 36. same, from the right [specimen from S of Lianshulu, Eastern Caprivi].

***Eumecurus hottentottus* (Stål, 1855)**

Figs 11, 24, 37–42

Cixius hottentottus Stål, 1855: 92 (“Caffraria”)

Eumecurus hottentottus (Stål), Emeljanov 1992

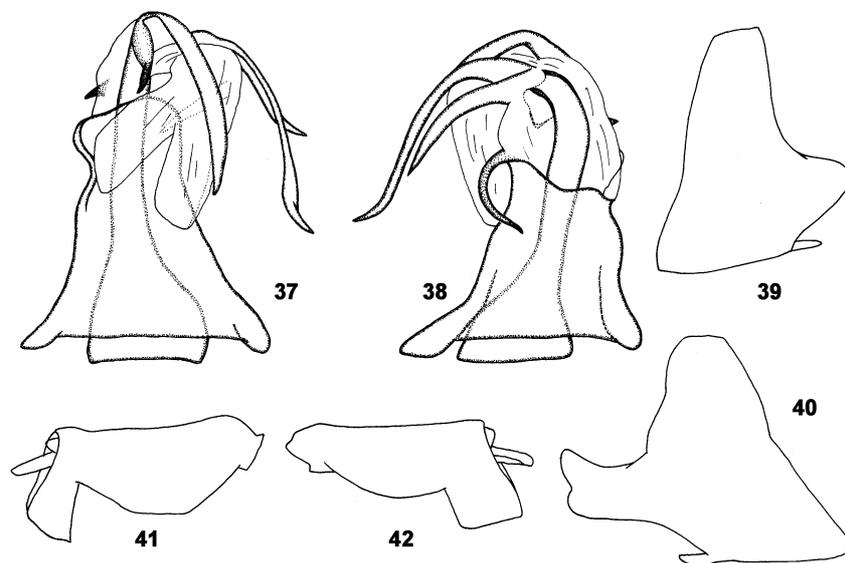
Material examined. Namibia: 1 male, Starkberg, Etosha Nat. Park (18°55'S, 15°48'E), 6.v.1987, E. Marais and J. Irish; 1 male, 1 female, 10km NNW Okondeka, Etosha Nat. Park (18°55'S, 15°48'E), 29.iv.1987, J. Irish and E. Marais; 1 female, Halali, Etosha Nat. Park (19°02'S, 16°58'E), 18–20.i.1987, E. Marais and J. Irish; 2 males, Kwando River Susuwe, West Caprivi Park (17°45'37"S, 23°20'55"E), 28.ix.–2.x.1998, A.H.Kirk-Spriggs; 1 male, Elakalapwe, Ovambo (17°24'S, 15°44'E), 20.i.1993, E. Marais (all NMNW).

Description. See Van Stalle (1987: 15; as *Oliarus hottentottus*). The specimens from Namibia as well as additional specimens from Angola (ex coll. RMCA) show a small, but distinct variability in male genitalia. In left

lateral view, the curved spine emerging from the apex of the periandrium can be semicircular or slightly s-shaped. The straight spine above is variable in its length, and the three larger, dorsal spines are variable in their length (see Figs 37, 38).

Distribution. Widely distributed in southern Africa (south of 10°S); see map in Van Stalle (1987: 16). In Namibia, it is only recorded from the northern parts (Etosha, Ovambo, Caprivi).

Ecology. Recorded mainly in the rainy season (October to May).



FIGURES 37–42. *Eumecurus hottentottus*. 37. aedeagus, dorsal view ; 38. same, ventral view ; 39. male genital segment from the left; 40. same, from the right; 41. male anal tube from the right; 42. same, from the left [specimen from West Caprivi Park, Kwando River].

Eumecurus incompletus (Van Stalle, 1983)

Figs 5, 27, 43–51

Oliarus incompletus Van Stalle, 1983: 160 (Tanzania: Taru Mombasa)

Eumecurus incompletus (Van Stalle), Emeljanov 1992

Material examined. Namibia: 1 male, Okavango, 80km W Rundu, SE 1719, 2.iii.1973 (NMNW).

Description. See Van Stalle (1987: 99, as *Oliarus incompletus*). This species was described from a single male from Tanzania. The single specimen we have from Namibia differs from the holotype by the shape of the long, ventral spine of the aedeagus: it is forked distally (see figs 60, 61), whereas the spine of the holotype is not forked. Other main characters of male genitalia as well as external characters fit very well to the holotype of *E. incompletus*. Our placement of this Namibian specimen to *E. incompletus* is tentative, further studies are essential to study the intraspecific variability of this species and to clarify the identity of the Namibian specimen.

Distribution. Tanzania, northern Namibia (new record)

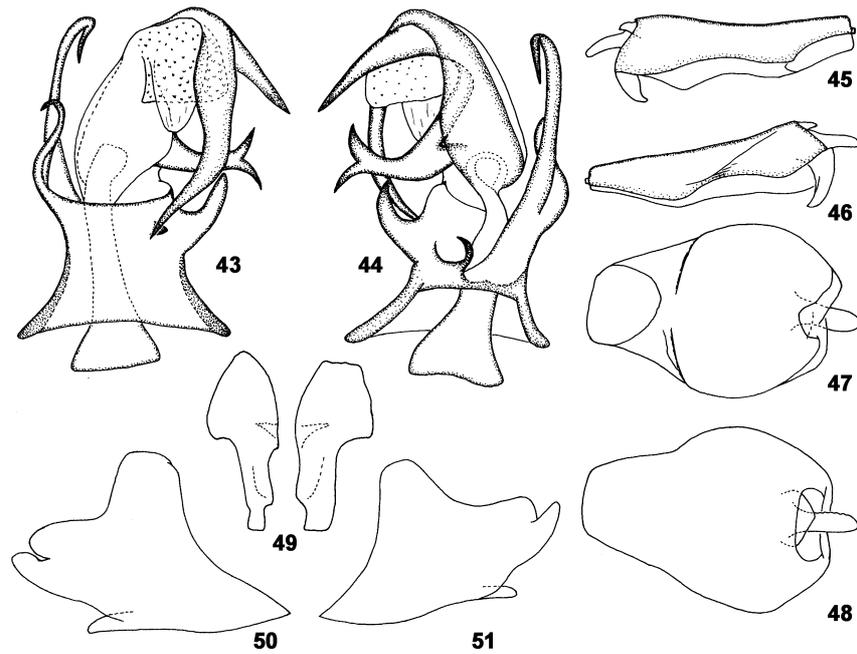
Eumecurus kibuyanus (Fennah, 1955)

Figs 6, 52–58

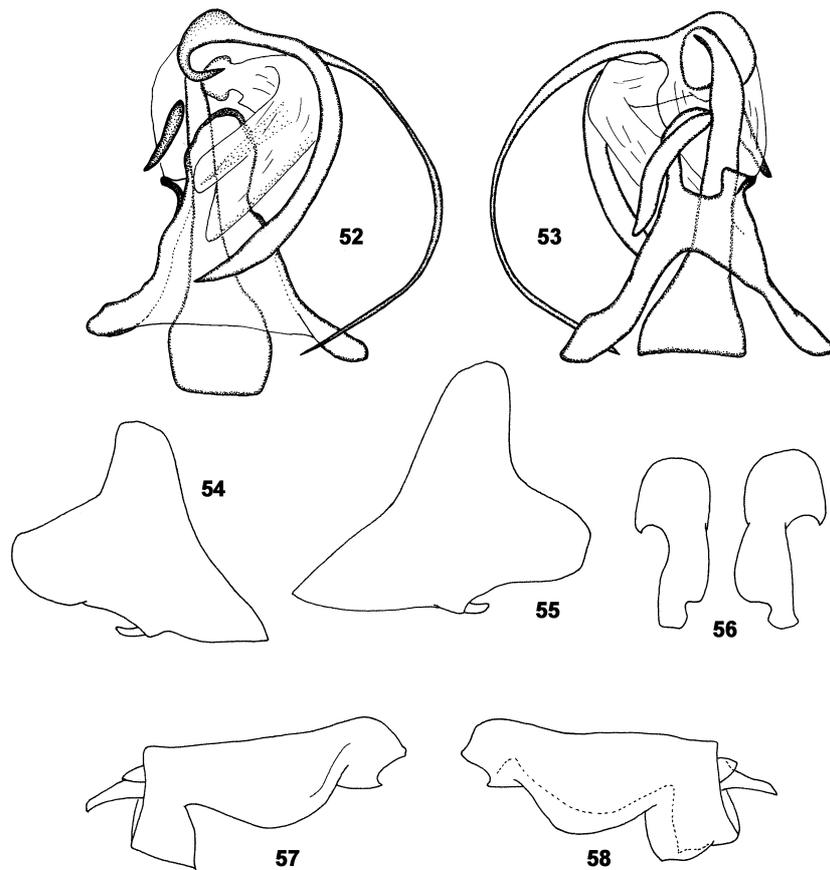
Oliarus kibuyanus Fennah, 1955: 427 (Ruanda: Rubengera, 1900 m, terr. Kibuye)

Eumecurus kibuyanus (Fennah), Emeljanov 1992

Material examined. Namibia: 1 male, Mahango Game Reserve, (18°16'S, 21°42'E), 2.iii.1992, E. Marais and M. Pusch; 1 male, Nkasa Island, E. Caprivi, S.W.A. (18°27'S, 23°36'E), 3.x.1987, E. Marais (all NMNW).



FIGURES 43–51. *Eumecurus incompletus*. 43. aedeagus, dorsal view ; 44. same, ventral view; 45. male anal tube from the right; 46. same, from the left; 47. same, ventral view; 48. same, dorsal view; 49. male genital styles; 50. male genital segment from the right; 51. same, from the left [specimen from Okavango, 80km W Rundu].



FIGURES 52–58. *Eumecurus kibuyanensis*. 52. aedeagus, dorsal view ; 53. same, ventral view ; 54. male genital segment from the right ; 55. same, from the left; 56. male genital styles; 57. male anal tube, from the right; 58. same, from the left [specimen from Nkasa Island, E. Caprivi].

Description. See Van Stalle (1987: 27 (as *Oliarus kibuyanus*).

Distribution. Eastern central Africa: Ruanda, Zaire, Uganda, Kenya, Tanzania. We present the first records from Namibia; here it is obviously restricted to the Caprivi area. *Eumecurus kibuyanus* belongs to a group of three closely related but geographically separated taxa: *E. kibuyanus* is known from the East African Highlands, from Ruanda in the north to Lake Mweru in the south, *E. chiluvoensis* (Van Stalle, 1987) is recorded from Zimbabwe and Mozambique, and *E. pondolandensis* (Van Stalle, 1987) from eastern South Africa. Our specimens, originating from Caprivi, increase the known area of *E. kibuyanus* considerably towards the south and west. Thus, it is very likely that the transition zone between *E. kibuyanus* and *E. chiluvoensis* is the region of the Zambesi river.

***Eumecurus lactescens* (Hesse, 1925)**

Oliarus lactescens Hesse, 1925: 150 (Namibia: Ovamboland, Namakunde)
Eumecurus lactescens (Hesse), Emeljanov 1992

Material examined. Namibia: 1 female, labelled “Rundu district, Halali, 17°52’58”S, 19°26’49”E, 20.i.1998, Kirk-Spriggs & Marais, light trap, primary forest” (NMNW) might belong to this species.

Description. Van Stalle 1987: 74 (as *Oliarus lactescens*).

Note. The identity of the specimen studied remains uncertain, as topotypic males are not available.

***Eumecurus maculosus* (Hesse, 1925)**

Oliarus maculosus Hesse, 1925: 152 (Namibia: Ovamboland, Namakunde)
Eumecurus maculosus (Hesse), Emeljanov 1992

Material examined. none

Description. See Van Stalle (1987: 100, as *Oliarus maculosus*)

Distribution. Northern Namibia.

***Eumecurus mashonanus* (Van Stalle, 1987)**

Fig 8

Oliarus mashonanus Van Stalle, 1987: 71 (Zimbabwe: Salisbury)
Eumecurus mashonanus (Van Stalle), Emeljanov 1992

Material examined. Namibia, 3 males, 10km S Rundu (18°00’S, 19°41’E), Kavango, 12.i.1993, E. Marais (NMNW).

Description. See Van Stalle (1987: 71, as *Oliarus mashonanus*)

Distribution. Zimbabwe, Namibia (new record).

***Eumecurus ongumae* (Van Stalle, 1987)**

Oliarus ongumae Van Stalle, 1987: 95 (Namibia: Onguma “55mls NW Tsumeb“)
Eumecurus ongumae (Van Stalle), Emeljanov 1992

Material examined. none.

Description. See Van Stalle (1987: 95, as *Oliarus ongumae*)

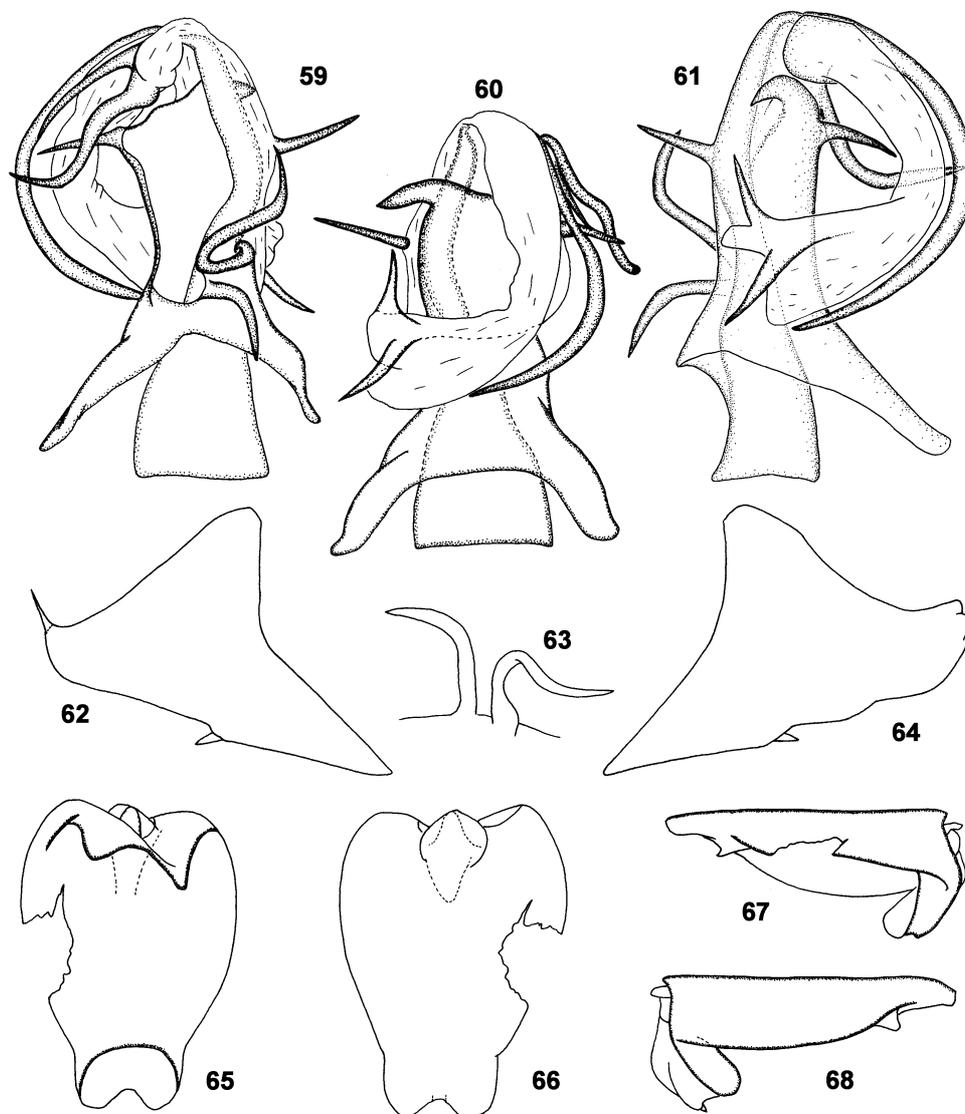
Distribution. Namibia (Onguma).

Eumecurus skofitschii Huang & Holzinger, sp. nov.

Figs 28, 59–68

Material. Holotype male, Angola, 5km E Capangombe (15°05'S, 13°10'E), 17–20.xi.1974 (NMNW No. H22570).

Etymology. The species is dedicated to our friend and colleague Prof. Dr. Gerhard Skofitsch.



FIGURES 59–68. *Eumecurus skofitschii*, male genitalia. 59. aedeagus, ventral view ; 60. same, dorsal view; 61. same, right lateral view; 62. male genital segment from the right; 63. ventrobasal spines of the aedeagus, left lateral view; 64. male genital segment from the left; 65. male anal tube from ventral; 66. same, from dorsal; 67. same, from the left; 68. same, from the right [drawn after the holotype].

Description. Length of male 6.0 mm. Body brownish. Vertex distinctly longer than broad, lateral keels strongly elevated, median keel present only at caudal fifth of the vertex. Face brownish, with a pair of large maculae at lateral margins of frontoclypeal suture. Median carina prominent, yellowish brown; frons broader than long.

Mesonotum with five carinae. Fore wings hyaline, with pale yellow veins covered by well developed brown granules. Pterostigma brownish. Legs with femora brown, tibiae brownish yellow and tarsi pale yellow. Chaetotaxy of hind tarsi 7/5.

Aedeagal complex in male genitalia as in figs 59–62: Periandrium with two long, curved spines emerging

basally – one pointing cranial, the other caudal (Figs 61, 62). A slender, straight, spine emerging ventrolaterad in middle of perianthium, two shorter, slightly curved spines at caudal end of perianthium, one on left, the other on right lateral side. Three spines emerging at base of flagellum: the longest one as long as the flagellum, slender and curved, the second one half as long as the first, semicircular, and the third one, the shortest, slightly curving left-cephalad.

Flagellum initially curving cephalad, then strongly bent to the right, enlarged apically. Flagellum subapically with two spines of equal length, one directed caudad, the other beginning cephalad and then slightly curving right.

Genital styles slightly asymmetrical; with shafts narrowed at midlength, expanded apically; left shaft narrower than right. Pygofer (Figs 63, 64) with medioventral process unusually small; with two well produced lobes, conspicuously asymmetrical: right lobe rounded at apex, bearing a thin spine, left lobe broader, with the central area of its lateral margin swollen. Anal segment (Figs 65–68) symmetrical in lateral view, medioventral margin asymmetrical, right protrusion further ventrad than left one.

Differential diagnosis: The new species is well distinguishable from other species of the genus by the unique shape of the aedeagus (Figs 59–62); no other species has this combination of spines. The two long, curved, basoventral spines of the perianthium enable easy identification of the species by checking the aedeagus in lateral view.

***Eumecurus zairensis* (Van Stalle, 1987)**

Figs 22, 69–77

Oliarus zairensis Van Stalle, 1987: 20 (Zaire: "Elisabethville" (=Lubumbashi))

Eumecurus zairensis (Van Stalle), Emeljanov 1992

Material examined. Malawi: 1 male, 1 female, 3 km NNE Namatandala; 2 km, SSW Lufipa, Chitipa Dist., 09°43'S, 33°20'E, 7.xii.1986, E. Holm and E. Marais (NMNW).

Description. See Van Stalle (1987: 20, sub *Oliarus zairensis*). Our male specimen differs from the holotype by the presence of a thin spine between the apical long spines of the aedeagal perianthium (see Figs 69, 70).

Distribution. Zaire, Malawi.

Ecology. Recorded at the beginning of the rainy season (Nov–Dec).

Genus *Pentastiridius* Kirschbaum, 1868

Type species: *Flata pallens* Germar, 1821, by monotypy

About 50 species in the Holarctic, Ethiopian and Oriental realms.

***Pentastiridius sudanicus* (Lallemand, 1925)**

Figs 3, 23, 78–83

Oliarus sudanicus Lallemand, 1925: 4 (Sudan, "Sudan Nilen")

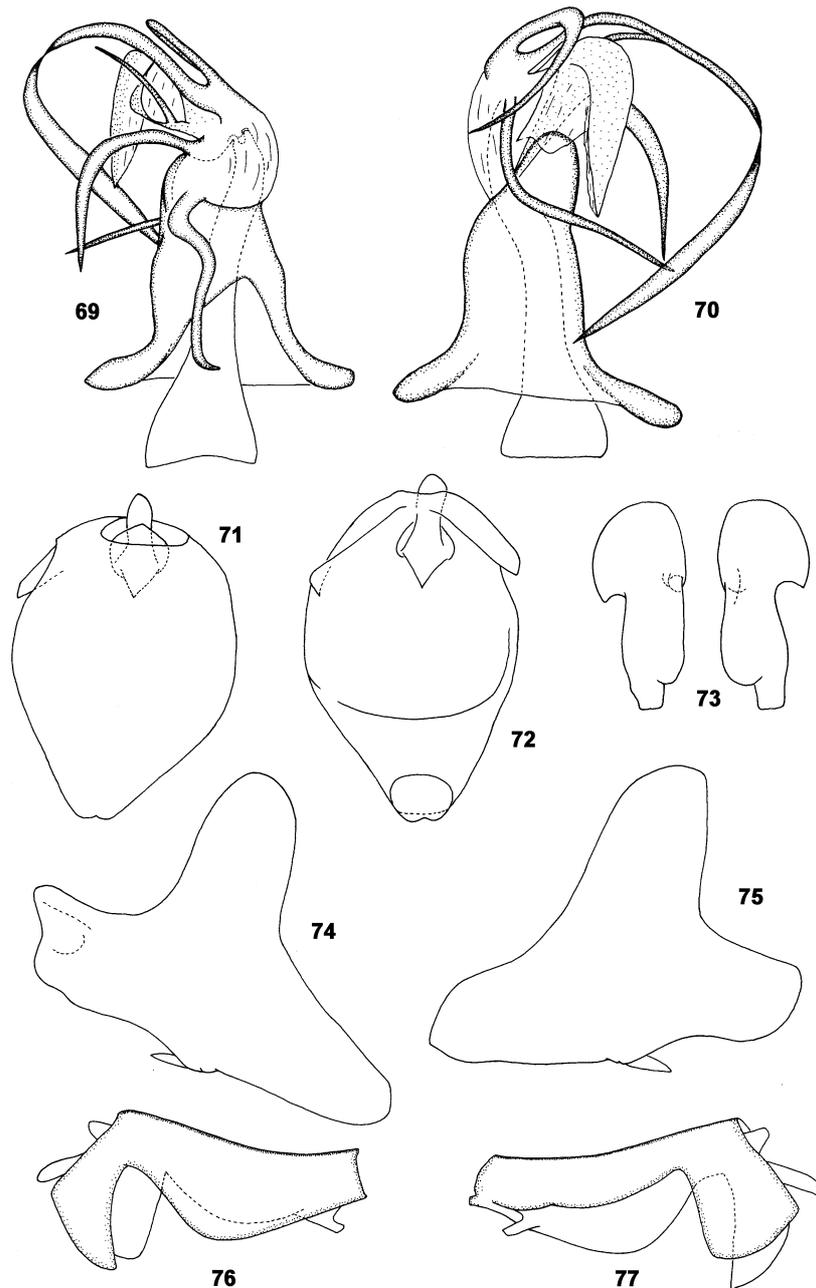
Pentastiridius sudanicus (Lallemand), Van Stalle 1986a: 86

Material examined. Namibia, 4 males, Uniab Delta Area, Skeleton Coast Park, 20°11'S, 13°13'E, 9–12.iv.1987, J. Irish and E. Marais; 1 male, Nakatwa, Mudumu Game Reserve, 18°11'S, 23°25'E, 6–13.iii.1992, E. Marais and M. Pusch (all NMNW); 12 males, 4 females, Swakop river in Swakopmund, 24.ii.2000, W. & I. Holzinger (OEKO).

Description. See Van Stalle (1986a: 86)

Distribution. "The commonest afrotropical species" (Van Stalle 1986a: 87), distributed from the Nile river towards the borders of Kalahari and Namib desert.

Ecology. The specimens collected along Swakop river were beaten from *Phragmites australis*.



FIGURES 69–77. *Eumecurus zairensis*. 69. aedeagus, ventral view ; 70. same, dorsal view; 71. male anal tube, dorsal view; 72. same, ventral view; 73. male genital styles; 74. male genital segment from the right ; 75. same, from the left; 76. male anal tube from the right; 77. same, from the left [specimen from Malawi].

***Pentastiridius limbifer* (Hesse, 1925)**

Figs 4, 26, 84–89

Oliarus limbifer Hesse, 1925: 151 (Namibia: Mafa, Ongandjera)

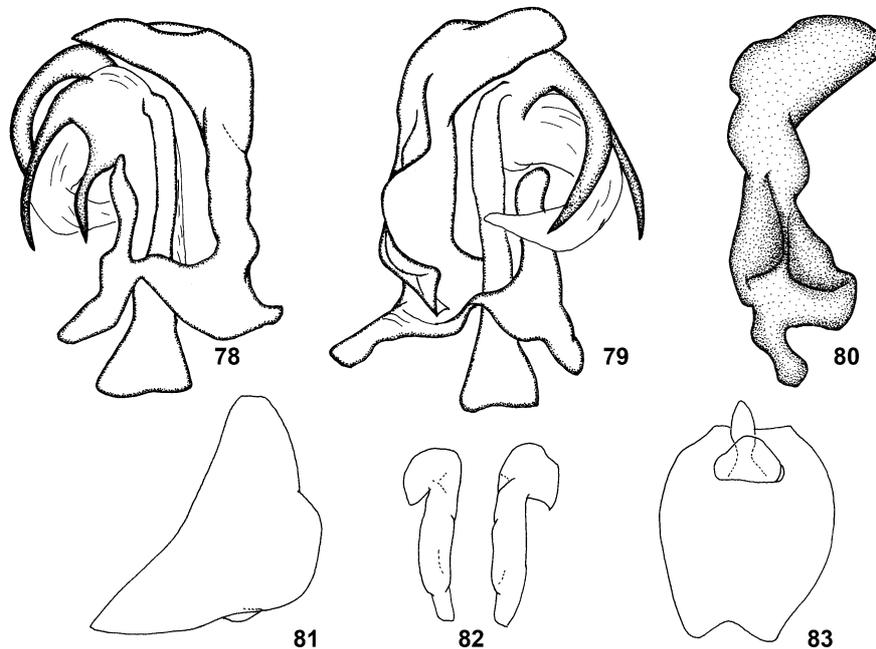
Pentastiridius limbifer (Hesse), Van Stalle 1986a: 88

Material examined. Namibia, 1 male, 2 females, Nakatwa, Mudumu Game Reserve, 18°11'S, 23°25'E, 8–13.iii.1992, E. Marais and M. Pusch; 1male, Kaudom Camp, Kaudom Game Reserve, 18°30'S, 20°44'E, 22–25.ii.1992, E. Marais and M. Pusch; 1 male, Simanya Okavango River, Rundu Dist., 17°33'17"S, 18°32'30"E, 23–24.i.1998, Kirk-Spriggs and Marais, light trap riverine forest; 1 male, 3 females, 80km W Rundu, Okavango, SE

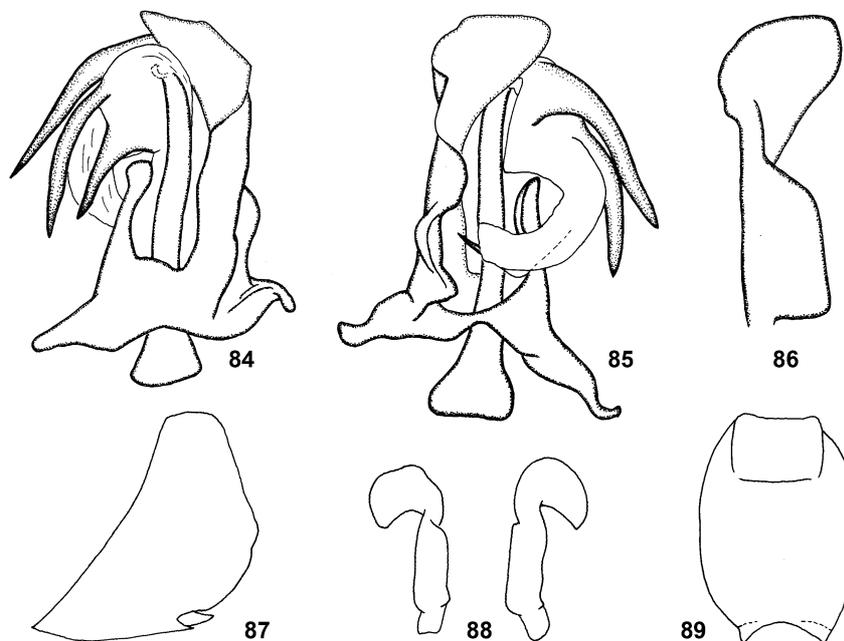
1719Cc, 2.iii.1973; 1 female, Leeupan, Kaudom Game Reserve, 19°03'S, 20°39'E, 25.ii.1992, E. Marais and M. Pusch; 1 female, 10 km S Rundu, Kavango, 18°08'S, 19°41'E, 12.i.1993, E. Marais; 1 female, Mariental District, Viljoenskroon 507, 25°10'S, 19°58'E, 29.iii–5.iv.1998, G. Olivier, Malaise Trap (all NMNW).

Description. See Van Stalle (1986a: 88)

Distribution. Namibia, Angola, Zaire, Zambia.



FIGS 78–83. *Pentastiridius sudanicus*. 78. aedeagus, ventral view ; 79. same, dorsal view; 80. dextral basal process of the aedeagus, maximum view; 81. male genital segment from the left ; 82. male genital styles; 83. male anal tube from dorsal [specimen from Uniab Delta Area, Skeleton Coast Park]



FIGURES 84–89. *Pentastiridius limbifer*. 84. aedeagus, ventral view ; 85. same, dorsal view; 86. dextral basal process of the aedeagus; 87. male genital segment from the left; 88. male genital styles; 89. male anal segment, ventral view [specimen from Nakatwa, Mudamu Game Reserve].

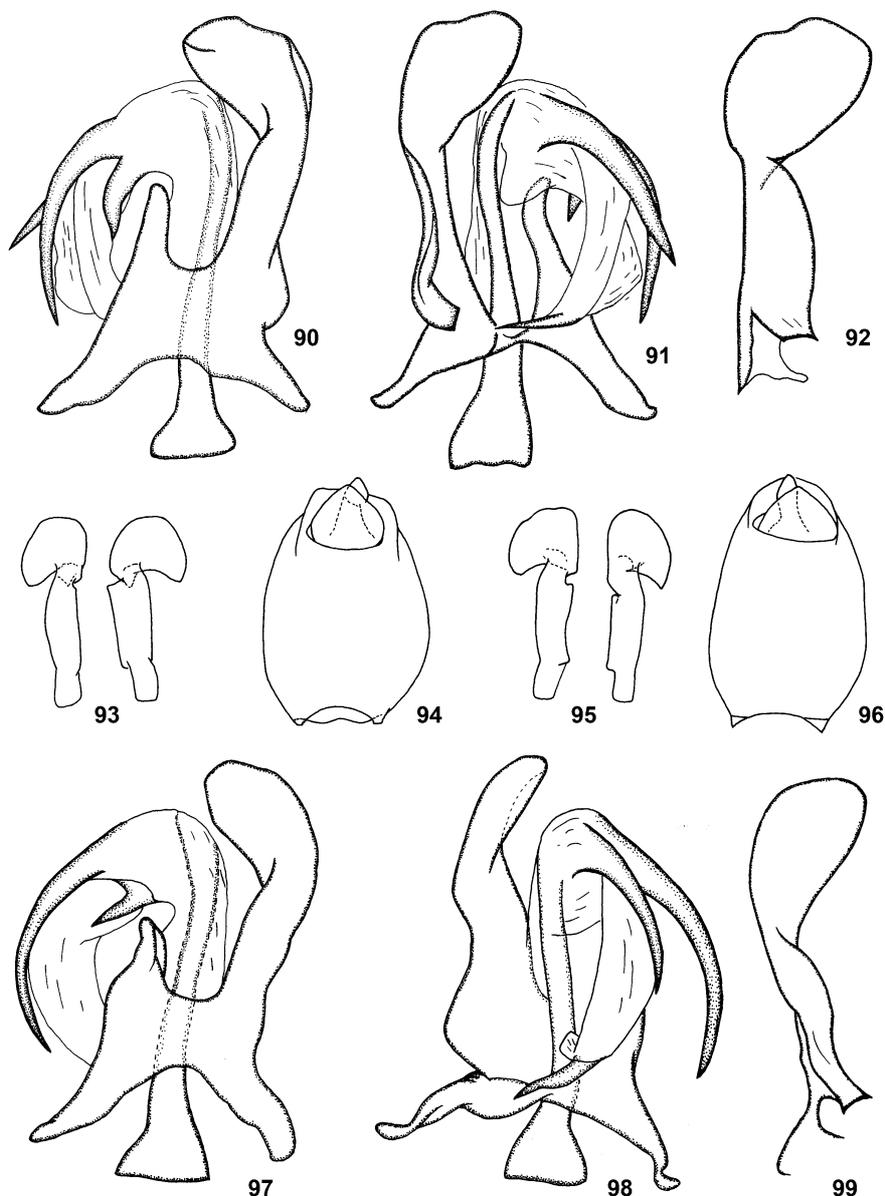
Pentastiridius moestus (Stål, 1855)

Figs 2, 25, 90–106

Cixius moestus Stål, 1855: 92 (“Caffraria”)

Pentastiridius moestus (Stål), Van Stalle 1986a: 97

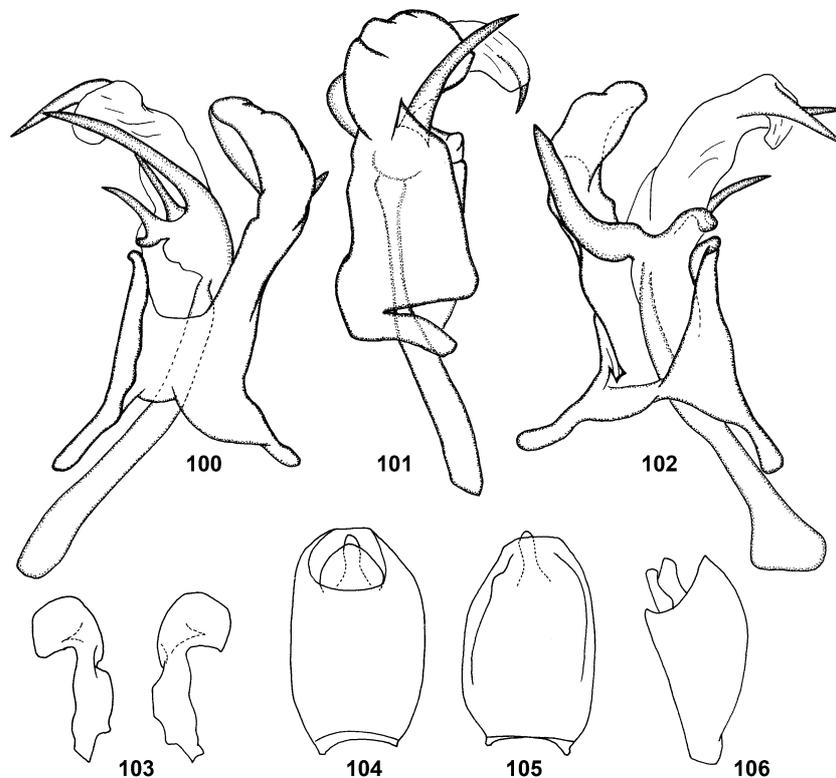
Material examined. Namibia, 1 male, West Caprivi Nature Reserve, 18°09'S, 21°13'E, 29.ii.1992, M. Pusch and E. Marais; 6 males, 5 females, Buffalo Base, West Caprivi Park, 18°08'S, 21°41'E, 6.iv.1990, E. Marais; 3 females Qugali River, West Caprivi Park, 18°01'S, 22°18'E, 7.iv.1990; 6 males, 1 female, Popa Falls, Kavango, 18°07'S, 21°04'E, 26.ii.–1.iii.1992, E. Marais and M. Pusch; 3 females, Popa Falls, Kavango, S.W.A., 18°35'S, 20°07'E, 29.x.1987, E. Marais; 1 male, Andara, Kavango, SE 1821 Ab, 20–25.viii.1971; 1 male, Takuasa, Kavango, SE 1720 Cd, 14–19.viii.1971; 1 male, Churutabis, Bethanien, SE 2717 Ad, 4–12.x.1974; 1 female, Dakota 424, Grootfontein Distr. SE 1917 Ac, 13–23.xii.1993, M. Pusch, light trap (all NMNW).



FIGURES 90–99. *Pentastiridius moestus*; 90–94 drawn after a specimen from Popa Falls, Kavango, 95–99 after another specimen from the same locality. 90. aedeagus, ventral view; 91. same, dorsal view; 92. dextral basal process of the aedeagus; 93. male genital styles; 94. male anal tube from dorsal; 95. male genital styles; 96. male anal tube from dorsal; 97. aedeagus, ventral view; 98. same, dorsal view; 99. dextral basal process of the aedeagus.

Description. See Van Stalle (1986a: 97). The species is quite variable (see figs 90–106); in one male specimen from Popa Falls, Kavango, the periandrium has four apical spines (figs 100–106). Further studies are needed to clarify the taxonomic consequences of this morphological variation.

Distribution. “It occurs in the eastern highlands and probably in the major part of Africa south of the equatorial forest” (Van Stalle 1986a: 100).



FIGURES 100–106. *Pentastiridius moestus*; drawn after another specimen from Popa Falls, Kavango. 100. aedeagus, ventral view; 101. same, right lateral view; 102. same, dorsal view; 103. male genital styles; 104. male anal tube from dorsal; 105. same, from ventral; 106. same, from the left.

Pentastiridius virgultivagus (Hesse, 1925)

Oliarus virgultivagus Hesse, 1925 : 153 (Namibia : Namakunde, Ovamboland)

Pentastiridius virgultivagus (Hesse), Van Stalle 1986a: 103

Material examined. None.

Description. See Van Stalle (1986a: 103)

Distribution. Namibia, Angola, South Africa

Discussion

In comparison to other Fulgoromorpha families, cixiids are very rare in Namibia and the regional diversity is low. Only two tribes, namely Duilliini and Pentastirini, are present. Even Cixiini are missing west of the Kalahari desert. The regional distribution of the 19 species recorded is shown in Table 1. Most records originate from the northern and northeastern parts of the country, where the annual rainfall is above 350 mm per year and the land is covered with woodland, forest savanna or Mopane savanna (cf. Barnard 1998). Cixiids have obviously greater difficulties than other planthoppers to survive in the arid areas of southern and western Namibia. This might be caused by the presence of subterranean nymphs in cixiids: they might not be capable of growing up in desert conditions. This

assumption is supported by the fact that the only two species recorded from the Namib desert, *Pentastiridius sudanicus* and *Duilius tenuis*, feed on plants growing in (ephemeral) streams where larvae have the chance to find comparatively moist conditions.

TABLE 1. Checklist of the Cixiidae species of Namibia by provinces.

Species	Oi	Os	Oh	Oo	Ok	Ca	Ku	Ot	Oe	Kh	Er	Ha	Ka
<i>Duiliini</i>													
<i>D. tenuis</i>											#		
<i>Pentastirini</i>													
<i>A. gaubi</i>								+		#			
<i>A. meridianus</i>			+			+							
<i>A. namibianus</i>							#						
<i>A. oleae</i>								+		#			
<i>E. brachycephalus</i>							+	+					
<i>E. decempunctatus</i>						+							
<i>E. eryx</i>							+						
<i>E. hottentottus</i>			+			+	#						
<i>E. incompletus</i>					+								
<i>E. kibuyanus</i>						+							
<i>E. lactescens</i>			?										
<i>E. maculosus</i>			?				+						
<i>E. mashonanus</i>					+								
<i>E. ongumae</i>				#									
<i>P. limbifer</i>	#				+	+							
<i>P. moestus</i>					+	+	#						+
<i>P. sudanicus</i>						+	+				+		
<i>P. virgultivagus</i>			?										
Total number of species	1	-	5?	1	4	7	7	3	-	2	2	-	1

Symbols: + species recorded from the province, # type locality in the province. The question marks in the “Oh”-column refer to the locality “Ovamboland, Namakunde” given by Hesse (1925). Namakunde is a locality in Angola between Ondangwa and Ondjiva, approx. 15 km north of the Namibian border.

Abbreviation of provinces (see also Fig. 107): Ca = Caprivi, Er = Erongo, Ha = Hardap, Ka = Karas, Kh = Khomas, Ku = Kunene, Oe = Omaheke, Oh = Ohangwena, Oi = Omusati, Ok = Okavango, Oo = Oshikoto, Os = Oshana, Ot = Otjozondjupa. Note: In this table, the type locality “Caffraria” (*E. hottentottus*, *P. moestus*) was referred to the Kunene region.

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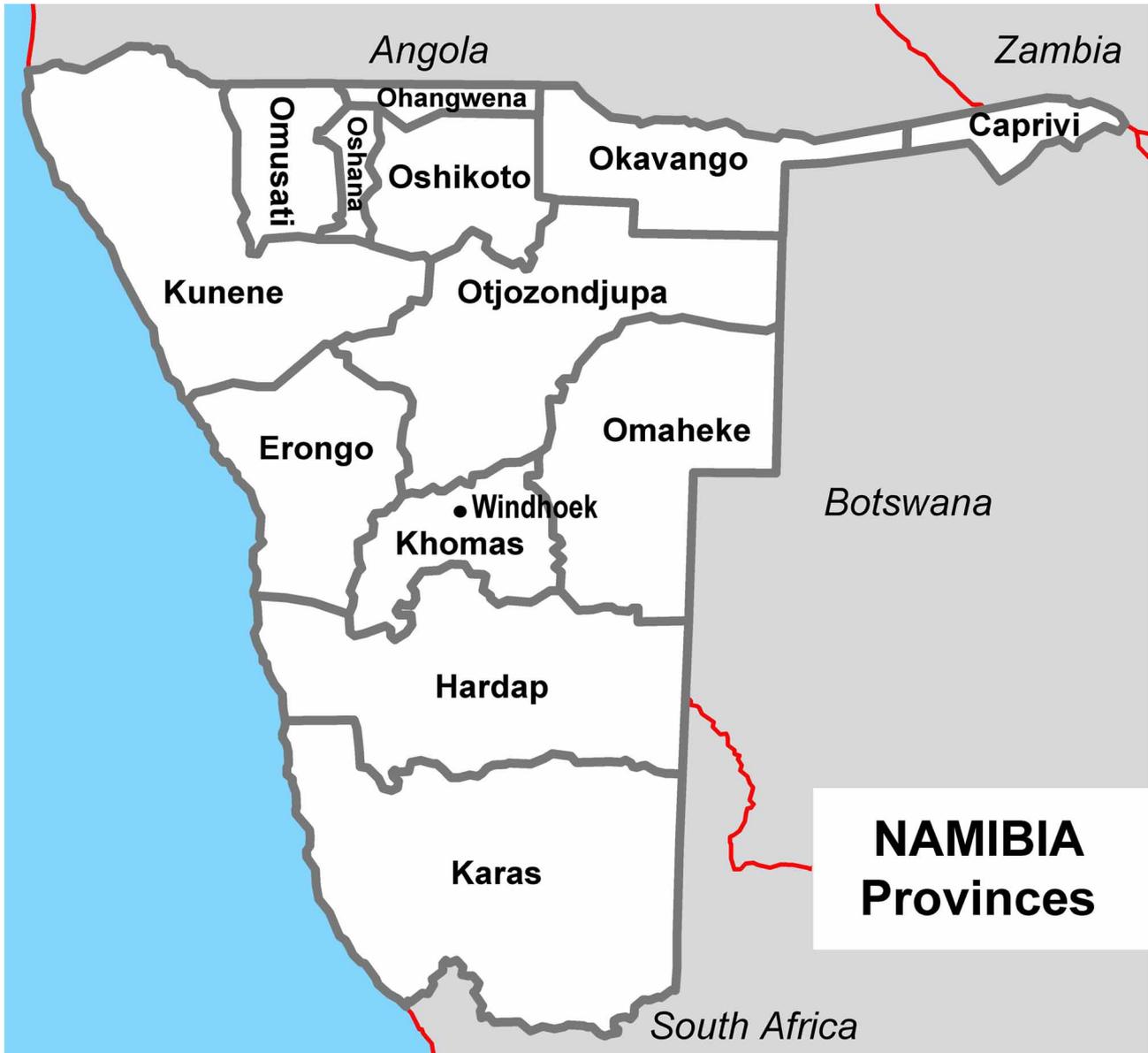


FIGURE 107. Map of Namibia with provinces (see also table 1).

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