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A revision of the spider genus *Menemerus* in Africa (*Araneae: Salticidae*)

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ABSTRACT. African species of the genus *Menemerus* SIMON, 1868 are revised. Altogether forty-three species have been treated, of which the following twenty-three are new to science: *M. bifurcus, davidi, desertus, formosus, guttatus, insolidus, magnificus, manicus, meridionalis, minshullae, mirabilis, modestus, namibicus, natalis, pilosus, placidus, pulcher, regius, sabulosus, silver, transvaalicus, utilis, zimbabwensis.* Five specific names are synonymised: *M. bonetti* SCHENKEL = *M. bivittatus* (DUFOUR), *M. duvali* BERLAND et MILLOT = *M. eburnensis* BERLAND et MILLOT, *M. hypenetes* LAWRENCE = *M. congoensis* LESSERT, M. *interemptor* O. P.-CAMBRIDGE = *M. illigeri* (SAVIGNY et AUDOUIN) and *M. lesserti* DENIS = *M. fagei* BERLAND et MILLOT. One new combination is proposed (*M. carlini* ex *Mendoza carlini*). Lectotypes for *M. carlini* and *M. congolensis* and a neotype for *M. soldani* are designated. *M. dubius* BERLAND et MILLOT, *M. gesneri* (SAVIGNY et AUDOUIN) *M. hottentosus* STRAND, *M. hunteri* (SAVIGNY et AUDOUIN), *M. milloti* DENIS and *M. niger* CAPORIACCO are regarded as *nomina dubia*. First descriptions of the males of *M. eburnensis, fagei, illigeri* and the female of *M. congoensis* are given. *M. taeniatus* and *semilimbatus* are recorded from Africa for the first time. A comparative analysis of the structure of copulatory organs within the genus is presented. A stridulatory apparatus found in males of five species is described. The identification key is provided.

Key words: Arachnology, taxonomy, new species, Africa, *Salticidae, Menemerus*, stridulation.

CONTENS

INTRODUCTION

The genus *Menemerus* was described by SIMON in 1868 for *M. heydenii*, which later turned out to be a junior synonym of *M. semilimbatus* (HAHN, 1827), originally described in the genus *Attus*. Later some earlier described species of the genera *Attus* (SAVIGNY & AUDOUIN 1825, L. KOCH 1867) and *Salticus* (DUFOUR 1831) were trensferred to *Menemerus*. The genus *Tapinattus* described by THORELL in 1887, with its three species, was synonymised with *Menemerus* as well. Additionally two monotypic genera from the Neotropical Region, *Stridulattus* PETRUNKEVITCH, 1926 and *Camponia* BADCOCK, 1932 have appeared to be synonyms of *Menemerus*. When this revision started, *Menemerus* included 56 nominate species distributed world-wide.

The genus is quite characteristic, but morphologically rather uniform, therefore it is easy to distinguish it from other genera, but species identification within the genus is fairly difficult.

The majority of species (except few widely distributed) are very poorly known, the descriptions in older publications are inadequate and not supplemented with figures. Numerous specimens in museum collections are misidentified or unidentified. Identification (especially females) is difficult, it often requires examination of genital structures (including internal structures in females).

I originally aimed at the revision of *Menemerus* from the Afrotropical Region, but since it has appeared that several species occurred both in that region and in the neighbouring Mediterranean sub-region, I have finally extended the study to all Africa, Canary Islands, Madeira and southern part of Arabian Peninsula (south of 20°N). Forty-three species found within this area are described below.

MATERIAL, METHODS AND ABBREVIATIONS OF DEPOSITORIES

Museum materials deposited in numerous collections constituted a basis of this revision. If only possible, the type-specimens were examined.

Specimens were examined in a dish with ethanol. Descriptions of colours pertain to wet specimens. The drawings were made with the aid of a reticular eyepiece attached to a stereomicroscope. The epigynes and the male pedipalps were removed for study. The epigynes were macerated in hot 5% KOH for a few minutes, and cleared in eugenol. After examination, the genitalia were placed in micro-vials with ethanol and placed in the vials containing the specimens from which they been removed. All measurements are given in millimetres. In the lists of materials males are marked as ”M” and females as ”F”.

The following abbreviations of collection names are used in the text:

AMNH - the American Museum of Natural History, New York;
SAM - South African Museum, Cape Town;
MNHU - Museum für Naturkunde der Humboldt-Universität, Berlin;
NMZ - National Museum (Natural History) of Zimbabwe, Bulawayo;
MNHN - Muséum National d’Histoire Naturelle, Paris;
MRAC - Musée Royal de l’Afrique Centrale, Tervuren;
BMNH - British Museum (Natural History), London;
MHN - Muséum d’Histoire Naturelle, Geneve;
CAS - California Academy of Sciences, San Francisco;
MCZ - Museum of Comparative Zoology, Harvard University, Cambridge, Mass.;
SMN - State Museum of Namibia, Windhoek;
NR - Naturhistoriska Riksmuseet, Stockholm;
IZ PAN - Instytut Zoologii Polskiej Akademii Nauk, Warszawa;
SMF - Forschungsinstitut und Museum Senckenberg, Frankfurt a. Main;
NMB - Naturhistorisches Museum, Basel;
NHMW - Naturhistorisches Museum, Wien;
MCSN - Museo Civico di Storia Naturale Lungadige, Verona;
PPRI - Plant Protection Research Institute, Pretoria;
MNH - Museum of Natural History, Wrocław University, Wrocław;
JW - private collection of J. Wunderlich, Straubenhardt;
ARS - private collection of A. Russell-Smith, Sittingbourne.

DEFINITION OF THE GENUS AND GENERIC CHARACTERS

Genus *Menemerus* Simon, 1868

Menemerus Simon 1868: 662. Type species: *Attus semilimbatus* Hahn, 1827, as senior synonym of *Menemerus heydenii* Simon, 1868.

Tapinattus THORELL 1887: 362. Type species: *Attus melanognathus* LUCAS, 1838 [=*M. bivittatus* (DUFOUR, 1831)], by original designation (synonymised with *Menemerus* by SIMON 1901).

Stridulattus PETRUNKEVITCH 1926: 74. Type species: *Stridulattus stridulans* PETRUNKEVITCH, 1926 [=*M. bivittatus* (DUFOUR, 1831)], by monotypy (synonymised with *Menemerus* by JASTRZĘBSKI 1997).

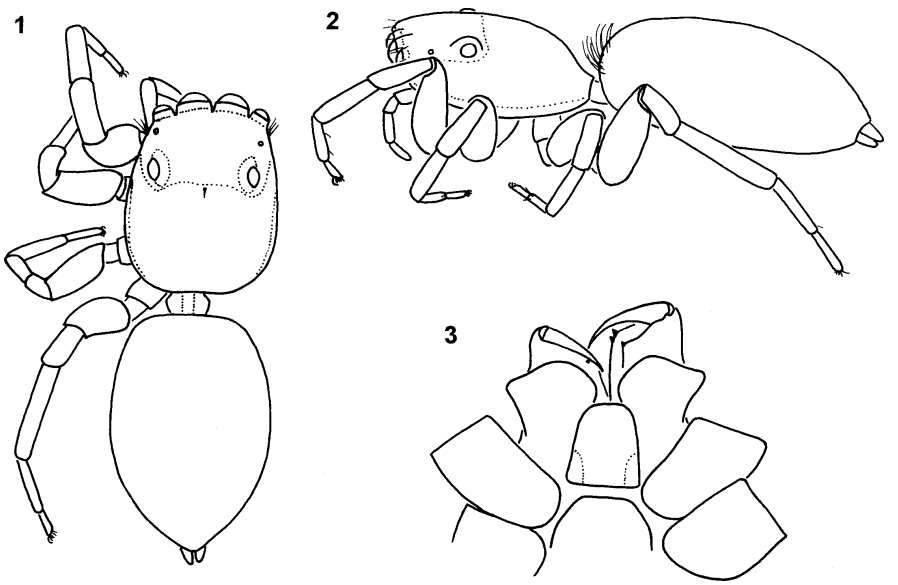
Camponia BADCOCK 1932: 40. Type species: *Camponia lineata* Badcock, 1932 [=*M. bivittatus* (DUFOUR, 1831)], by monotypy (synonymised with *Menemerus* by GALIANO 1978).

DIAGNOSIS

Medium to big spiders, ranging from about 4 to 10 mm in length; body flattened, strongly hairy. Carapace in the majority of species with white lateral margins. The structure of copulatory organs is diagnostic for this genus: presence of very long tegular furrow and characteristic tegular protuberance in the male (Fig. 4); sclerotized entrance bowls and distinctive accessory glands in the female (Fig. 5).

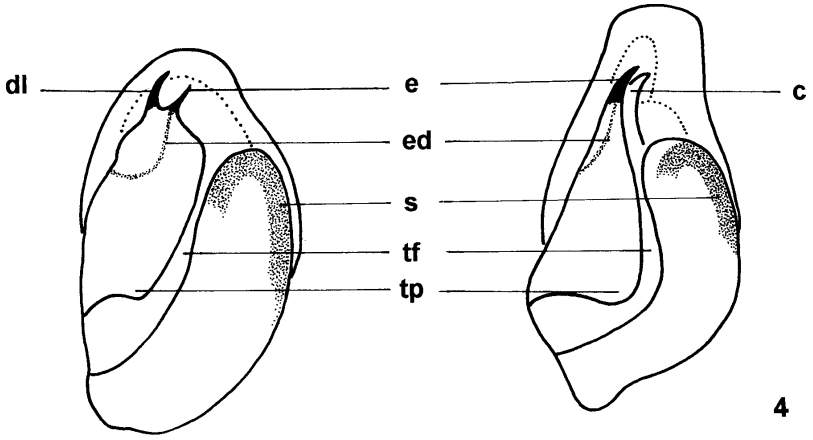
DESCRIPTION

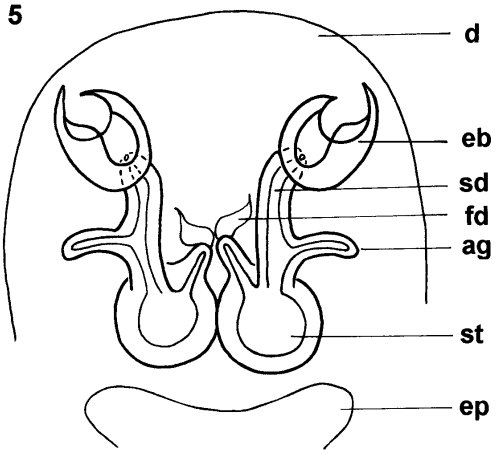
General appearance as in Figs 1 and 2. Cephalothorax rather low, flat and broad, broadest behind half of its length. Only two species (*M. pulcher* and *M. plenus*) have high cephalothorax. Carapace brown, eye field darker, in some species foveal area lighter, yellowish. Whole carapace clothed in short, dense,



1-3. Body proportions in *Menemerus*: 1-2 - general appearance, dorsal and lateral views, 3 - labium and maxillary plates in male

brown and greyish-white hairs. Near eyes numerous brown, long bristles. In majority of species along lateral margins of carapace extends a stripe composed of white hairs. Arrangement and size of eyes typical for the family. Eye field rectangular or slightly trapezoid, wider than long. Clypeus low, usually brown. Chelicerae dark brown, with two teeth on promargin and single tooth on





4-5. Diagram of genitalia structure in *Menemerus*: 4 - palpal organ: c - conductor, dl - distal lamella, e - embolus, ed - ejaculatory duct, s - spermophore, tf - tegular furrow, tp - tegular protuberance, 5 - epigyne: d - depression, eb - entrance bowl, sd - seminal duct, fl - fertilization duct, ag - accessory gland, st - spermatheca, ep - epigynal pocket

retromargin. Labium trapezoid, in males external angle of maxillary plate forms prominent triangular extension (Fig. 3). Sternum rounded, yellowish to dark brown. Pedicel short, generally invisible from above, covered with anterior margin of abdomen. Abdomen oval, in some species elongate (e.g. *M. eburnensis*) in others (e.g. *M. pulcher*) rounded. Coloration of abdomen varies, frequently dark with leaf-shaped lighter pattern or with pattern composed of numerous light patches. Abdomen clothed in very bushy hairs, at anterior edge hairs longer and denser. Venter usually light. Often integument of abdomen transparent, with numerous silver spots of internal guanine crystals. Spinnerets small, set at tip of abdomen. Legs rather short, generally light, sometimes with brownish rings and patches. First pair legs stronger than others. Spines not numerous, brown. Two claws on tarsus, scopula absent. Leg formula 4-1-2-3. In males of some species present stridulatory apparatus.

Male palp big, brown, sometimes with white hairs on dorsal surface of femur. Femur robust, in majority of species with big ventral process at its base. Tibia very short and broad, its prolateral surface swollen. One to three tibial apophyses, ventral one (if present) often not well visible unless bulbus and cymbium are removed. Tegulum oval, with very distinct furrow separating distal haematodocha. Embolus short, sometimes double (with distal lamella), in majority of species with accompanying large conductor. Cymbium oval, rather broad, in some species with dorsal process at its base. Diagram of male palp structure is shown in Fig. 4.

Epigyne large, strongly sclerotized, usually with posterior pocket. The greater part of epigyne occupied by one or two large depressions. Internal structures simple, copulatory openings in majority of species situated in very heavily sclerotized cavities, seminal ducts rather short, accessory glands present, often with long ducts, spermathecae one-chambered, spherical or pear-shaped, their walls thick. Diagram of epigynal structure is shown in Fig. 5.

Natural history

Biology of *Menemerus* is poorly known. From scanty information on collecting labels one can infer that some species are terrestrial, they were collected in pitfall traps (*M. lesnei, M. pilosus*), on the ground (*M. namibicus*), on sandy plain (*M. pilosus, M. sabulosus, M. semilimbatus*) or among stones (*M. placidus*). Some were caught in low vegetation (*M. bivittatus, M. regius, M. bifurcus*). There are records of capture of some species on trunks or on stone walls (*M. bivittatus, M. bifurcus*) and on walls of buildings - suggesting an active hunting, typical for almost all salticids. Some species were also found inside houses (*M. bivittatus, M. bifurcus, M. regius*). One species - *M. namibicus* - was found in a mud wasp nest, inside a farm building. Cosmopolitan *M. bivittatus* is a synanthropic species, which is suggested by data on its distribution and biology.

Jackson (1986) described details of biology and behaviour of an undetermined *Menemerus* species from savanna on shore of the Lake Victoria in Kenya. This species is communal, builds nest complexes within *Araneidae* webs, shows

some signs of territorial behaviour and is probably kleptoparasitic. Such a set of features, especially living socially, is rather unique as for a cursorial spider. Unfortunately, the voucher specimens deposited by Jackson in BMNH could not be found there.

DISTRIBUTION

Members of this genus are found in warm climate world-wide.

KEY TO SPECIES OF *MENEMERUS* IN AFRICA

Males

1. Pedipalpal patella with apophysis ..... 2.
-. Pedipalpal patella without apophysis ..... 3.
2. Patellar apophysis large, with spherical tip (Fig. 273) ..... *soldani*, p. 334
-. Patellar apophysis small (Fig. 149) ..... *illigeri*, p. 296
3. Ventral tibial apophysis very small, short, spine-shaped ..... 4.
-. Ventral tibial apophysis bigger or absent ..... 5.
4. Retrolateral tibial apophysis rather small; embolus forceps-shaped, short (Fig. 258) ..... *semilimbatus*, p. 330
-. Retrolateral tibial apophysis large, lobate; embolus not forceps-shaped (Fig. 188) ..... *meridionalis*, p. 307
5. Ventral tibial apophysis long and thin, embolus long (Fig. 226) ..... *pilosus*, p. 318
-. Ventral tibial apophysis different or absent ..... 6.
6. Bulbus triangular; embolus double (with lamella), bent aside from bulbus, its prolateral branch wide (Fig. 97) ..... *dimidius*, p. 283
-. Bulbus ovate ..... 7.
7. Cymbium with long prolateral process at its base (Fig. 124) ..... *fagei*, p. 289
-. Cymbial process shorter or absent ..... 8.
8. Single (retrolateral) tibial apophysis, sometimes with additional dorsal tooth ... 9.
-. More than one tibial apophysis ..... 15.
9. Tibial apophysis large, long and wide, its end truncated ..... 10.
-. Tibial apophysis smaller, pointed 11
10. Embolus double (with lamella), without conductor (Fig. 162) ..... *lesnei*, p. 300
-. Embolus single, with large conductor (Fig. 277) ..... *taeniatus*, p. 336
11. Conductor with sclerotized keel (Figs 182, 217) ..... 12.
-. Conductor without sclerotized keel ..... 13.
12. Embolus long, tibial apophysis very short, width of tibia (in dorsal view) much narrower than cymbium (Figs 218-220) ..... *natalis*, p. 317
-. Embolus shorter (Fig. 182) ..... *manicus*, p. 306
13. Tibial apophysis with additional dorsal tooth; bulbus short (Figs 50-52) ..... *brevibulbis*, p. 271

-. Tibial apophysis without such tooth; bulbus longer ..... 14.
14. Tibial apophysis straight (Fig. 39) ..... *bivittatus*, p. 267
-. Tibial apophysis curved (Figs 65, 108) ..... *congoensis*, p. 276
eburnensis, p. 285
15. Two retrolateral, parallel, long tibial apophyses; embolus rather long (Fig. 240) ..... *pulcher*, p. 323
-. Tibial apophyses otherwise ..... 16.
16. Dorsal tibial apophysis rather long and thin (not plate-shaped) (Figs 136, 25, 289) ..... 17.
-. Dorsal tibial apophysis different or absent ..... 19.
17. Embolus short, double, forceps-shaped, bent to bulbus (Fig. 134) ..... *formosus*, p. 292
-. Embolus longer, double, rather straight (not bent to bulbus) (Figs 22, 287) ..... 18.
18. Below dorsal apophysis (seen in dorsal view) tibia with retrolateral triangular lobe (Fig. 25) ..... *bifurcus*, p. 264
-. Tibia without such lobe (Fig. 289) ..... *transvaalicus*, p. 339
19. Bulbus rather long and slender, with long posterior lobe; ending part of distal haematodocha slender (Figs 7, 78, 143, 210) ..... 20.
-. Bulbus oval, its posterior lobe shorter and wider; distal haematodocha wider ..... 23.
20. Dorsal tibial apophysis plate-shaped, trilobate (Fig. 80) ..... *davidi*, p. 279
-. Dorsal tibial apophysis smaller, not trilobate ..... 21.
21. Embolus single, bent to bulbus (Fig. 7) ..... *animatus*, p. 260
-. Embolus double (with lamella) ..... 22.
22. Ventral tibial apophysis small (Fig. 210) ..... *modestus*, p. 313
-. Ventral tibial apophysis larger (Fig. 143) ..... *guttatus*, p. 294
23. Dorsal tibial apophysis lobate, embolus as in Fig. 90 ..... *desertus*, p. 283
-. Embolus different ..... 24.
24. Lack of ventral tibial apophysis (Fig. 245) ..... *regius*, p. 325
-. Ventral tibial apophysis present ..... 25.
25. Embolus short; dorsal tibial apophysis with shallow notch (Fig. 197) ..... *mirabilis*, p. 310
-. Embolus longer; dorsal tibial apophysis bilobate (Fig. 177) ..... *magnificus*, p. 304

Females

1. Epigyne with single, large depression occupying its anterior half ..... 2.
-. Epigyne different ..... 4.
2. Epigyne with notch at posterior edge; seminal ducts longer (Figs 223, 224) ..... *paradoxus*, p. 317
-. Epigyne without notch; seminal ducts short ..... 3.
3. Posterior edge of epigynal depression straight; rims of entrance bowls visible as straight line (Fig. 215) ..... *namibicus*, p. 314

-. Rims of entrance bowls visible as strongly curved line (Fig. 58) .... *carlini*, p. 274
4. Epigyne with notch at posterior edge and two oval depressions situated in anterior half; copulatory openings covered with semicircular, strongly sclerotized roofs (Fig. 266) ..... *semilimbatus*, p. 330
-. Epigyne without semicircular anterior roofs ..... 5.
5. Epigynal depression large, heart-shaped (Fig. 233) ..... *placidus*, p. 320
-. Epigyne without heart-shaped depression ..... 6.
6. Epigyne with single, narrow pocket ..... 7.
-. Epigynal pocket otherwise or not visible ..... 11.
7. Epigyne rather wider than long, with notch at posterior edge and two large oval depressions, separated by wide triangular elevation (Fig. 195) .... *minshullae*, p. 309
-. Epigyne more or less rounded ..... 8.
8. Epigyne with small, shallow grooves anteriorly; posterior rims of grooves limited by sclerotized ridges; entries to copulatory openings in front (Fig. 281) .... *taeniatus*, p. 336
-. Epigynal depressions without sclerotized ridges; entries to copulatory openings different ..... 9.
9. Rims of entrance bowls poorly visible (Fig. 118) ..... *eburnensis*, p. 285
-. Rims of entrance bowls clearly visible ..... 10.

10. Entries to entrance bowls from side; seminal ducts short (Fig. 132) ..... *fagei*, p. 289
-. Entries to entrance bowls from behind; seminal ducts longer (Fig. 75) .... *congoensis*, p. 276
11. Epigyne slightly longer than wide, narrowed posteriorly, with large notch at posterior edge (Fig. 250) ..... *regius*, p. 325
-. Epigyne more or less rounded, not narrowed posteriorly ..... 12.
12. Epigynal pocket very large, more or less semicircular, occupies one third of epigynal length; copulatory openings situated anteriorly (Fig. 153) .... *illigeri*, p. 296
-. Epigynal pocket different or not visible ..... 13.
13. Epigyne without pocket ..... 14.
-. Epigyne with pocket ..... 18.
14. Most of epigyne occupied by large depression, divided by narrow median triangular elevation (Figs 45, 53) ..... *bivittatus*, p. 267
brevibulbis, p. 271
-. Epigynal depression not so large or not divided ..... 15.
15. Entrance bowls huge (Fig. 301) ..... *zimbabwensis*, p. 342
-. Entrance bowls smaller ..... 16.
16. Depression rather shallow, occupies central part of epigyne (Fig. 160) .... *insolidus*, p. 299
-. Central depression large and deep ..... 17.
17. Enties to entrance bowls from side; seminal ducts short (Fig. 298) ..... *utilis*, p. 341

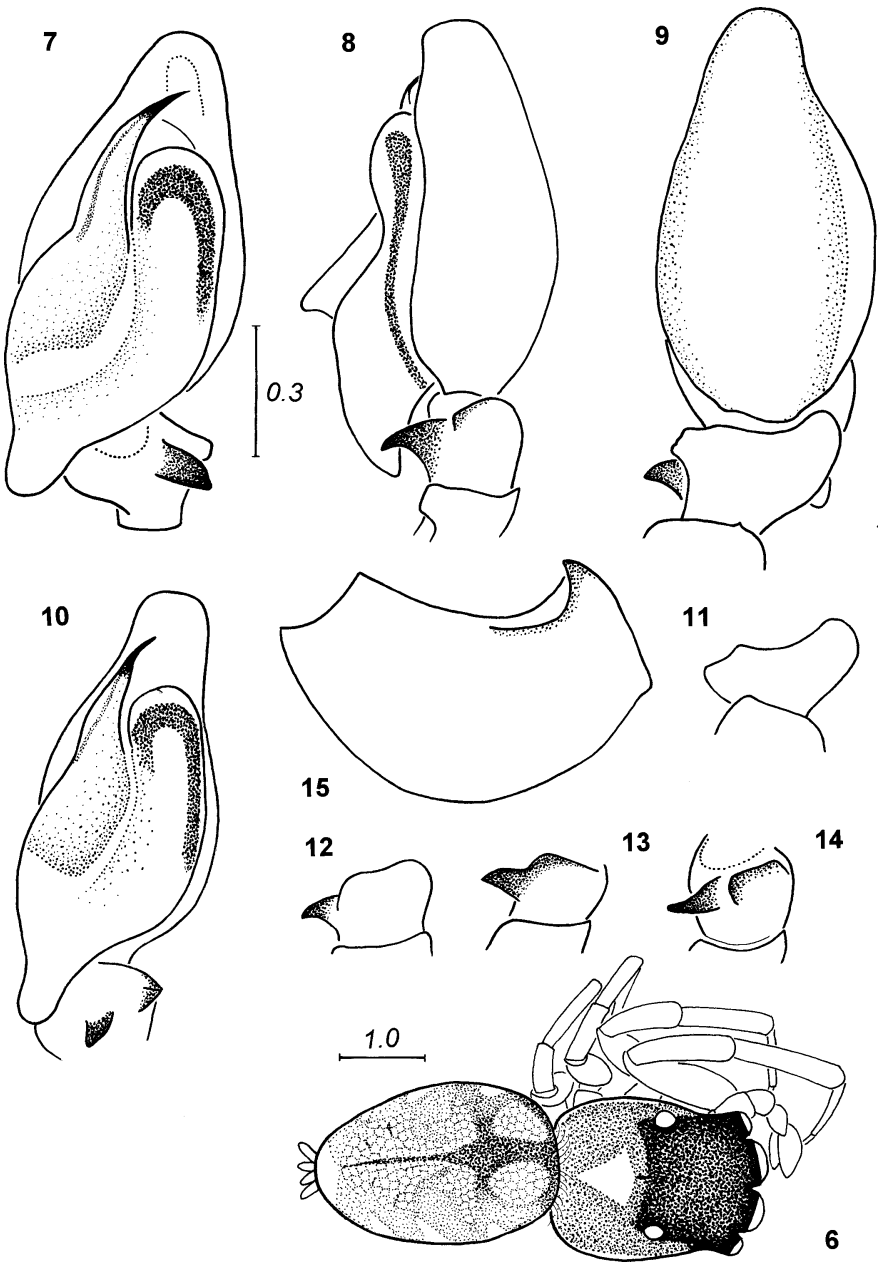
-. Entries to entrance bowls in front; seminal ducts long (Fig. 176) .... *lesserti*, p. 302
18. Epigynal pocket occupies about one third of epigynal width; epigyne with notch at posterior edge; copulatory openings situated laterally (Fig. 268) ..... *silver*, p. 333
-. Epigynal pocket very wide ..... 19.
19. Epigyne with two small, oval, conterminous depressions ..... 20.
-. Epigynal depressions different ..... 21.
20. Entrance bowls strongly sclerotized; epigyne with posterior notch (Fig. 34) .... *bifurcus*, p. 264
-. Copulatory openings with semicircular ridges only; epigyne without notch (Fig. 296) ..... *transvaalicus*, p. 339
21. Copulatory openings located posteriorly ..... 22.
-. Copulatory openings different ..... 23.
22. Seminal ducts thick-walled; accessory glands not visible (Fig. 237) ... *plenus*, p. 322
-. Wall of seminal ducts not thick; accessory glands pronounced (Fig. 147) .... *guttatus*, p. 294
23. Entrance bowls not clearly separated, fore part of seminal duct very wide (Fig. 255) ..... *rubicundus*, p. 329
-. Well defined entrance bowls ..... 24.
24. Copulatory openings situated laterally; entrance bowls very long ..... 25.
-. Copulatory openings situated otherwise; entrance bowls different ..... 26.
25. Accessory glands in front of copulatory openings (Fig. 18) ..... *animatus*, p. 260
-. Accessory glands behind copulatory openings (Fig. 88) ..... *davidi*, p. 279
26. Entrance bowls situated in front of epigynal depression (Fig. 103) .... *dimidius*, p. 283
-. Entrance bowls situated inside epigynal depression ..... 27.
27. Entries to entrance bowls from front ..... 28.
-. Entries to entrance bowls from centre ..... 29.
28. Epigyne with large shallow depression (Fig. 140) ..... *formosus*, p. 292
-. Epigyne with two rounded depressions anteriorly (Fig. 208) ..... *mirabilis*, p. 310
29. Entries to entrance bowls very wide (Fig. 257) ..... *sabulosus*, p. 329
-. Entries to entrance bowls with additional paracentral ridge (Fig. 96) .... *desertus*, p. 283

REVIEW OF THE SPECIES

Menemerus animatus O. P.-Cambridge, 1876

(Figs 6-21)

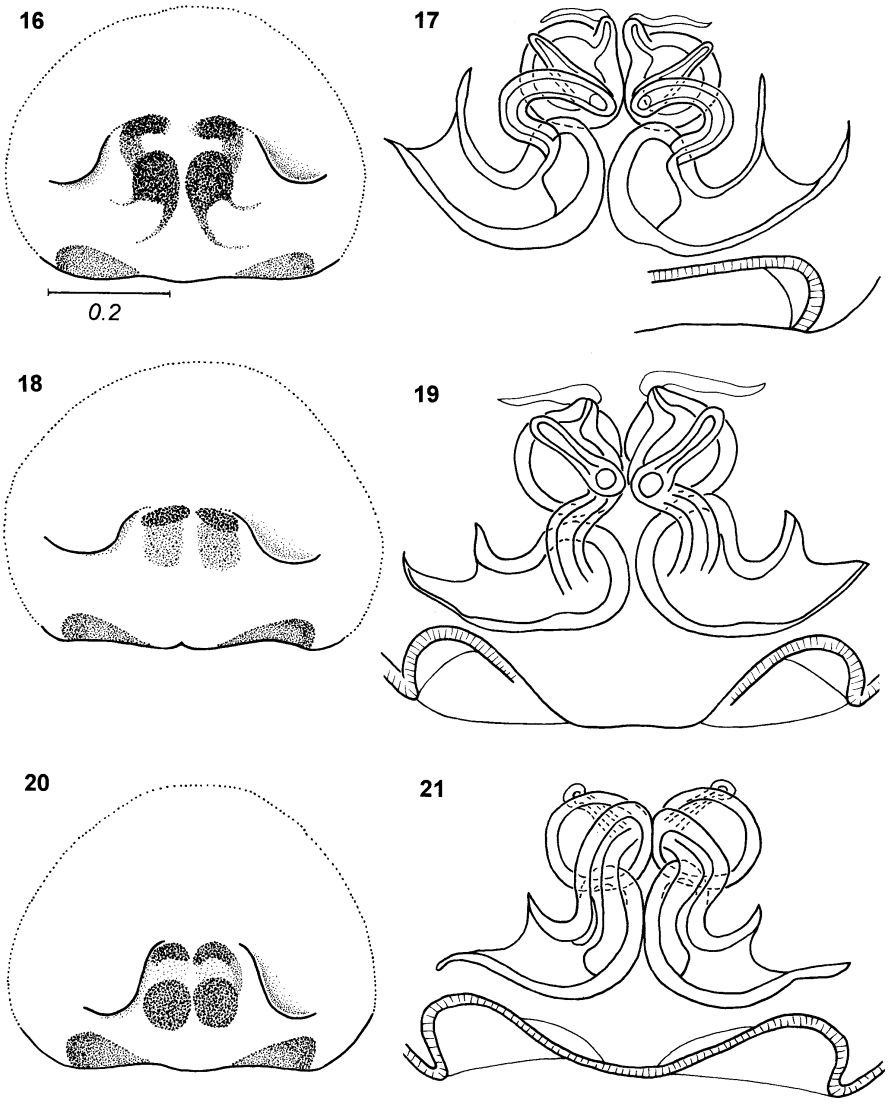
Menemerus animatus O. P.-Cambridge 1876: 622; Strand 1909: 188; Caporiacco 1934: 19; Denis 1947; 71 1966: 118; Prószyński 1993: 35; in press.



6-15. *Menemerus animatus* O. P.-Cambr., male: 6 - general appearance, 7-10 - palpal organ, ventral, lateral and dorsal views, 11-14 - tibial apophyses, 15 - palpal femur

MATERIAL

Egypt: Siwa, 2 F, 29.IV.-3.V.1935 (BMNH, 1936.12242-243); Gizeh, 1 M, 3 F, 1904, leg. E. REIMOSER (NHMW); Suez, 2 F (MNHN, 7366); **Mali**: Bandiagara, 14°25′N 3°37′W, 70 km E Mopti, 1 M, 17.XII.1978, leg. W. H. SETTLE (CAS); Goundam, 3 M, 3 F, III.1979, leg. W. H. SETTLE (CAS); **Mauritania**: Nouakchott,



16-21. *Menemerus animatus* O. P.-CAMBR., female, epigyne and its internal structure

1 F, 15.X.1993, leg. W. Puławski (CAS); **Sudan**: Kodok, White Nile, 1 M, leg. W. P. Lowe (BMNH); White Nile, near Bor, 1 M (MNHN, 23892); Khartoum, 1 M, 1967, leg. J. L. Cloudsley-Thompson (MRAC, 133062); same locality, 1 F, XI.1964, leg. J. L. Cloudsley-Thompson (MRAC, 127497); Wadi Halfa, 1 M, IX.1962, leg. J. L. Cloudsley-Thompson (MRAC, 122739); Reuk, 10°45′N 32°50′E, 1 M, 4.XII.1961, leg. J. L. Cloudsley-Thompson (MRAC, 120835); without precise data: 1 M, 6 F *"M. illigeri"* (ZMB, 18836).

Diagnosis

This species is related to *M. davidi, M. guttatus*, *M. modestus* and *M. silver.* Males of these species differ in details of the structure of the palpal apophyses and embolus. *M. animatus* may be separated by the single embolus, slightly bent towards bulbus. The female has unique fissured entries to the copulatory openings on the surface of the epigyne, this feature is usual poorly visible, so examination of the internal structures is often neccessary. The entrance bowls are wide and transverse, the accessory glands are placed anterior to the copulatory openings.

Description

Measurements (male/female): length of carapace 2.1-2.8/2.5-2.9, width of carapace 1.5-2.1/1.9-2.1, height of carapace 0.6-1.0/0.7-0.8, length of abdomen 2.2-3.6/3.0-4.7, width of abdomen 1.4-1.9/2.1-3.2, length of eye field 1.0-1.4/1.2-1.4, anterior width of eye field 1.3-1.7/1.6-1.7, posterior width of eye field 1.3-1.6/1.5-1.6.

Male. General appearance in Fig. 6. Medium sized spider. Carapace brown with darker eye field. Light, greyish-white hairs cover carapace, near eyes brown bristles. Thorax with triangular whitish patch composed of light hairs. Along lateral carapace margins white stripes. White setae on clypeus. Chelicerae brown, labium and maxillae light brown with pale tips, sternum yellow. Abdomen light with median narrow brown stripes, whole abdomen with silver patches formed by translucent guanine crystals. Venter yellowish. Dense light hairs and scarce brown bristles on abdomen, bushier at its anterior edge. Spinnerets yellow. Legs yellow, their hairs and spines brown. Pedipalp brown, white hairs on palpal femur. Big process at base of palpal femur (Fig. 15). Bulbus rather narrow, embolus single, slender, without conductor, tibial apophyses short (Figs 7-14).

Female. Slightly bigger than male, the same coloration. Epigyne weakly sclerotized, copulatory openings situated laterally (Figs 16, 18, 20). Internal structure shown in Figs 17, 19, 21, spermathecae spherical, long accessory glands.

Distribution

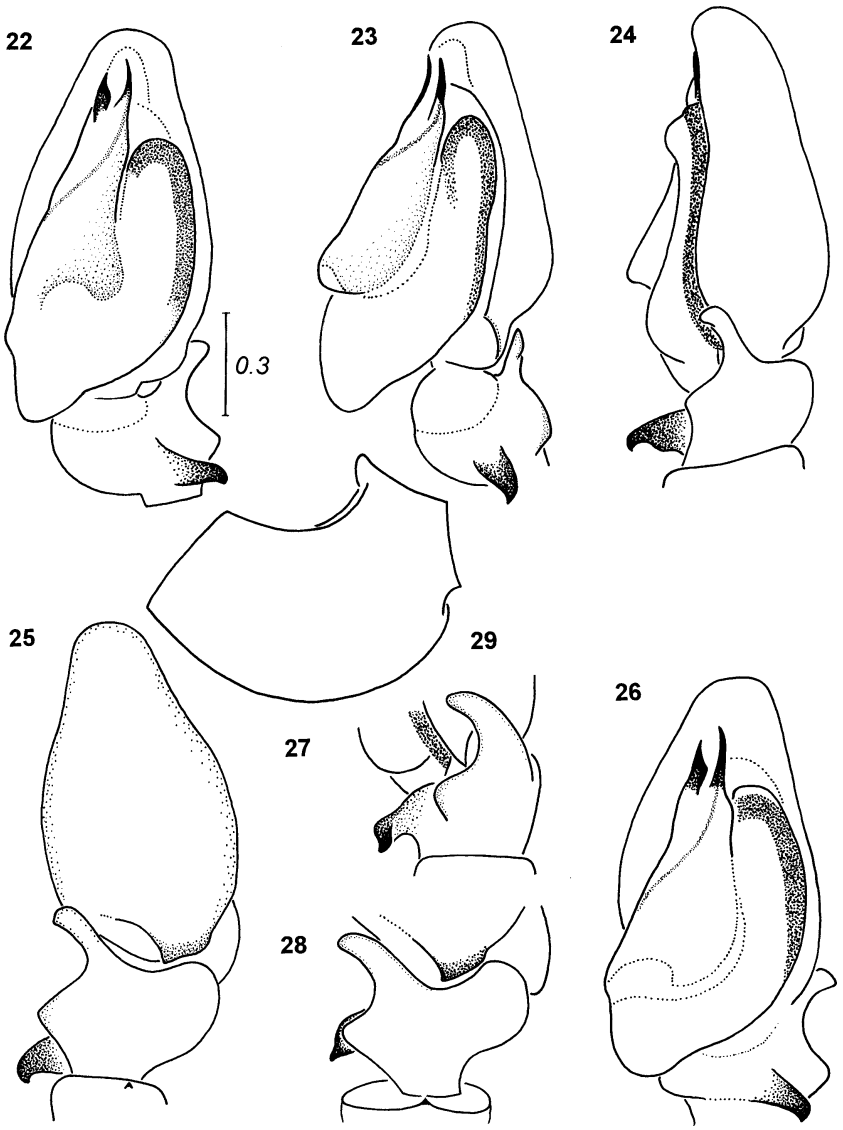
A species widely distributed in the Mediterranean subregion, occurs also in the northern part of Afrotropical Region.

Menemerus bifurcus sp. n.

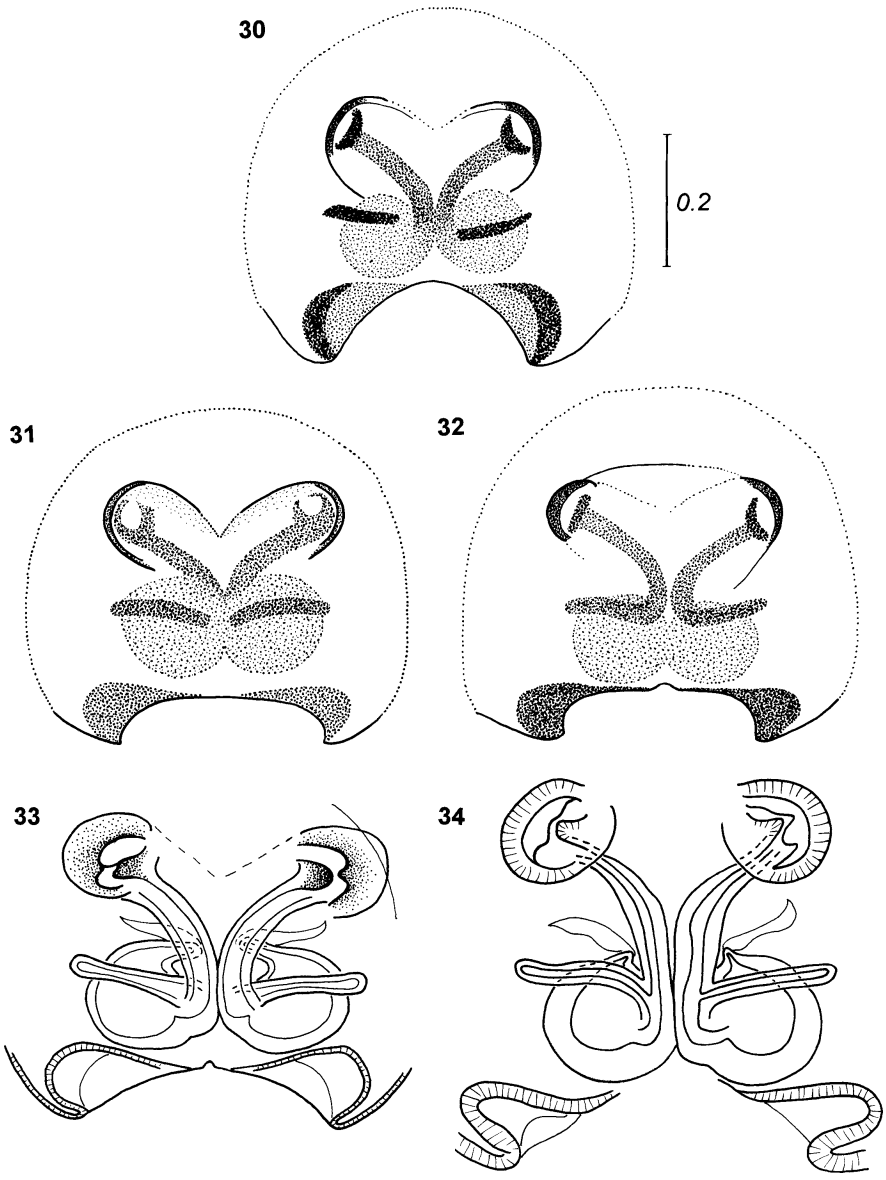
(Figs 22-34)

MATERIAL

Holotype M: **Zambia**: Kitwe, 12°50′S 28°0′E, 28.III.1963 (NMZ, A1126). Paratypes: **South Africa**: N Transvaal, Tshipise, Hot Springs, 22°20′S 30°05′E,



22-29. *Menemerus bifurcus* sp. n., male (22-25, 29 - holotype): 22-26 -palpal organ, ventral, ventrolateral, lateral and dorsal views, 27-28 - tibial apophyses, 29 - palpal femur



30-34. *Menemerus bifurcus* sp. n., female, epigyne and its internal structure

1 M, 3 F; VII.1979, leg. C. A. CAR (NMZ, A785); Pretoria, in house, 1 M, 27.IX.1976 (PPRI, 76/1672); prov. Mpumalanga, Rust de Winter, on river plots, 1 M, 10.V.1972, leg. L. PRETORIUS (PPRI, 76/1702); **Zimbabwe**: Bulawayo, 20°10′S 19°28′E, 1 F, XI.1962, leg. H. ASHTON (NMZ, A172); same locality, 1 M, XII.1962, leg. H. ASHTON (NMZ, A1170); same locality, museum building, 1 F, 14.IX.1979, leg. A. CAR (NMZ, A191); Harrare, garden, on trunk of tree, hiding under cracks in the bark, 1 M, 1 F, 1 juv., 8.X.1998, leg. M. CUMMING (MNH); same locality, 1 M, in leaf litter, 24.X.1998, leg. M. CUMMING (MNH).

DIAGNOSIS

See diagnosis of *M. transvaalicus*.

ETYMOLOGY

The specific name is derived from Latin words "*bis*" and "*furca*" meaning "bifurkate" and refers to shape of embolus.

DESCRIPTION

Measurements (male/female): length of carapace 2.0-2.1/2.1-2.3, width of carapace 1.6/1.6-1.8, height of carapace 0.6/0.7-0.8, length of abdomen 1.9-2.0/2.1-2.6, width of abdomen 1.6/1.7-1.8, length of eye field 0.9-1.0/1.0-1.1, anterior width of eye field 1.4/1.4-1.5, posterior width of eye field 1.3/1.4-1.5.

Male. Carapace flat, brown with darker eye field. Brown bristles in vicinity of eyes, brown and whitish short hairs on carapace, light hairs form white lines on lateral margins of carapace. Clypeus low, brown with white hairs. Chelicerae and labium light brown, maxillae and sternum orange. Abdomen fawn-brownish with lighter pattern, composed of three - four pairs of spots. In some specimens this pattern very poorly visible, abdomen almost uniformly dark brown. Venter light. Brown hairs cover whole abdomen, at its anterior margins hairs longer. Spinnerets brownish. Legs orange, only first pair with brown femora. Pedipalp brown, white hairs on pedipalp femur. Embolus double (with lamella), cymbium with dorsal process at its base, below dorsal tibial apophysis big triangular lobe (Figs 22-28).

Female. Carapace fawn-brownish, ocular area dark brown, eyes surrounded by black. Brown hairs on carapace, on eye field also white hairs. Chelicerae, labium and maxillae orange, sternum yellow. Abdomen slightly paler than in male, in some specimens uniformly yellowish. Brown hairs on abdomen. Spinnerets yellowish. Legs light. Epigyne with wide notch in posterior edge and heart-shaped depression (Figs 30-32). Internal structure shown in Figs 33, 34, vicinity of copulatory openings strongly sclerotized.

DISTRIBUTION

A southern African species.

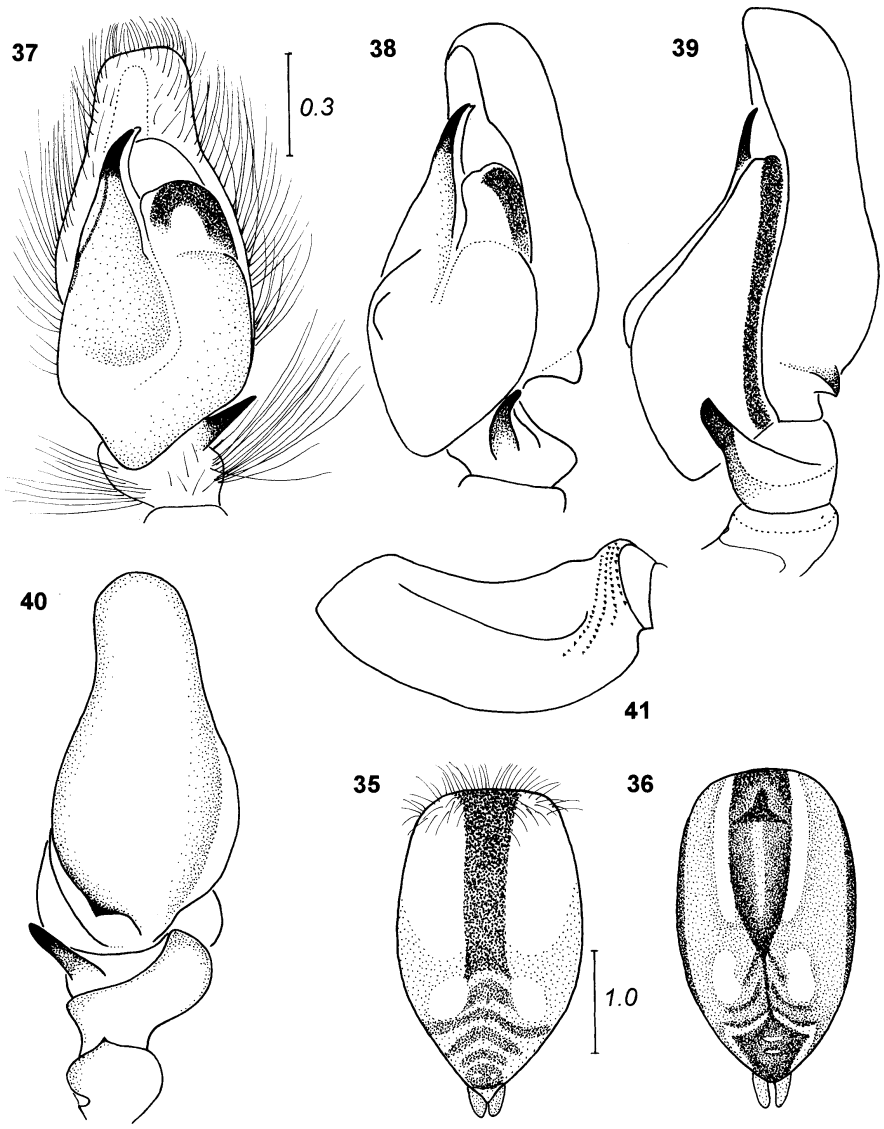
Menemerus bivittatus (DUFOUR, 1831)
(Figs 35-47)

Salticus bivittatus DUFOUR 1831: 369.
Attus cinctus WALCKENAER 1837: 430.
Attus melanognathus LUCAS 1838: 29.
Marpissa balteata C. L. KOCH 1846: 68.
Marpissa dissimilis C. L. KOCH 1846: 70.
Marpissa incerta C. L. KOCH 1846: 73.
Marpissa discoloria C. L. KOCH 1846: 74.
Salticus convergens DOLESCHALL 1859: 15.
Attus muscivorus VINSON 1863: 47.
Attus foliatus L. KOCH 1867a: 226.
Salticus nigrolimbatus O. P.-CAMBRIDGE 1869: 542.
Attus planus TACZANOWSKI 1871: 80.
Marpissa nigrolimbata: SIMON 1876: 29.
Menemerus vittatus: SIMON 1877: 59.
Icius convergens: THORELL 1878: 232.
Marpissa plana: TACZANOWSKI 1878: 324.
Marptussa marita KARSH 1879: 358.
Menemerus foliatus: L. KOCH 1879: 1123.
Attus mannii PECKHAM & PECKHAM 1883: 27.
Menemerus bivittatus: PECKHAM & PECKHAM 1886: 292; KULCZYŃSKI 1910: 403; PETRUNKEVITCH 1925: 241; 1930: 184; LESSERT 1927: 430; 1942: 184; BERLAND 1936: 81; SIMON 1937: 1210, 1262; BERLAND & MILLOT 1941: 346; CRANE 1950: 255; BARNES 1958: 44-47; CHRYSANTUS 1968: 68; WANLESS 1983: 78; GALIANO 1984: 6; ŻABKA 1985: 240-241; WESOŁOWSKA 1989: 268; JASTRZĘBSKI 1997: 41; PRÓSZYŃSKI in press.
Tapinattus melanognathus: THORELL 1887: 362; THORELL 1892: 307.
Menemerus melanognathus: PECKHAM & PECKHAM 1888: 82; MARX 1889: 99; NAKATSUDI 1943: 172.
Marpissa melanognatha: F. P.-CAMBRIDGE 1901: 250; PECKHAM & PECKHAM 1909: 483.
Stridulattus stridulans PETRUNKEVITCH 1926: 74; BRYANT 1942: 355.
Camponia lineata BADCOCK 1932: 40.
Menemerus lineatus: PRÓSZYŃSKI 1984: 137.
Menemerus bonetti SCHENKEL 1963: 430 (holotype from MNHN, examined); WESOŁOWSKA 1981: 145, **syn. n.**

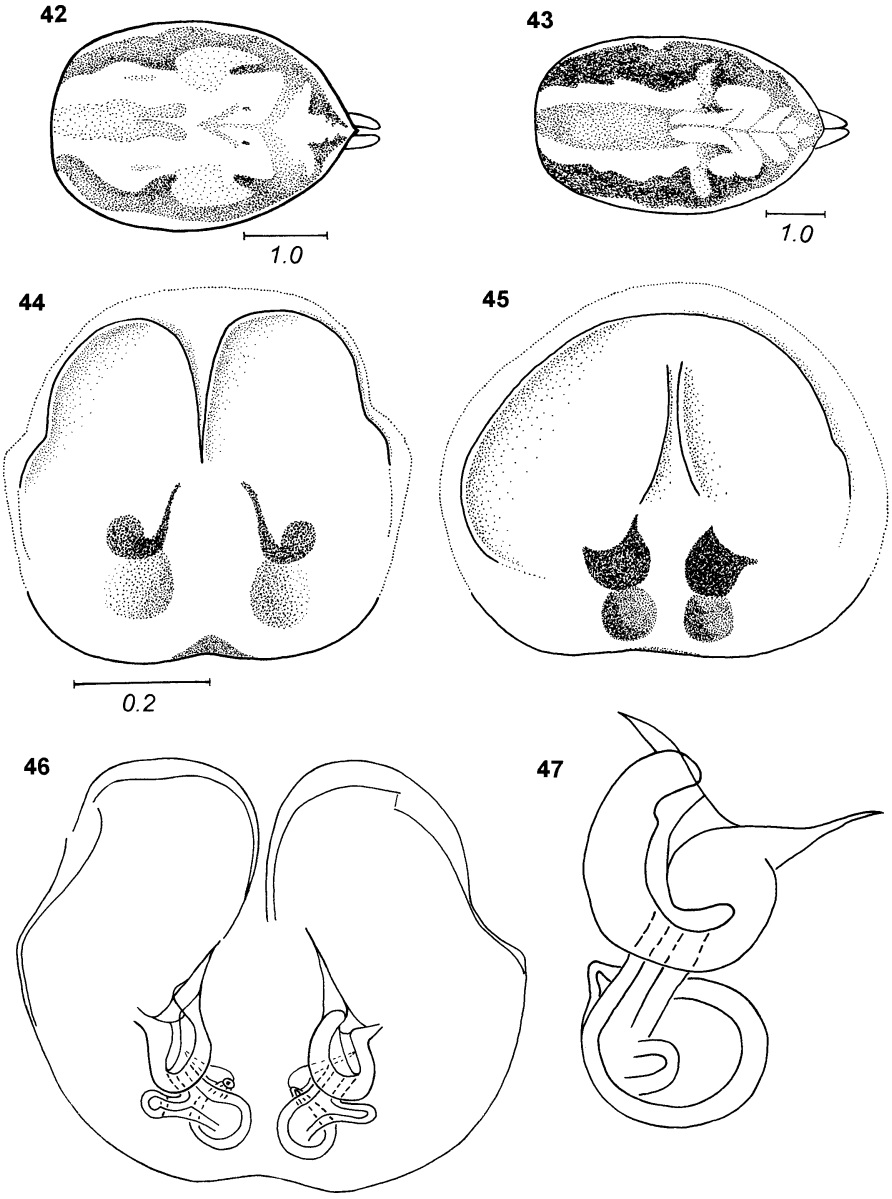
MATERIAL

Burundi: Bujumbura [Usumbura], 1 F, X.1956, leg. N. L. H. KRAUSS (AMNH); Bujumbura, 1 M, 10.XII.1968, leg. J. LEWALLE (MRAC, 134598); Plaine de la Ruzizi, Gihanga, 900 m a.s.l., 1 F, V.1966, leg. S. NDANI (MRAC, 130575); same locality, 1 F, II.1967, leg. S. NDANI (MRAC, 131466); Plaine de la Ruzizi, Luvungi, 1 M, 17.VII.1961, leg. R. HISS (MRAC, 120022); Cameroon: Victoria, 1 F, 15-16.I.1949, leg. B. MALKIN (CAS); **Central African Republic**: Bambari, 16 M, 16 F, VIII.-IX.1967, leg. C. PIERRARD (MRAC, 133910); same locality, 2 M, II.1969, leg. C. PIERRARD (MRAC, 136610); same locality, 3 M, II.1969, leg. C. PIERRARD (MRAC, 136607); same locality, 1 M, II.1969, leg. C. PIERRARD (MRAC, 136609); same locality, 14 M, 22 F, II.1969, leg. C. PIERRARD (MRAC, 136661); **Congo**: Brazzaville, 1 M, XI.1956, leg. N. L. H. KRAUSS (AMNH); **Djibouti**: 2 F (MNHN, 20074); Khor Anghar, 1 M (MNHN); **Egypt**: (without

precise locality) 1 F *"M. soldani"* (microscopic slide) (ZMB, 18855); **Ethiopia**: Nazret, Smoa prov., on stone wall, 1 F, 13.VI.1983, leg. A. RUSSELL-SMITH (ARS); **Ghana**: Accra-Achimota, in garden, 1 M, 1 F, XII.1961, leg. C. P. HINCKLEY (MCZ), Legon, 1 M, V.-X.1963, leg. J. PRÓSZYŃSKI (IZ PAN, 16/64); **Kenya**: Diani Beach, 30 km S Mombasa, 1 F, 7.III.1970 (NR, 249); same locality, 1 M,



35-41. *Menemerus bivittatus* (DUF.), male: 35-36 - abdominal pattern, 37-40 - palpal organ, ventral, ventrolateral, lateral and dorsal views, 41 - palpal femur



42-47. *Menemerus bivittatus* (DUF.), female: 42-43 - abdominal pattern, 44-46 - epigyne and its internal structure, 47 - detailes structure of spermathecae

3 F, VI.1957, leg. N. L. H. KRAUSS (AMNH); **Liberia**: Roberts Int'l, airport near Monrovia, outside of terminal building, 2 F, 3.V.1975, leg. A. J. PENNIMAN (AMNH); **Madagascar**: Befandriana, Majunga prov., 1 M, leg. POTILLER (AMNH); Tananariva, 2 M, (MNHN, 26172); **Mauritius**: Curepipe, 1 M, 1 F, VIII.1974, leg. G. MALHERBE (MRAC, 146273); **Nigeria**: Lagos Colony, Isheri, 1 F, 3-10.IV.1949, leg. B. MALKIN (CAS); **Senegal**: Dakar Peninsula, 2 F, I.-VI.1945, leg. E. H. NEWCOMB (AMNH); Fdakar, 15 km Rufisque road, 1 F, 20.VII.1981, leg. W. H. SETTLE (CAS); **Sierra Leone**: Freetown, Mt Aureol, 1 M, IX.1976, leg. D. OLU-PITT (MRAC, 148467); same locality, 1 F, IX.1976, leg. D. OLU-PITT (MRAC, 148485); Freetown, 3 M, I.1977, leg. D. OLU-PITT (MRAC, 148516); same locality, 4 F, I.1977, leg. D. OLU-PITT (MRAC, 148537); **South Africa**: E Cape, Fish River Mouth, 32°30´S 27°10´E, 1 M, 1 F (NMZ, A1296); W Cape, Kirstenbosch, 33°55´S 18°22´E, 1 M, 13.II.1980, leg. C. A. CAR (NMZ, A1117); Natal, Umhlali, 29°29´S 31°13´E, 1 F, II.1940, leg. R. F. LAWRENCE (NMZ, A27); Durban, 1 M, 6.I.1990, leg. L. H. B. MORIS (NMZ, A7777); **Tanzania**: Dar es Salaam, 1 F, IV.1957, leg. N. L. H. KRAUSS (AMNH); Zanzibar, 2 M, 4 F, coll. COOKE (MCZ, 985); **Zaire**: Stanleyville, 2 M, 2 F, coll. LESSERT (AMNH); Lubondaie, Tshimbulu, 1 M, 1 F, leg. C. R. STEGALL (AMNH); Bokuma, 1 M, 1951, leg. R. P. LOOTENS (MRAC, 80476); Kivu, Uvira, near Kalundu, 3 M, 3 F, VI.1961, leg. R. KISS (MRAC, 119924); Tshuapa, Bamanya, 1 M, 2 F, 1968, leg. R. P. HULSTAERT (MRAC, 135335); Equater, Bamanya, 3 M, 1975, leg. R. P. HULSTAERT (MRAC, 148561); Equater, Flandria, 1 F, leg. R. P. HULSTAERT (MRAC, 134538); Leopoldville [Kinshasa], 1 F, 1941, leg. LEPERSONNE (MRAC, 58093); Banana, 1 F, 1947, leg. E. DARTEVELLE (MRAC, 134537); Bohuma, 1 F, 1951-1952, leg. R. P. LOOTENS (MRAC, 84212); same locality, 1 F, 1951-1952, leg. R. P. LOOTENS (MRAC, 84230); same locality, 2 M, 1951-1952, leg. R. P. LOOTENS (MRAC, 84247); same locality, 2 M, 1 F, 1 juv., 1954, leg. R. P. LOOTENS (MRAC, 80464-80468); Bokote, 2 M, leg. R. P. HULSTAERT (MRAC, 11857/11858); Paulis, Wamla, 810 m a.s.l., 1 F, leg. R. CASTELAIN (MRAC, 85516); Sankuru, Komi I, 1 M, leg. J. GHESQUIERE (MRAC, 11889), Albertville [Kalemia], 2 F, 1960, leg. J. VERHOUSTRAETE (MRAC, 164352); Katanga, Kisange, 1 M, 1965, leg. Q. REGUARD (MRAC, 128016); **Zimbabwe**: Harare [Salisbury], 17°50´S 31°02´E, museum building, 1 M (palp only), 29.II.1968, leg. M. RAATH (NMZ, A960); Harare [Salisbury], 17°50´S 31°05´E, Prince Edward school, on wall of building, 1 M, 18.IV.1969, leg. J. R. MACKAY (NMZ, A1444); Bulawayo, 20°10´S 28°35´E, 2 M, XI.1969 (NMZ, A10); same locality, 1 F, 10.I.1984, leg. P. MHLANGA (NMZ, A2084); Bulawayo, Malindela Service Station, 1 F, 19.II.1981, leg. M. & R. ELROY (NMZ, A5402); Bulawayo, 1 F, 29.I.1995. leg. W. PUŁAWSKI (CAS); Athens Mine, Muuma, 1 M, VI.-VII.1989, leg. J. HOGAN (NMZ, A7691); Ngezi, 1 M, 1.V.1984, leg. A. MKONDO (NMZ, A2239).

DIAGNOSIS

This species is closely related to *M. brevibulbis, M. brachygnathus* (THORELL, 1887) and *M. fulvus* (L. KOCH, 1887). The male may be recognized by the

narrower bulbus, shape of the tibial apophysis and the embolus with less bent end (cf. Figs 7-14 with Figs 50-52 and Figs 293-295 in ŻABKA 1985 and Figs 7-9, 14-16 in JASTRZĘBSKI 1997 and Figs 145-149 in BOHDANOWICZ & PRÓSZYŃSKI 1987). Females of these species have identical form of the epigyne and are impossible to tell apart based on morphological features.

DESCRIPTION

Measurements (male/female): length of carapace 2.5-3.3/2.7-3.3, width of carapace 1.8-2.6/2.5-2.7, height of carapace 0.8-1.0/0.9-1.2, length of abdomen 2.2-3.5/3.0-5.1, width of abdomen 1.5-2.0/2.2-3.3 length of eye field 1.1-1.4/1.1-1.4, anterior and posterior width of eye field 1.5-1.8/1.6-1.8.

Male. One of bigger species in the genus. Carapace flat, brown or dark brown, eye field blackish. Long, brown bristles near eyes. Dense light hairs cover anterior part of ocular area. Light hairs on thoracic part of carapace form longitudinal median light streak. Clypeus low, clothed in white hairs. White line composed of hairs along lateral margins of carapace. Chelicerae dark brown. Labium and sternum brown, maxillae brownish with pale tips. In majority of specimens abdomen light, yellow with russet median streak anteriorly (Fig. 35), sometimes abdominal pattern slightly darker (Fig. 36). Whole abdomen clothed in dense yellow and brown hairs. At anterior abdominal margins hairs longer. Venter light, sometimes with silver spots of translucent guanine crystals. Spinnerets yellowish. Legs yellowish-brown, femora and patellae slightly darker. Leg hairs brown. Stridulatory apparatus present, composed of cheliceral "grater" and numerous bristles on ventral surface of palpal femur (in majority of specimens stridulatory bristles rubbed off, only pegg-like processes visible - Fig. 41). Pedipalp light brown, on palpal femur and tibia very long white hairs. Tibial apophysis straight, retrobasal process on cymbium, bulbus oval, membranous conductor acompanying embolus poorly visible (Figs 37-40).

Female. Slightly bigger than male. Coloration of abdomen darker, brown with yellowish irregular pattern (Figs 42, 43). Sides and venter of abdomen yellowish. Legs yellow. Epigyne big, rounded, with very large depression, partially divided by median septum (Figs 44-45). Sometimes depression plugged with waxy secretion. Internal structures shown in Figs 46, 47.

DISTRIBUTION

A pantropical species.

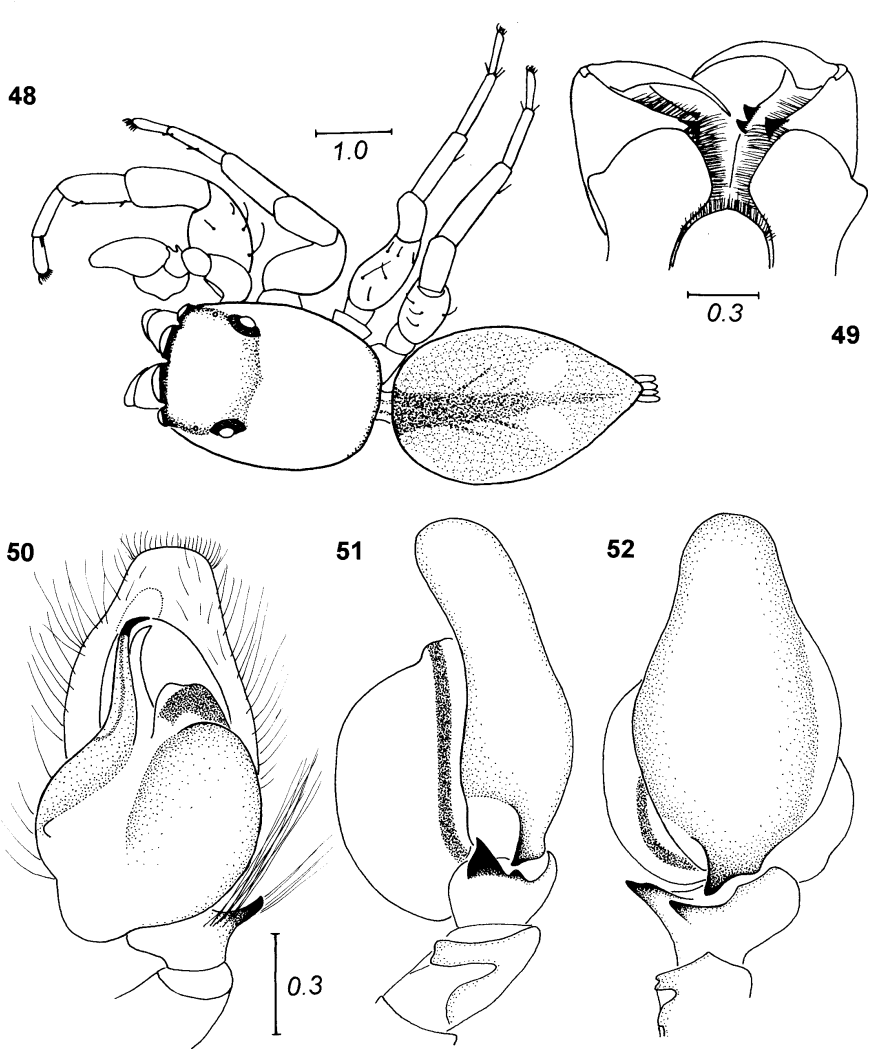
Menemerus brevibulbis (THORELL, 1887)

(Figs 48-57)

Menemerus balteatus: SIMON 1882: 212; 1885: 346.
Tapinattus brevibulbis THORELL 1887: 372 (nom. nov.).
Menemerus brevibulbis: PRÓSZYŃSKI 1984: 84.

MATERIAL

Djibouti: Djibouti, 3 M, 2 F, VII.1974, leg. P. LERICHE (MRAC, 146265); **Somalia**: Berbera, 2 M, 2 F, 2 juv. (BMNH, 4.7.94); **West Africa**: (without precise locality, probably Senegal), 1 M "*M. brevipalpis*", leg. E. SIMON, coll. THORELL (NR, 258/1712); **Yemen**: Sana'a, 1 M, 11.VI.1998, leg. M. MAHYOUB (MRAC); Lahj, in Malaise-trap, 1 M, VI.1998, leg. A. VAN HARTEN & A. SALLAM (MRAC).



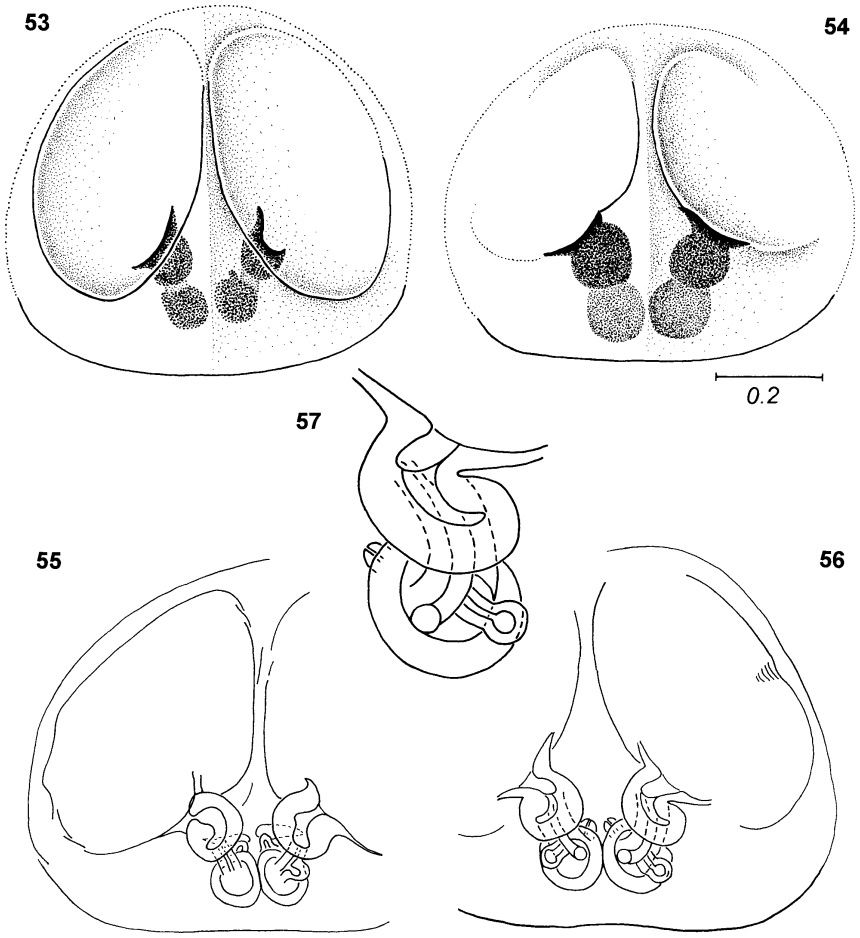
48-52. *Menemerus brevibulbis* (THOR.), male: 48 - general appearance, 49 - chelicerae and maxillary plates, 50-52 - palpal organ, ventral, lateral and dorsal views

DIAGNOSIS

This species is closely related to *M. bivittatus, M. brachygnathus* (THORELL, 1887) and *M. fulvus* (L. KOCH, 1887). The male may be distinguished by the rather short and wide bulbus and characteristic form of the tibial apophysis with an additional dorsal process. Female - see diagnosis of *M. bivittatus*.

DESCRIPTION

Measurements (male/female): length of carapace 2.8-3.5/3.2-3.5, length of abdomen 2.7-3.9/3.2-3.6, length of eye field 1.2-1.5/1.3-1.4, anterior and posterior width of eye field 1.5-1.8/1.5-1.9.



53-57. *Menemerus brevibulbis* (THOR.), female: 53-56 - epigyne and its internal structure, 57 - detailes structure of spermathecae

Male. General appearance as in Fig. 48. One of bigger species in the genus. Carapace dark brown with almost black eye field. Numerous light hairs cover carapace, denser on ocular area, brown bristles near eyes. White hairs form narrow stripe along lateral edges on carapace. Dense, white hairs on clypeus. Chelicerae dark brown. Labium brown, maxillae brownish with lighter margins, sternum light brown. Abdomen yellowish with silver spots of translucent guanine crystals. Brown stripe on abdomen medially, in some specimens pair of large light patches posteriorly. Ventrally abdomen light. Whole abdomen clothed in light hairs, only median stripe composed of brown hairs. Spinnerets light. Legs orange or light brown, first pair slightly darker. Leg hairs long, brown. Stridulatory apparatus present. Palp brownish, dense hairs on cymbium. Bulbus rounded, clearly shorter than in other species (Fig. 50). Tibial apophysis rather short and wide, with accompanying dorsal process (Figs 51, 52).

Female. Slightly bigger than male. Coloration of carapace similar to male. Abdomen in some specimens darker, brownish with leaf-shaped lighter pattern. Epigyne very large, with two oval shallow depressions separated by very narrow median septum (Figs 53, 54). Internal structure rather simple. Gonopores hidden in very strongly sclerotized entrance bowls, plugged with waxy secretion, seminal ducts straight and short, accessory glands short, spermathecae spherical (Figs 55-57).

DISTRIBUTION

A range of this species poorly known; reported from Senegal, vicinity of Aden Gulf and India.

Menemerus carlini (PECKHAM et PECKHAM, 1903), comb. n.

(Figs 58-61)

Mendoza carlinii PECKHAM & PECKHAM 1903: 204, part: F.

MATERIAL

Lectotype F (present designation): **Zimbabwe**: Mashonaland, leg. MARSHALL (MCZ, 362). **South Africa**: Kentani, 1 F, 1903, leg. PYLER (SAM, 13037).

DIAGNOSIS

This species slightly resembles *M. namibicus* but may be separated by the posterior edge of the epigynal depression (cf. Fig. 58 with Fig. 214). Its sclerotized entrance bowls are larger, their rims are visible as strongly curved lines (straight in *M. namibicus* - cf. Fig. 59 with Fig. 216).

DESCRIPTION

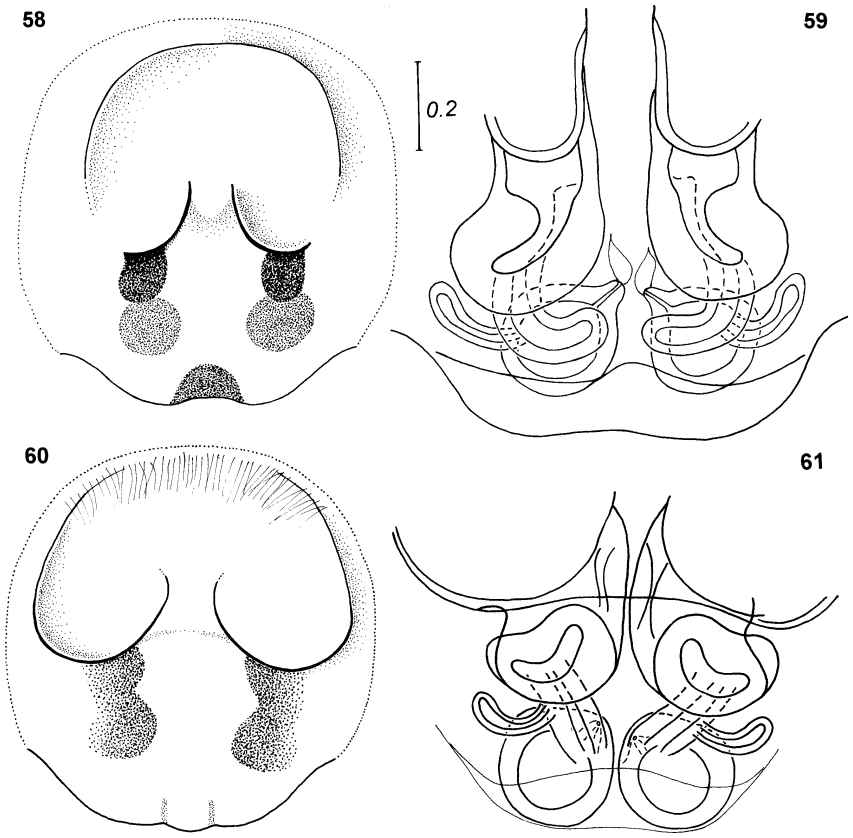
Measurements: length of carapace 3.6-3.8, width of carapace 2.8, height of carapace 1.0, length of abdomen 4.7-5.8, width of abdomen 3.2, length of eye field 1.3, anterior width of eye field 1.6-1.8, posterior width of eye field 1.7-1.9.

Male unknown.

Female. Big spider. Carapace dark brown, eye field black. Adpressed brown and fawn hairs on carapace, long brown bristles in vicinity of eyes. White hairs form narrow line along lateral margins of carapace. Chelicerae dark brown. Labium and sternum brownish, maxillae brown with pale margins. Abdomen brownish with large leaf-shaped lighter pattern, anteriorly with median brown streak. Ventrally abdomen greyish-orange. Spinnerets grey. Legs yellow to light brown. Epigyne large, rounded, with big shallow depression in anterior half (Figs 58, 60). Internal structures very heavily sclerotized. Inlets of seminal ducts hidden in very deep, enormous, thick-walled entrance bowls (Figs 59, 61).

REMARK

Original description of *Mendoza carlini* includes both sexes, but the male proved to be conspecific with *M. congoensis*.



58-61. *Menemerus carlini* (PKH.), female (58-59 - holotype), epigyne and its internal structure

DISTRIBUTION

A southern African species.

Menemerus congoensis LESSERT, 1927

(Figs 62-77)

Menemerus congoensis LESSERT 1927: 430; CAPORIACCO 1949: 486, WESOŁOWSKA & RUSSELL-SMITH in press.
Menemerus hypenetes LAWRENCE 1928b: 259 (syntype from SAM, examined), **syn. n.**
Mendoza carlinii PECKHAM & PECKHAM 1903: 204, part: M.

MATERIAL

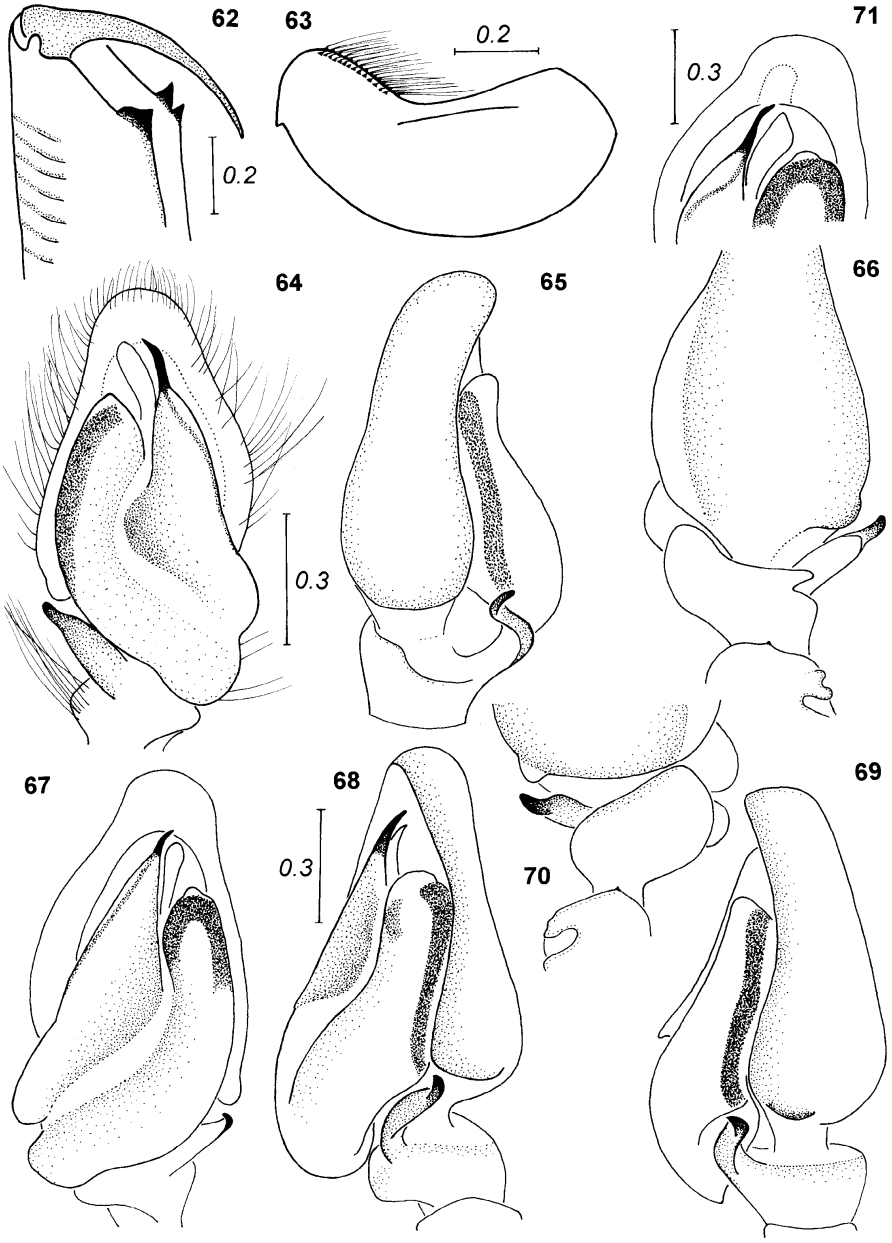
Lectotype M (present designation): **Zaire**: Avakubi, 1 M (AMNH). **Central African Republic**: Bambari, 2 F, VIII.-IX.1967, leg. C. PIERRARD (MRAC, 133912); **Ethiopia**: Lake Langano, under stones in short grass, 1 F, 13.IV.1983, leg. A. RUSSELL-SMITH (ARS); **Kenya**: Athi river, 1530 m a.s.l., 1 F, 19.IX.1857, leg. E. S. ROSS & R. E. LEECH (CAS); Salt Lake East, 2100 m a.s.l., 1 M, 6.XII.1937 (NR); **Namibia**: Kaoko Otavi, 1 M (syntype of *M. hypenetes*), I.-IV.1926, (SAM, 2347); **Rwanda**: Butare, 1 F, VI.1971, leg. P. NYALAGUKA (MRAC, 139157); **Zaire**: with lectotype, only male palps (MHN); Leopoldville [Kinshasa], 1 F, leg. LEPERSONNE (MRAC, 58094); Beni forest, 1000 m a.s.l., 1 M, 2 F, 5.V.1964, leg. R. CELIS (MRAC, 126795); Kivu, camp de Makayoba (Semliki), 1 F, 12.VII.1968, leg. R. LEJEUNE (MRAC, 135711); Sankuru, Komi I, 1 M, leg. J. GHESQUIERE (MRAC, 11890); **Zambia**: Nyawa, 1 F, 31.VII.1978, leg. R. STJERNSTEDT (MRAC, 151974); Mweru Wantipa Lake, 1 M, IX.1944, leg. P. D. GUILBRIDE (BMNH, 1946.12.31.109); **Zimbabwe**: Mashonaland, 1 M (syntype of *Mendoza carlinii*), leg. MARSHALL (MCZ, 362).

DIAGNOSIS

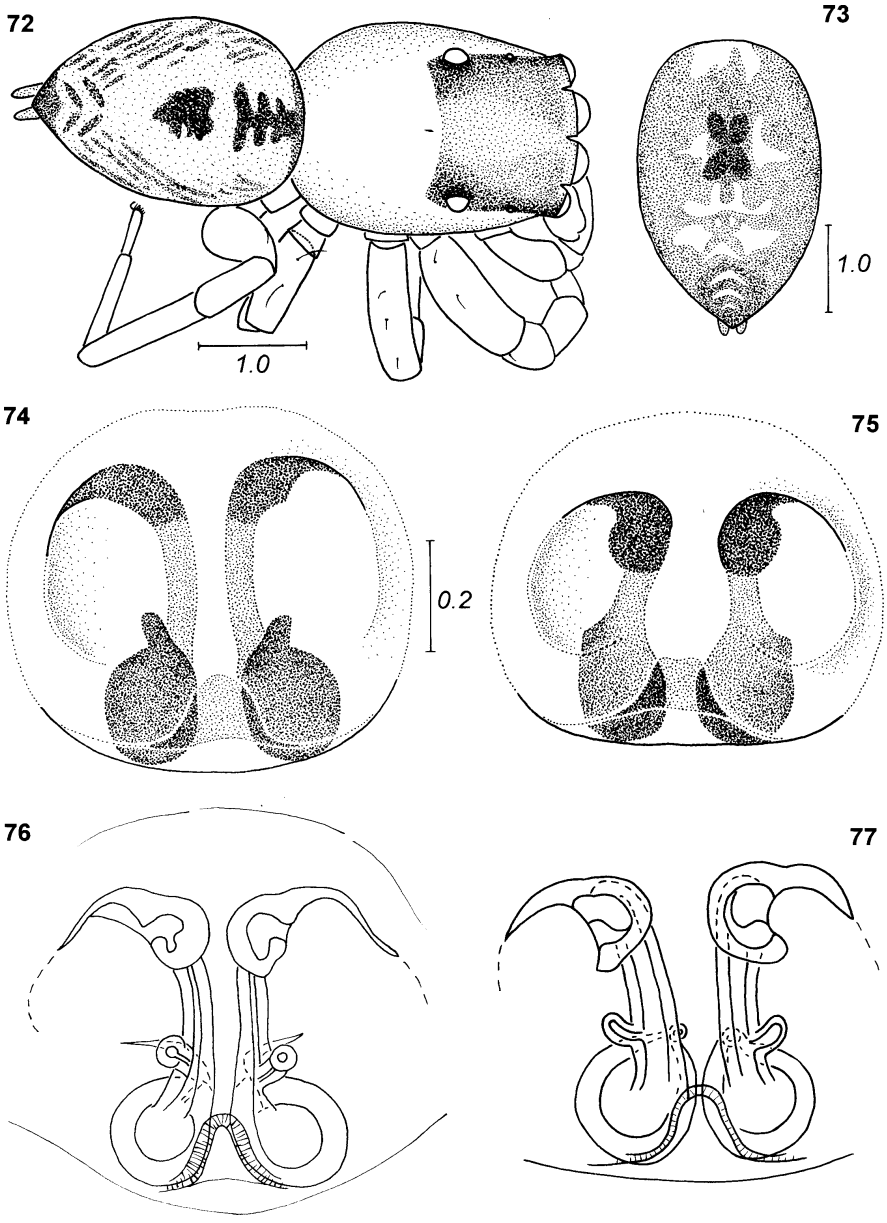
This species is closely related to *M. eburnensis*. Males of both species are impossible to tell apart based on morphological features, though *M. eburnensis* seems more slender, and its abdomen is slightly darker coloured. The female can be distinguished by the longer seminal ducts and sclerotization of the vicinity of the copulatory openings; the latter being bowl-shaped in *M. congoensis* or forming rounded plate in *M. eburnensis* (cf. Figs 75, 77 with Figs 118, 119).

DESCRIPTION

Measurements (male/female): length of carapace 2.4-2.8/2.4-2.9, width of carapace 1.8-2.0/1.9-2.1, height of carapace 0.5-0.7/0.7-0.8, length of abdomen 2.2-3.2/2.5-5.1, width of abdomen 1.5-1.8/1.9-2.7, length of eye field 1.0-1.2/1.0-1.1, anterior width of eye field 1.2-1.4/1.3-1.6, posterior width of eye field 1.3-1.4/1.3-1.4.



62-71. *Menemerus congoensis* Les., male (62-66 - lectotype, 67-70 - syntype of *M. hypenetes*): 62 - cheliceral dentition, 63 - palpal femur, 64-69 - palpal organ, ventral, ventrolateral, lateral and dorsal views, 71 - embolus



72-77. *Menemerus congoensis* Les., male and female: 72 - general appearance of male, 73 - abdominal pattern of female, 74-77 - epigyne and its internal structure

Male. General appearance as in Fig. 72. Medium-sized. Carapace flattened, brown, eye field dark brown or blackish. Dense, adpressed brownish hairs on carapace, lighter on eye field, long bristles near eyes. Very narrow white line along lateral abdominal margins. Clypeus covered with white hairs. Labium and sternum dark brown, maxillae brown with light margins. Abdomen brownish-russet, in some specimens with whitish leaf-shaped pattern, covered with brown hairs. Venter light. Spinnerets greyish-brown. Legs orange to brown, femora slightly darker than remaining segments. Leg hairs dense, brown, spines brown. Stridulatory apparatus present (Figs 62, 63). Pedipalp shown in Figs 64-71. Conductor in some specimens poorly visible.

Female. Like male, but somewhat bigger. Abdominal pattern (Fig. 73) composed of black and greyish-yellow patches on brown background. Legs brown with darker rings. Epigyne rounded with two shallow oval depressions and single pocket near epigastric furrow (Figs 74, 76). Gonopores plugged by waxy secretion. Initial part of seminal ducts with strongly sclerotized entrance bowls, seminal ducts rather long, spermathecae spherical (Figs 75, 77).

REMARK

The first description of the female is given here.

DISTRIBUTION

Widely distributed Afrotropical species; reported from Ethiopia to South Africa, but not recorded from West Africa.

Menemerus davidi PRÓSZYŃSKI et WESOŁOWSKA sp. n.

(Figs 78-89)

MATERIAL

Holotype M: **Libya**: Tripolitania, 2220-2400 m a.s.l., 28.IX.-2.X.1948, leg. B. MALKIN (AMNH). Paratypes: together with holotype, 1 F; **Algeria**: Djelfa, 2 M, leg. VIBERT (MNHN, 13155); ain Sefra, 2 M, 1 F, leg. VIBERT (MNHN, 23578); **Egypt**: 1 M *"M. soldani"* (microscopic slide) (ZMB, 18854).

DIAGNOSIS

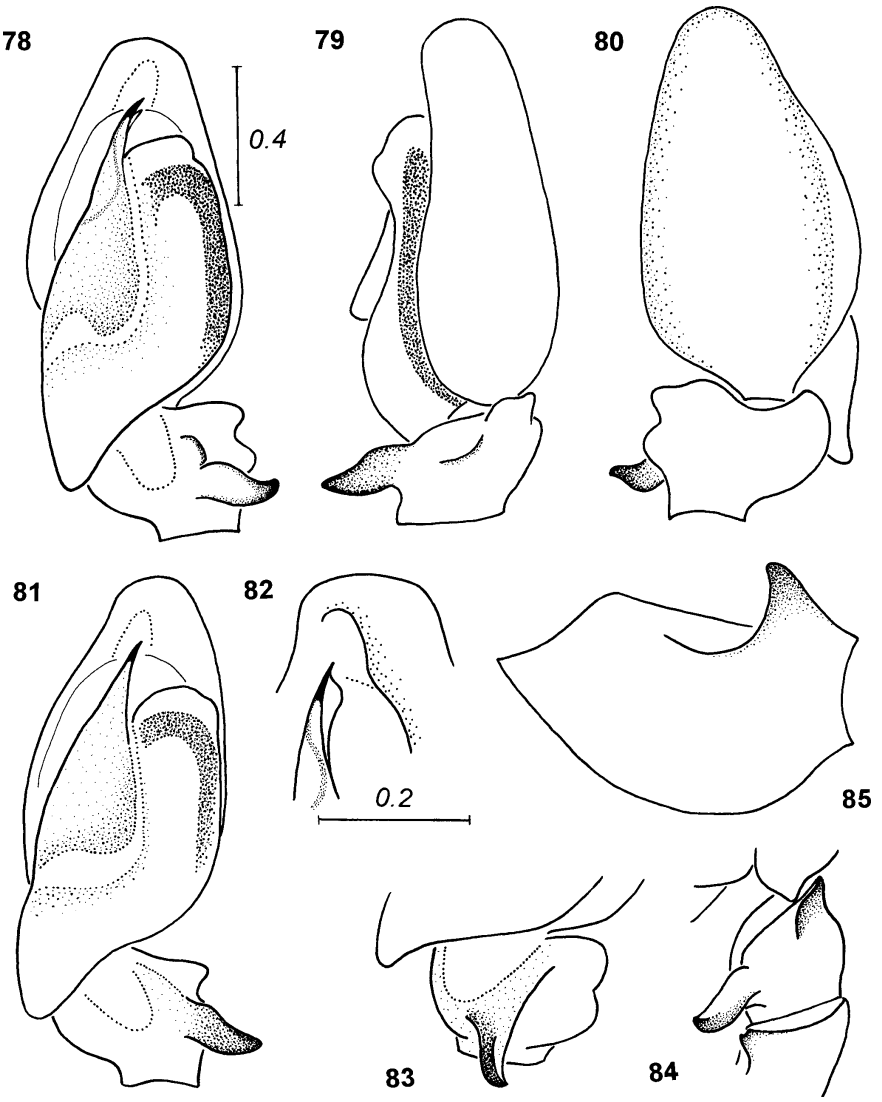
This species is related to *M. animatus*. The male may be separated by the size and shape of the dorsal palpal apophysis, which is lobate in *M. davidi* (cf. Fig. 80 with Fig. 9). Moreover, the embolus in *M. davidi* is slightly shorter, with a poorly visible, small conductor. In the female entries to the copulatory openings are rather semirounded (in *M. animatus* fissured - cf. Figs 86, 87 with Figs 16, 18, 20), but in some cases only study of the internal structures makes species identification possible. Course of the seminal ducts and position of the accessory glands in both species differ (cf. Fig. 88 with Figs 17, 19, 21).

ETYMOLOGY

The specific name is derived from David, king of Israel in XI/X century B.C.

DESCRIPTION

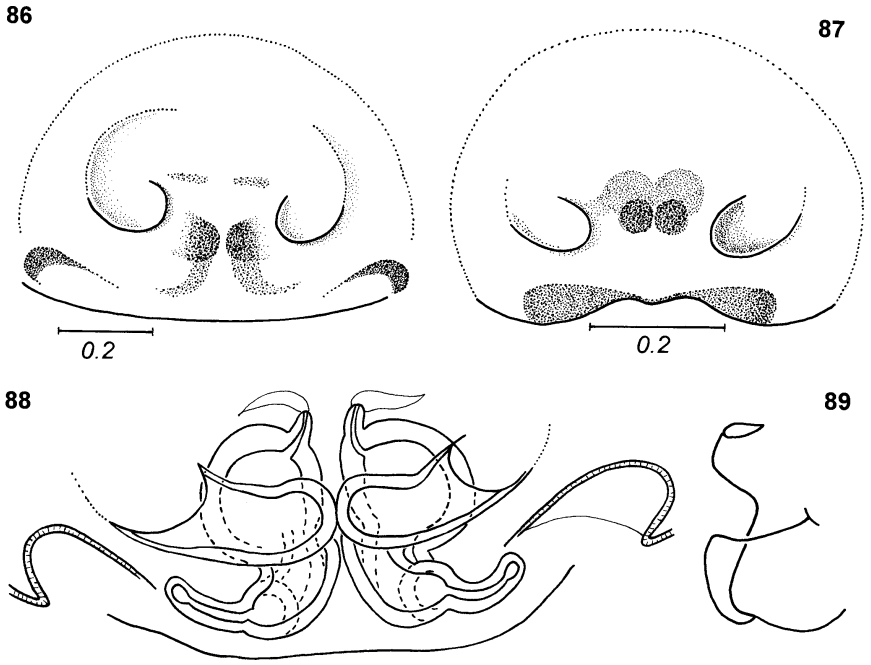
Measurements (male/female): length of carapace 2.3-2.7/2.7-3.0, width of carapace 1.9/2.0-2.1, height of carapace 0.7/0.8, length of abdomen 2.2-2.9/2.9-



78-85. *Menemerus davidi* sp. n., male (78-82, 85 - holotype): 78-81 - palpal organ, ventral, lateral and dorsal views, 82 - embolus, 83-84 - tibial apophyses, 85 - palpal femur

3.2, width of abdomen 1.8/1.9-2.2, length of eye field 1.1-1.2/1.2-1.3, anterior width of eye field 1.5-1.6/1.5-1.8, posterior width of eye field 1.4-1.5/1.4-1.7.

Male. Carapace brown, eye field darker. Short whitish hairs on thorax, brown bristles near eyes. Chelicerae dark brown, labium and maxillae orange-brownish with pale tips, sternum orange-yellowish. Abdomen light, yellowish with silver patches (translucent guanine) and median narrow light brown stripe. In some specimens abdomen brownish laterally. Venter light yellow. Spinnerets orange. Legs orange, only femur of first leg brown, covered with short brownish hairs. Pedipalp light brown, its hairs white. Embolus with very small conductor, dorsal tibial apophysis very flat, big process at base of femur (Figs 78-85).

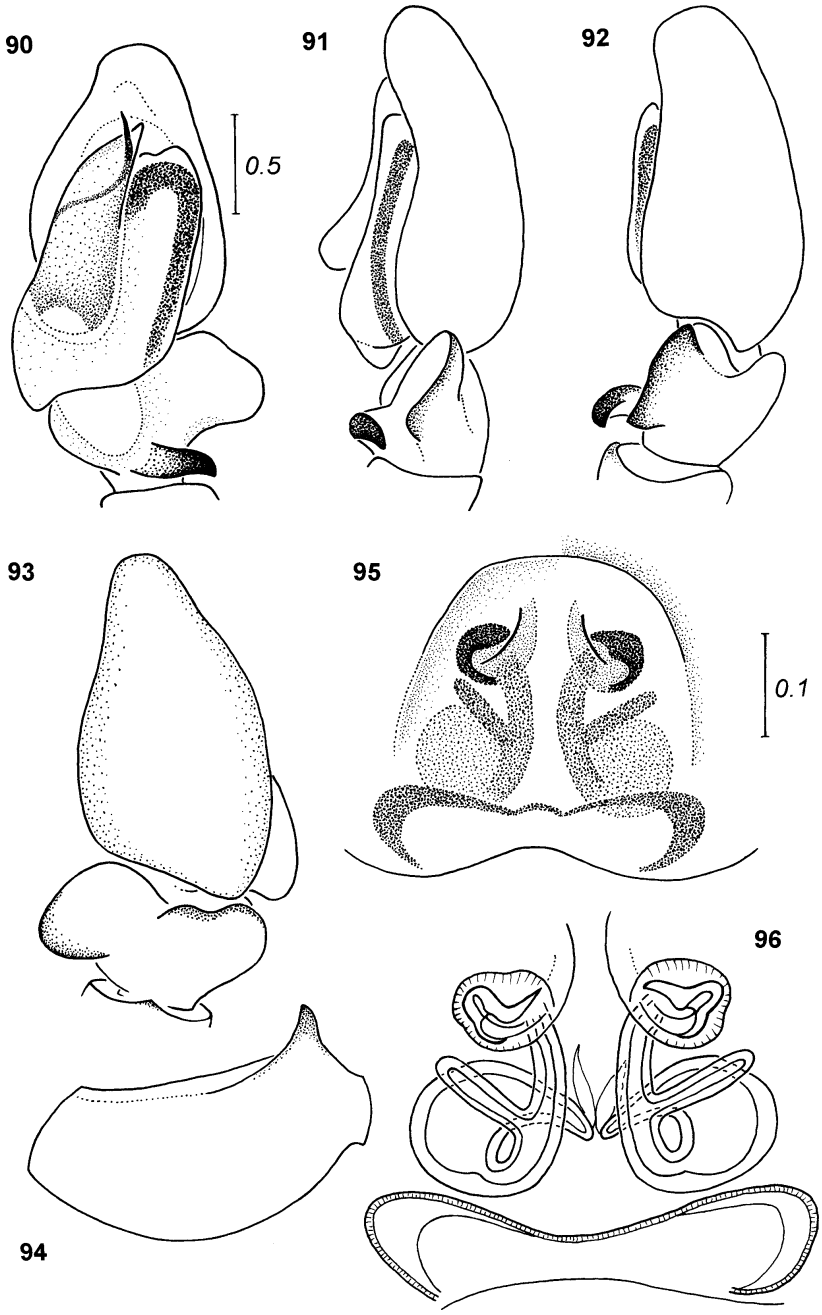


86-89. *Menemerus davidi* sp. n., female: 86-88 - epigyne and its internal structure, 89 - diagrammatic course of seminal duct

Female. Like male. Brown and white hairs on carapace, denser on thoracic slopes. Abdomen light, covered with sparse brown hairs, at its anterior edge haris long, light. Epigyne large, oval, with very wide posterior pocket, copulatory openings situated laterally (Figs 86, 87). Internal structure shown in Fig. 88, strongly sclerotized.

DISTRIBUTION

North Africa, recently recorded from Israel (PRÓSZYŃSKI in press).



90-96. *Menemerus desertus* sp. n., male and female (90-94 - holotype): 90-93 - palpal organ, ventral, lateral, dorsolateral and dorsal views, 94 - palpal femus, 95-96 - epigyne and its internal structure

Menemerus desertus sp. n.

(Figs 90-96)

MATERIAL

Holotype M: **Algeria**: ain Sefra, leg. VIBERT (MNHN, 6379). Paratype: together with holotype, 1 F.

DIAGNOSIS

A distnctive species, the male may be separated by the very large, lobate dorsal tibial apophysis and characteristic embolus, the female has characteristic ridges at the entrance bowls.

ETYMOLOGY

The specific name is derived from Latin word "*deserta*" meaning "desert".

DESCRIPTION

Measurements (male/female): length of carapace 2.5/2.7, length of abdomen 2.7/4.7, length of eye field 1.2/1.2, anterior width of eye field 1.4/1.6, posterior width of eye field 1.3/1.6.

Male. Carapace dark brown, near eyes black. Whole carapace densely clothed in adpressed, short, brown hairs. Longer bristles in vicinity of eyes, few white hairs on ocular area. Chelicerae brown, labium and maxillae orange, sternum yellow. Abdomen light brown with wide yellow stripe medially. Dense brown and light hairs on abdomen, longer at its anterior edge. Venter yellowish. Spinnerets light. Legs yellowish-orange, their hairs brownish and whitish, spines brown. Pedipalp brown, embolus thin, dorsal tibial apophysis large, lobated (Figs 90-93).

Female. Bigger than male, but similar coloration. Epigyne large, with very shallow depression and wide pocket (Fig. 95). Vicinity of copulatory openings very strongly sclerotized, seminal ducts form loop in fore part, accessory glands long (Fig. 96).

DISTRIBUTION

Known from the type locality only.

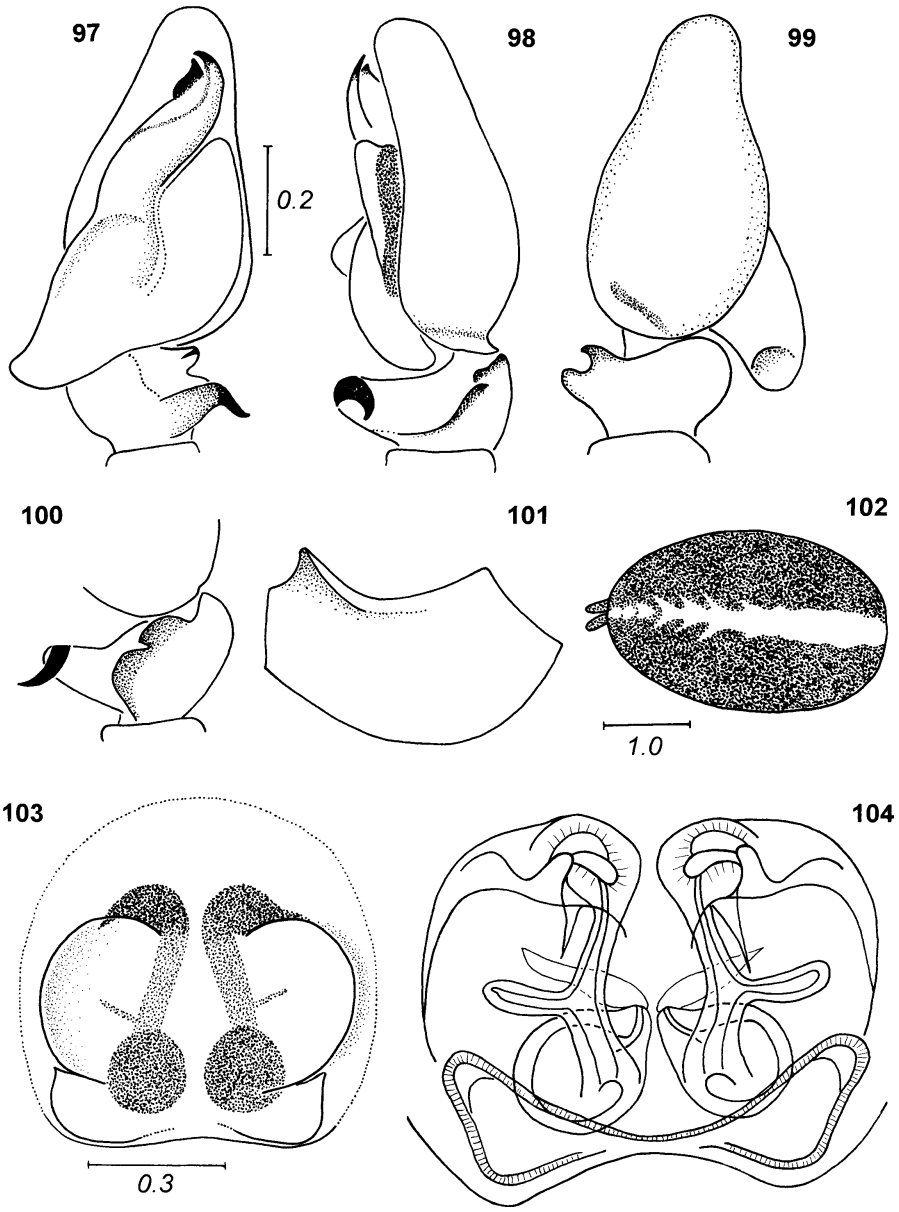
Menemerus dimidius (SCHMIDT, 1976)

(Figs 97-104)

Sitticus? dimidius SCHMIDT 1976: 330.
Menemerus dimidius: WUNDERLICH 1995: 274.

MATERIAL

Canary Islands: Fuerteventura: Tarajalejo, 1 F (holotype), 30.VI.1973, leg. G. SCHMIDT (SMF, 29103); Tenerife, la Esperanza, meadow, 1 M, leg. J. WUNDERLICH (JW).



97-104. *Menemerus dimidius* (SCHM.), male and female (102-104 - holotype): 97-99 - palpal organ, ventral, lateral and dorsal views, 100 - tibial apophyses, dorsolateral view, 101 - palpal femur, 102 - abdominal pattern of female, 103-104 - epigyne and its internal structure

DIAGNOSIS

A characteristic species, easily distinguishable by a triangular shape of the bulbus (with a large posterolateral lobe) and embolus bent aside from the bulbus, with a wide lamella. The female can be distinguished by the shape of the epigynal pocket and very large entrance bowls.

DESCRIPTION

Measurements (male/female): length of carapace 1.9/2.2, width of carapace 1.2/1.4 height of carapace 0.7/0.6, length of abdomen 2.3/2.9,width of abdomen length of eye field 0.7/0.9, anterior width of eye field 1.1/1.2, posterior width of eye field 1.2/1.2.

Male. Carapace dark brown with almost black eye field. Brown bristles on carapace, longer on eye field. Chelicerae dark brown, labium and maxillae brown with pale tips. Sternum light brown. Abdomen very dark, brownish-black with wide yellow streak medially. Brown hairs on abdomen, denser at its anterior edge. Venter yellowish. Spinnerets light. Legs light brown, only first femora darker. Leg hairs and spines brown. Pedipalp brown. Retrolateral tibial apophysis very long and curved, large triangular bulbus, embolus bent aside from bulbus, with wide lamella (Figs 97-100).

Female. Carapace very low, red-brownish, eye field darker. Adpressed hairs cover carapace, long brown bristles near eyes. Chelicerae light brown, labium nad maxillae brownish with yellow margins, sternum yellowish-orange. Abdomen dark, russet-black with narrow yellowish streak medially (Fig. 102), venter dark. Long hairs at anterior abdominal edge. Spinnerets brownish. Legs dark yellow. Epigyne with two oval depressions, partially plugged with waxy secretion (Fig. 103). Entrance bowls large, accessory glands long, spermathecae spherical (Fig. 104).

REMARK

This species was described on base of the female by SCHMIDT (1976) from Fuerteventura Island in Canary Archipelago. WUNDERLICH (1995) gave first description of the male from Teneriffe in the same Archipelago. Because both islands are far apart (about 200 km), and Wunderlich collected only males, the connection of those specimens seems uncertain, though general body proportions and coloration of both sexes are similar.

DISTRIBUTION

Reported from the Canary Islands only.

Menemerus eburnensis BERLAND et MILLOT, 1941

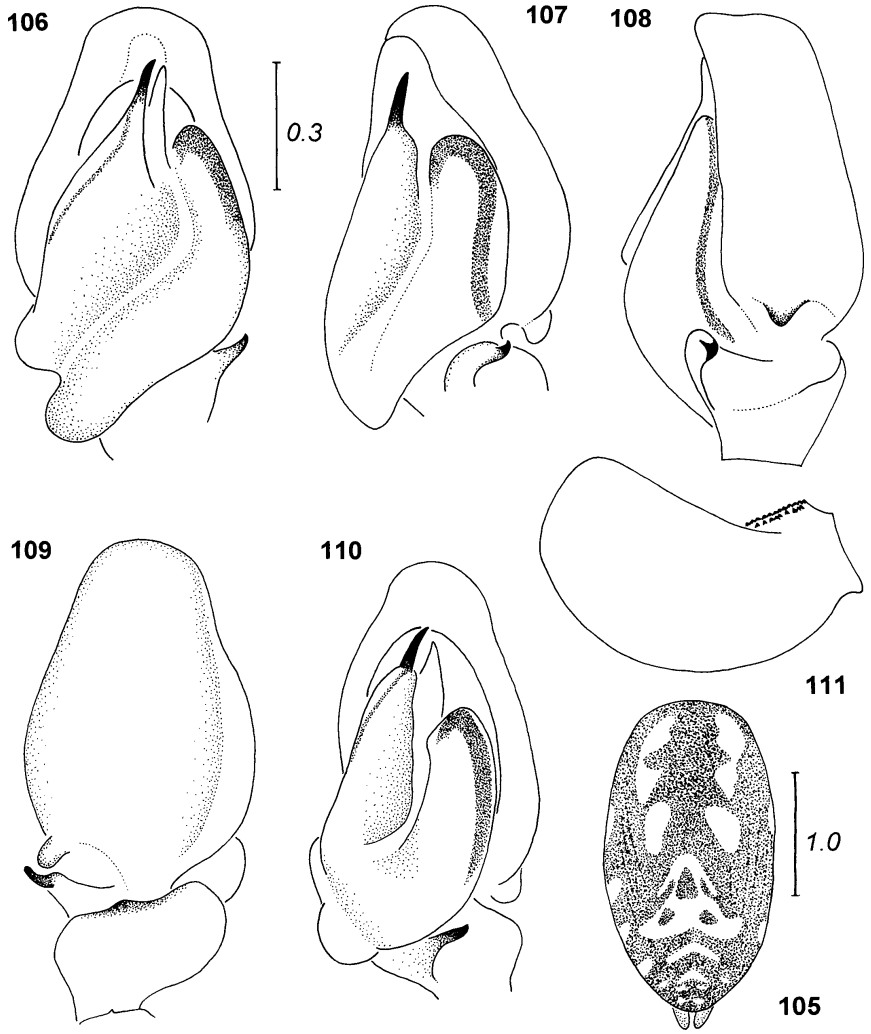
(Figs 105-119)

Menemerus eburnensis BERLAND & MILLOT 1941: 349.

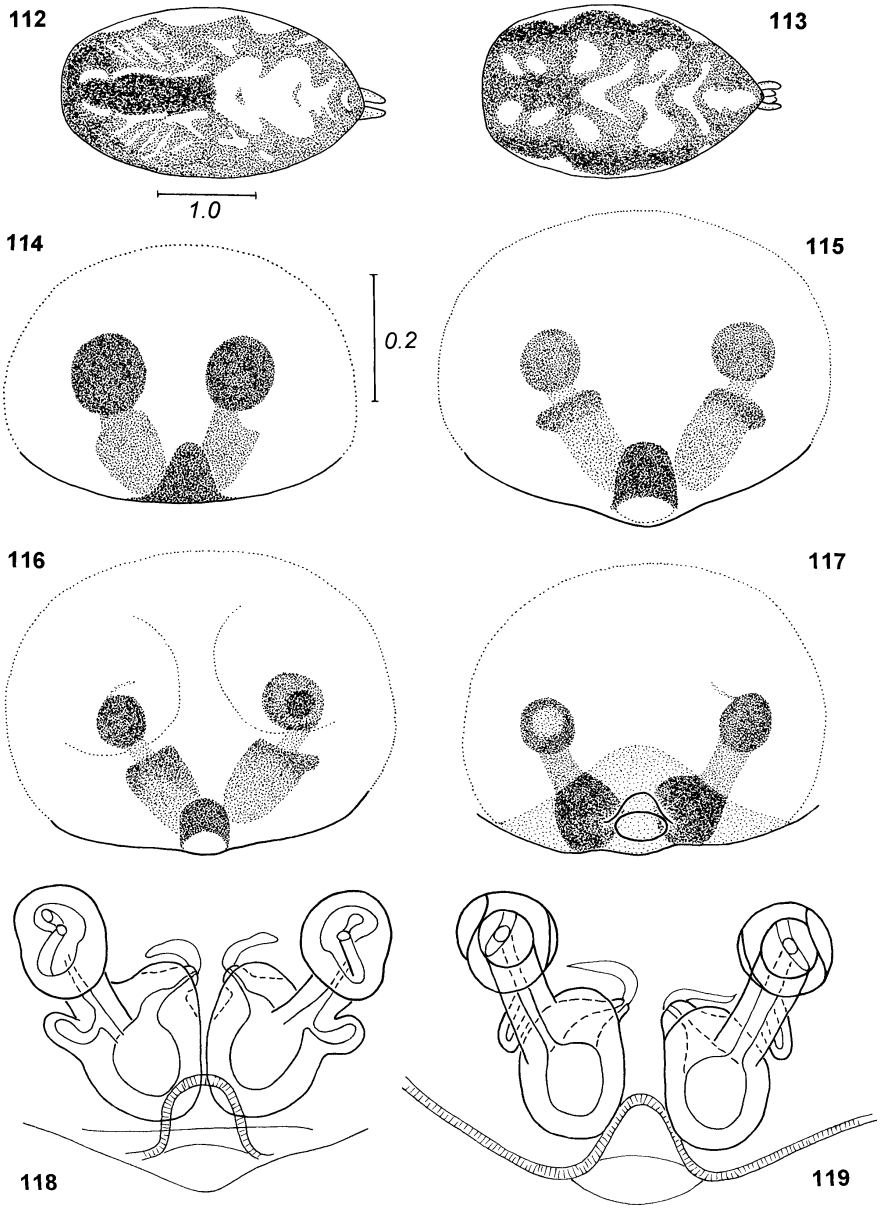
Menemerus congoensis: BERLAND & MILLOT 1941: 348.
Menemerus duvali BERLAND & MILLOT 1941: 349 (holotype lost), **syn. n.**

MATERIAL

Ivory Coast: Bingerville, 1 F (holotype), VIII.1937 (MNHN); Lamto foret, 1 M, 5.VIII.1968, leg. J. VAN MOL (MRAC, 134626); **Senegal**: Dakar Peninsula,



105-111. *Menemerus eburnensis* BERL. et MILL., male: 105 - abdominal pattern, 106-110 - palpal organ, ventral, ventrolateral, lateral and dorsal views, 111 - palpal femur



112-119. *Menemerus eburnensis* BERL. et MILL., female (113-114 - hilotype): 112-113 - abdominal pattern, 114-119 - epigyne and its internal structure

1 F, I.-IV.1945, leg. E. H. NEWCOMB; same locality, 1 M, 3 F, VI.1945 (AMNH); **West Africa**: 1 F (without precise data) (BMNH).

DIAGNOSIS

See in diagnosis of *M. congoensis*.

DESCRIPTION

Measurements (male/female): length of carapace 2.3-2.4/2.2-2.9, width of carapace 1.8/2.0, height of carapace 0.7/0.8, length of abdomen 2.2-2.3/2.8-4.5, width of abdomen 1.5/1.9-2.3, length of eye field 1.0/1.0-1.1, anterior width of eye field 1.2/1.3-1.6, posterior width of eye field 1.3/1.4-1.7.

Male. Medium-sized spider. Carapace dark brown, eye field black. Brown bristles on eye field. White hairs form two narrow lateral margins on carapace and extend on clypeus. Chelicerae, labium, maxillae and sternum brown. Abdomen elongate, dark brownish, with traces of light pattern (Fig. 105), venter dark. Adpressed brown hairs cover abdomen, at anterior abdominal edge hairs longer and lighter. Spinnerets dark. Legs dark brow, with brown hairs and spines. Stridulatory apparatus present (Fig. 111). Pedipalp with single curved tibial apophysis; embolus short, stiletto-shaped, with large membranous conductor; retrolateral process at base of cymbium (Figs 106-110).

Female. Distinctly larger than male. Carapace dark brown, eye field almost black. Scarce white hairs cover carapace, brown bristles near eyes. White hairs form light stripes on lateral edges of carapace. Clypeus rather low, clothed in white hairs. Chelicerae dark brown. Labium and maxillae brown with pale tips. Sternum brown. Abdomen greyish-brown to dark russet with yellowish irregular pattern (Figs 112, 113). Long brown hairs on abdomen, denser at its anterior margins. Venter yellowish, in some specimens with wide longitudinal darker band medially. Spinnerets brownish. Legs yellow or orange with brown rings on their segments. Exceptionally legs brown. Leg hairs long, dense, brown and greyish. Palps light with dense hairs. Epigyne oval, with two large shallow rounded grooves (Fig. 116). Deep pocket near posterior epigynal edge (Figs 114-117). Internal structures shown in Figs 118, 119.

REMARKS

The first description of the male is given here. The holotype of *M. duvali* which was kept at MNHN has been lost, but its original description and recognition of *M. eburnensis* variability allow to synonymize them.

DISTRIBUTION

A species distributed in north-western Afrotropical Region.

Menemerus fagei Berland et Millot, 1941

(Figs 120-133)

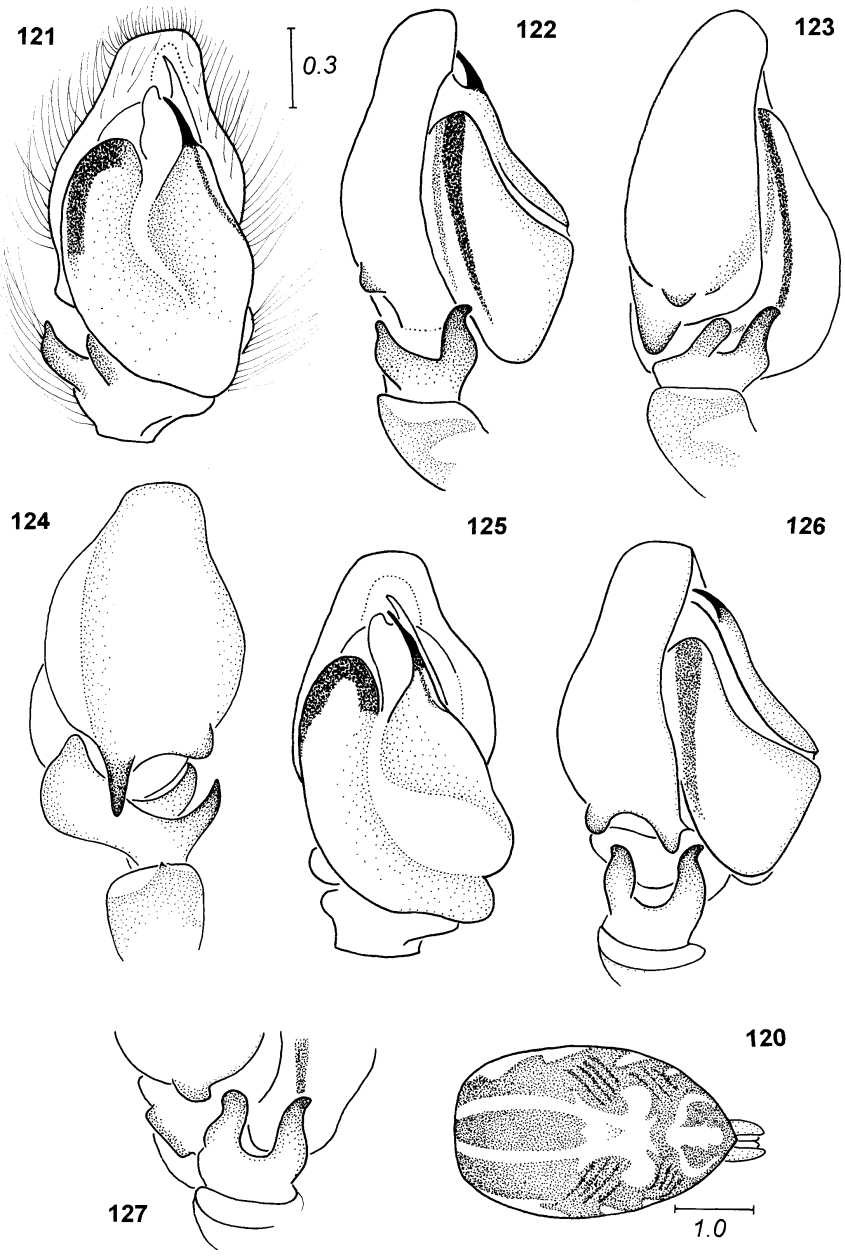
Menemerus fagei Berland & Millot 1941: 350; Prószyński in press.
Menenerus lesserti Denis 1955: 122 (not Lawrence, 1928) (holotype from MNHN, examined), **syn. n.**
Menenerus cf. bivittatus: Prószyński 1989: 37.
Menemerus soldani: Denis 1947: 71 (misidentification).

Material

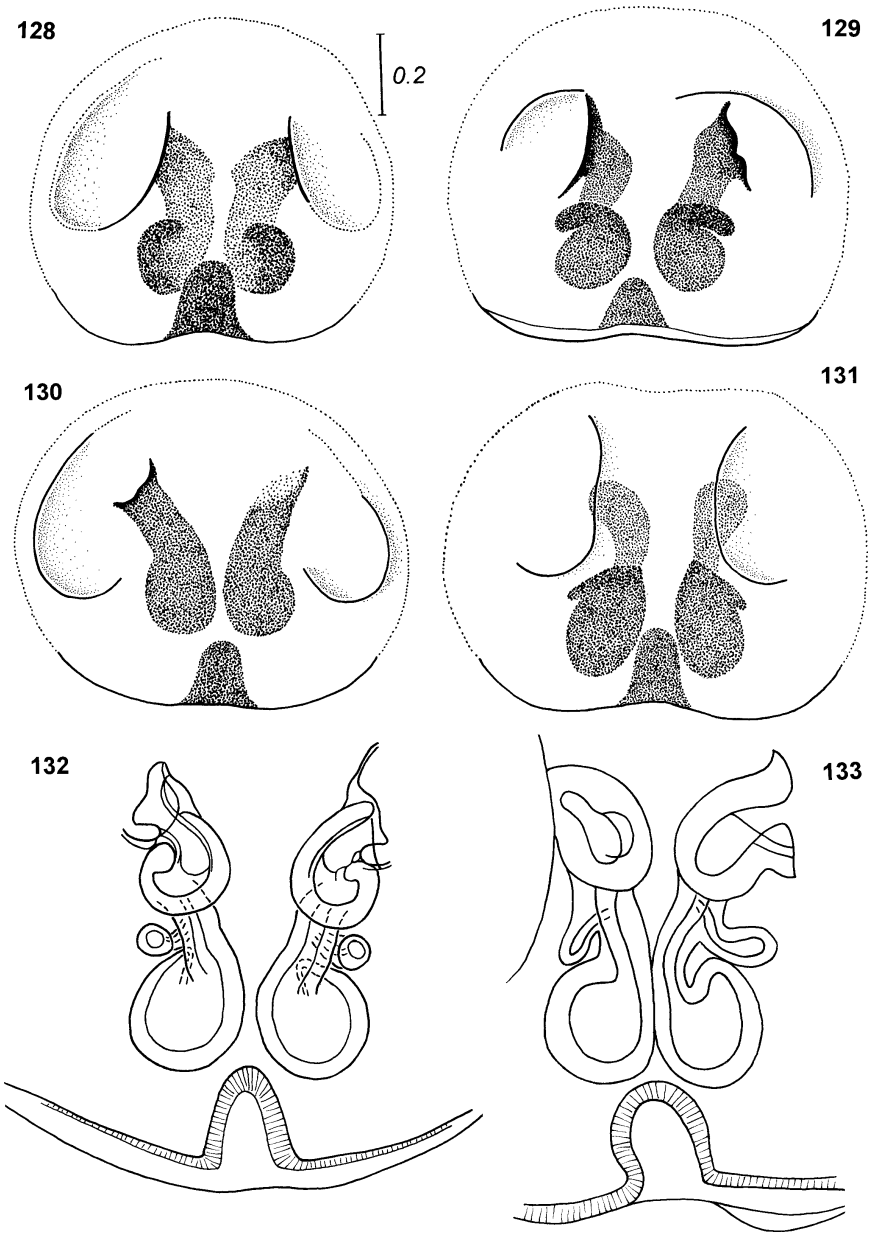
Burkina Faso [Haute-Volta]: Batie, 1 F (holotype), IX.1937 (MNHN); Ouagadougou, 1 F, IV.-V.1965, leg. B. Roman (MRAC, 128074); **Chad**: Tibesti Mts, 1 M, VII.-X.1965, leg. J. Brandily (MRAC, 132942); same data, 1 F (MRAC, 132929); Bebedjia, near Moundou, 1 M, 2 F, 1 juv., 1-10.VII.1977, leg. G. Ruella (MRAC, 151448); N´Djamena [Fort Lamy], 2 F, 1.XI.1965, leg. J. Brandily (MRAC, 132919); (without precise locality), 1 F, 9.-15.XII.1978, leg. A. Spielman (MCZ); **Djibouti**: Khor Anghar, 1 M, coll. Werner (MNHN, 12145); **Egypt**: Suez, Isnailia, 1 M (MNHN, 7366A); Cairo, 1 M "*M. falsificatus*", leg. Walentiner (ZMB, 18832), same locality;1 F "*M. falsificatus*" (ZMB 18830); Trigrolis, 1 F "*M. falsificatus*" (ZMB, 18833); **Ethiopia**: Awash N. P., 1000 m a.s.l., on walls of hotel, 1 M, 24.VII.1982, leg. A. Russell-Smith (ARS); **Mali**: Bamako, 1 M, VI.-VII.1977, leg. W. H. Settle (CAS); 10 km of Sevare, 10°30´N, 4°W, 2 M, 1 F, 15.VIII.-1.IX.1977, leg. W. H. Settle (CAS); Goudam, 1 M, III.1979, leg. W. H. Settle (CAS); Koro, 1 M, IX.-X.1977, leg. W. H. Settle (CAS); Kogeni, 60 km N Nino, 1 F, XII.1969, leg. G. Pierrard (MRAC, 136759); **Niger**: Niamey, 1 F, IX.-X.1970, leg. F. van Impe (MRAC, 137729); Mts Bagzane, 1500-1600 m a.s.l., 1 F (holotype of *M. lesserti*), 1.-4.IX.1947 (MNHN); **Senegal**: Dakar, 15 km from Rufisque, 1 F, 26.VI.1981, leg. W. H. Settle (CAS); same locality,1 F, VIII.1980, leg. W. H. Settle (CAS); **Sudan**: Gunboat "Abou Klea", White Nile, 1 M, 1 F, IV.1900, leg. S. Flower (BMNH, 0.8.21.31.32); Kassala, 1 F, 15.XII.1962, leg. J. L. Cloudsley-Thompson (MRAC, 123060); Khartuoum, 1 M, 1960, leg. J. L. Cloudsley-Thompson (MRAC, 120969); **Togo**: Namoundjoga, 1 F,1 juv., 27.VII.1969, leg. F. Puylaert (MRAC, 136036); same data, 5 M, 2 F, 2 juv., (MRAC, 136037); **Yemen**: Sana'a, 1 F, XI.-XII.1997, leg. A. van Harten (MRAC); same locality, 1 F, I.1998; leg. A. van Harten (MRAC).

Diagnosis

Male distinctive, can be easily distinguished by the structure of the palpal organ; two retrolateral tibial apophyses, very long process at the base of cymbium and very large conductor. The female slightly resembles *M. congoensis*, but may be separated by the position of the copulatory openings and shorther seminal ducts (cf. Fig. 132 and Fig. 75).



120-127. *Menemerus fagei* BERL. et MILL., male: 120 - abdominal pattern, 121-126 - palpal organ, ventral, lateral, dorsolateral and dorsal views, 127 - tibial apophyses



128-133. *Menemerus fagei* BERL. et MILL., female (129 - holotype), epigyne and its internal structure

DESCRIPTION

Measurements (male/female): length of carapace 2.9-3.4/3.5-4.6, width of carapace 2.3-2.5/2.4-2.6, height of carapace 0.9-1.0/0.8-1.0, length of abdomen 3.2-4.0/4.0-7.8, width of abdomen 1.9-2.2/2.6-3.5, length of eye field 1.1-1.5/1.3-1.6, anterior width of eye field 1.5-1.6/1.6-2.1, posterior width of eye field 1.6-1.7/1.7-2.2.

Male. One of the biggest species in the genus. Body slender. Carapace brown, eye field black. Carapace clothed in dense light hairs, near eyes brown setae. White hairs form narrow stripes along lateral margins of carapace. Clypeus low, covered with white hairs. Labium and maxillae brown, sternum light brown. Abdomen rather elongate and slender, light brown with yellowish pattern (Fig. 120), in some specimens abdomen darker. Venter light. Very dense and long brown hairs on abdomen dorsally. Spinnerets beige. Legs yellow or light brown, leg hairs dense, brown. Stridularory apparatus well visible. Pedipalp brown. Two tibial retrolateral apophyses, long process at base of cymbium dorsally, conductor very wide with two tips (Figs 121-127).

Female. Much bigger than male. Coloration like male but slightly lighter. Legs yellowish. Epigyne large, with two oval depressions, partially plugged with waxy secretion (Figs 128-131). Internal structures very strongly sclerotized, especially entrance bowls (Figs 132,133).

REMARK

The first description of the female is given here.

DISTRIBUTION

A species widely distributed in northern part of the Afrotropical Region, lately reported also from the West Mediterranean sub-region.

Menemerus formosus sp. n.

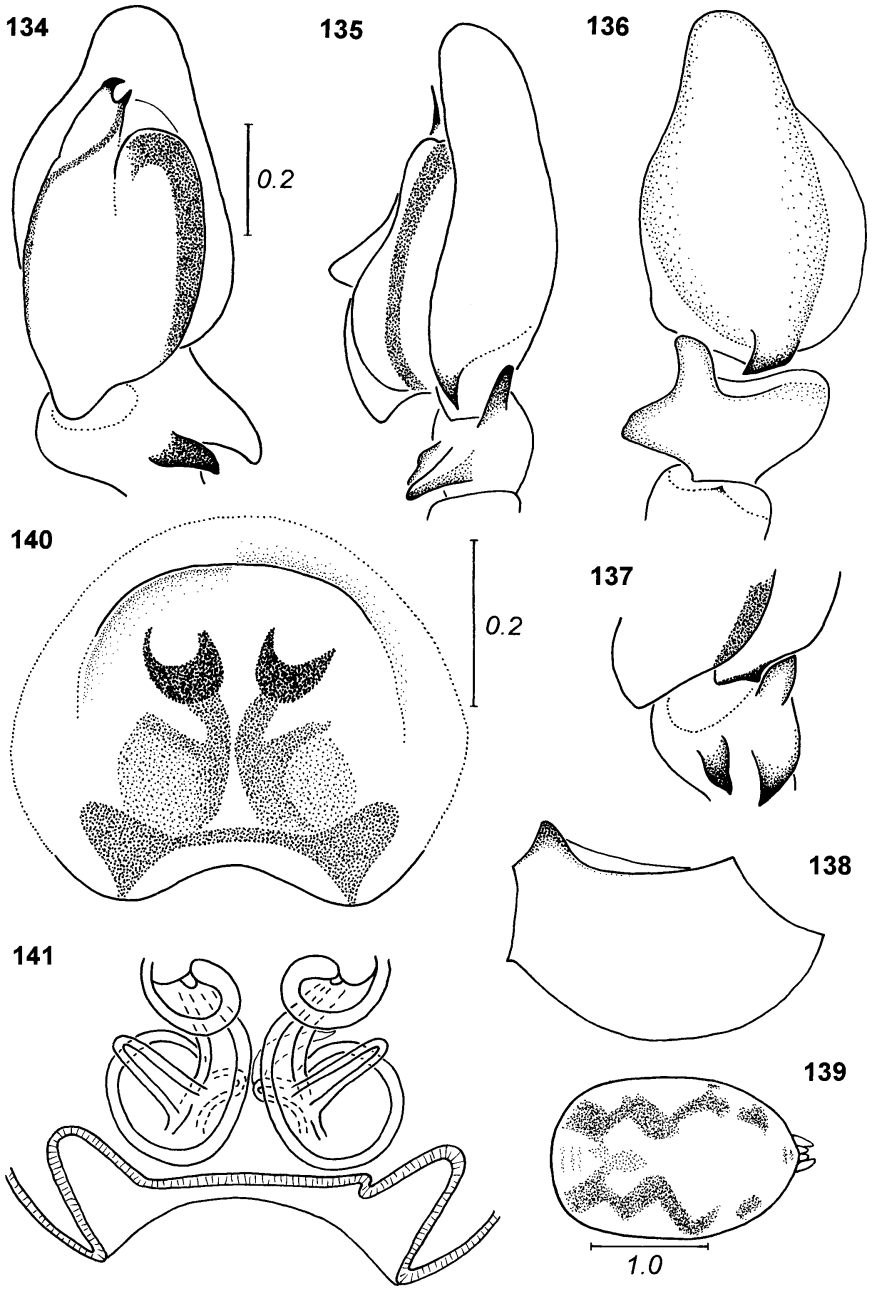
(Figs 134-141)

MATERIAL

Holotype M: **Kenya**: Elyia Ponat, [Lake Rudolf] L. Turkana, III.1920, leg. J. MISKEL (BMNH). Paratypes: together with holotype, 3 F.

DIAGNOSIS

This species is related to *M. bifurcus* and *M. transvaalicus*. The male can be best distinguished by the diagnostic forceps-shaped embolus. The female slightly resembles *M. mirabilis*, but the latter species has two rounded distinct depressions in the epigyne (cf. Fig. 140 and Fig. 208).



134-141. *Menemerus formosus* sp. n., male and female (134-138 - holotype): 134-136 - palpal organ, ventral, lateral and dorsal views, 137 - tibial apophyses, 138 - palpal femur, 139 - abdominal pattern of female, 140-141 - epigyne and its internal structure

ETYMOLOGY

The specific name is derived from Latin word "*formosus*" meaning "neat, shapely".

DESCRIPTION

Measurements (male/female): length of carapace 2.0/2.0-2.3, length of abdomen 1.9/2.0-2.3, length of eye field 1.0/1.1-1.2, anterior width of eye field 1.3/1.3-1.4, posterior width of eye field 1.2 /1.3-1.4.

Male. Carapace brown, ocular area darker, near eyes black. Dense adpressed brownish and light greyish hairs cover whole carapace, long brown bristles near eyes. Along lateral margins of carapace white streaks composed of white hairs. Clypeus low, brown, with a few white hairs. Chelicerae, labium and maxillae brown, sternum orange. Abdomen yellowish, clothed in long light hairs, venter whitish. Spinnerets light. Legs yellow, first with light brownish femora. Leg hairs light. Pedipalp light, orange. Embolus double, very short, forceps-shaped (Fig. 134). Three tibial apophyses (Figs 135-137). Cymbium with process at its base (Figs 135, 136).

Female. Resembles male, but abdomen with brownish pattern (Fig. 139) and silver patches composed of translucent guanine. Epigyne large, strongly sclerotized, with shallow depression and wide pocket near epigastric furrow (Fig. 140). Internal structure of epigyne shown in Fig. 141.

DISTRIBUTION

Known from the type locality only.

***Menemerus guttatus* sp. n.**

(Figs 142-147)

MATERIAL

Holotype M (largest): **Morocco**, Gravel river, Asni, High Atlas, 1300 m a.s.l., 10.V.1977 (BMNH). Paratypes: together with holotype, 1 M, 3 F.

DIAGNOSIS

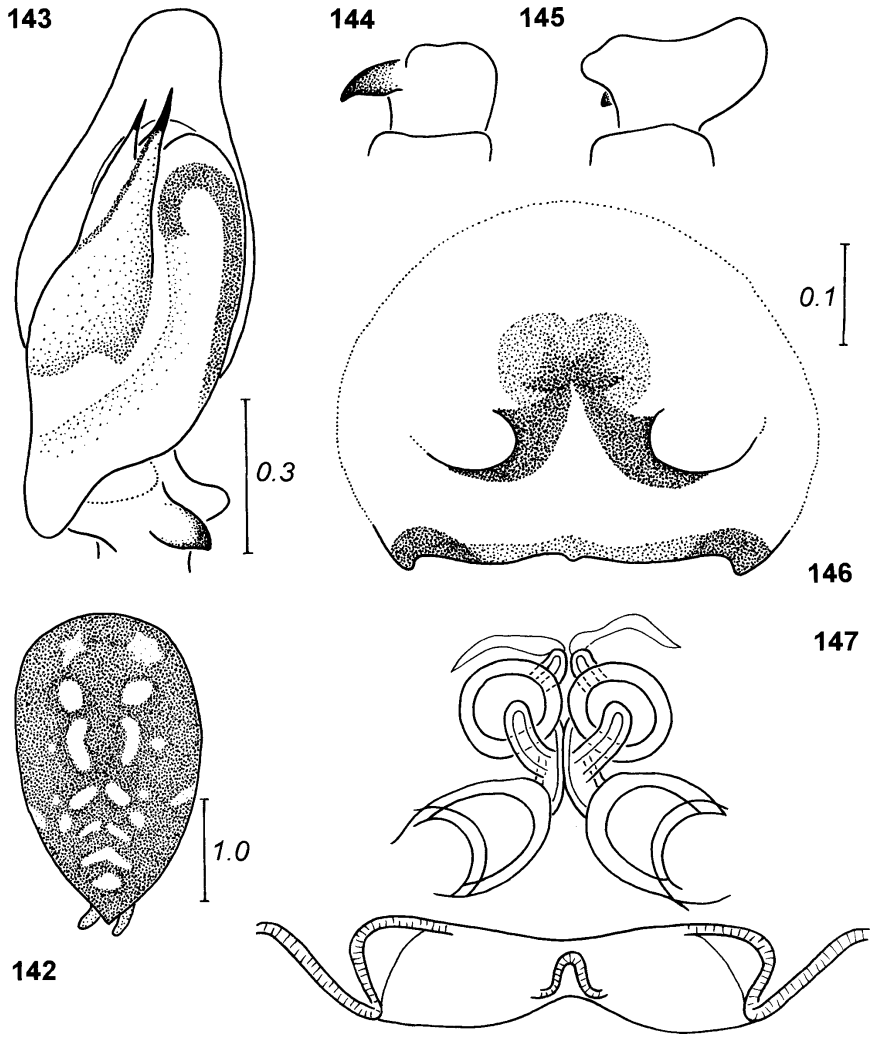
This species is related to *M. animatus, M. davidi* and *M. modestus*. but its abdominal coloration is darker. The apophyses in the male palpal organ are similar to *M. animatus*, but the male may be easily distinguished by the structure of the embolus. In *M. guttatus* the embolus is short with an accompanying lamella (cf. Fig. 134 with Fig. 7). The internal structure of the epigyne distinguishes female of this species from *M. davidi* (cf. Fig. 147 and Fig. 88). See also diagnosis of *M. modestus*.

ETYMOLOGY

The specific name is derived from Latin word "*guttatus*" meaning "spotted".

DESCRIPTION

Measurements (male/female): length of carapace 2.8-3.1/2.8-3.5, length of abdomen 2.5-3.1/3.7-5.6, length of eye field 1.2-1.4/1.1-1.7, anterior width of eye field 1.6-1.8/1.7-2.1, posterior width of eye field 1.5-1.7/1.8-2.1.



142-147. *Menemerus guttatus* sp. n., male and female: 142 - abdominal pattern of male, 143 - palpal organ, ventral view, 144-145 - tibial apophyses, lateral and dorsal views, 146-147 - epigyne and its internal structure

Male. Carapace dark brown, almost black. White hairs form large triangular patch on thorax and two streaks along lateral carapace margins. Brown hairs on eye field, denser and longer in vicinity of eyes. Clypeus very low, brown. Chelicerae dark brown, labium and maxillae dark brown with yellowish tips, sternum light brown. Abdomen dark brown with subdued pattern composed of light patches (Fig. 142), clothed in brownish hairs. Venter yellowish or grey. Spinnerets brownish. Legs brown, femora darker. Long brown hairs on legs. Pedipalp dark brown, with white hairs on femur. Structure of palp as in Figs 143-145.

Female. Like male, but adominal pattern distinctive. Legs darker, bases of their segments very dark. Epigyne large with lateral openings and large pocket at epigastric furrow (Fig. 146). Internal structure shown in Fig. 147.

DISTRIBUTION

Known from the type locality only.

Menemerus illigeri (SAVIGNY et AUDOUIN, 1825)

(Figs 148-157)

Attus illigeri SAVIGNY & AUDOUIN 1825: 172; SIMON 1876: 34; 1906: 1173; PRÓSZYŃSKI in press.
Menemerus interemptor O. P.-CAMBRIDGE 1876: 623 (type? from Hope Department of Zoology, Oxford, not examined); PRÓSZYŃSKI 1984: 86, **syn. n.**

MATERIAL

Egypt: Cairo, 4 F "*M. interemptor*", 1911, leg. E. GRAETER (NMB, 1048a); **Tunisia**: Kizida (?), 2 M, 1 F, coll. E. SIMON (MNHN, 7048).

DIAGNOSIS

A distinctive species, the male may be distinguished by the presence of the small patellar apophysis, the female by the very large epigynal pocket, occupying one third of the epigyne length.

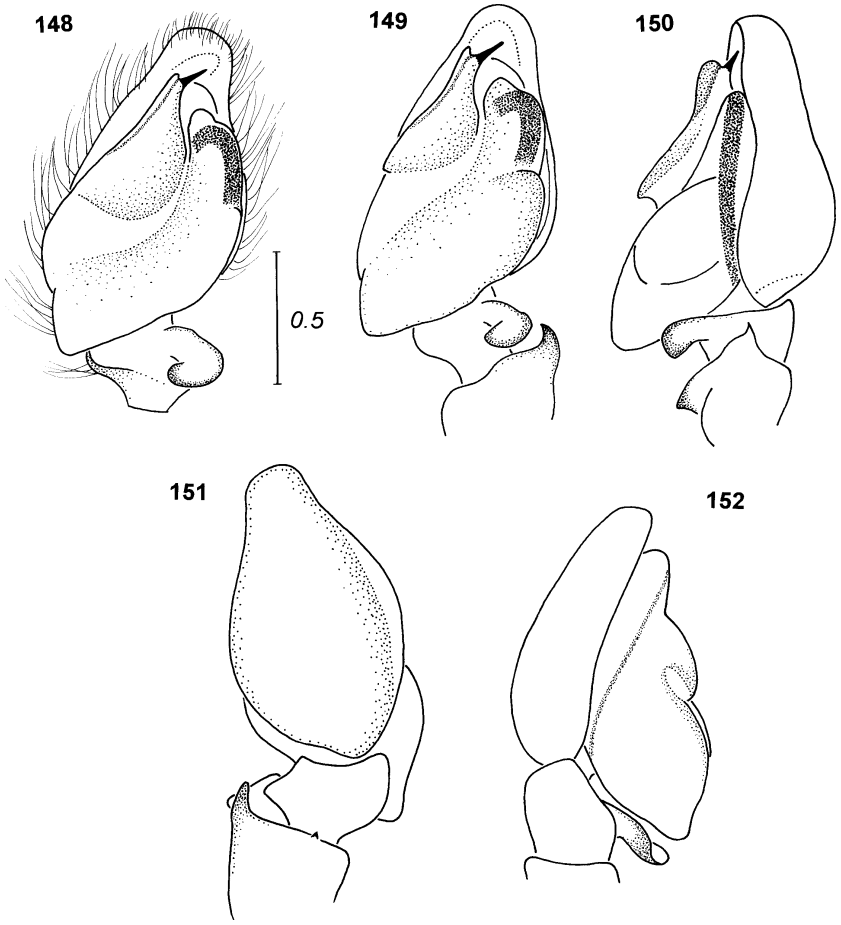
DESCRIPTION

Measurements (male/female): length of carapace 2.7-2.8/2.8-3.3, width of carapace 1.9-2.0/1.9-2.2, height of carapace 1.0-1.1/1.2-1.4, length of abdomen 2.8-3.0/3.7-4.4, width of abdomen 1.9-2.2/2.3-3.0, length of eye field 1.2-1.3/1.2-1.4, anterior width of eye field 1.4-1.5/1.4-1.8, posterior width of eye field 1.4-1.5/1.5-1.7.

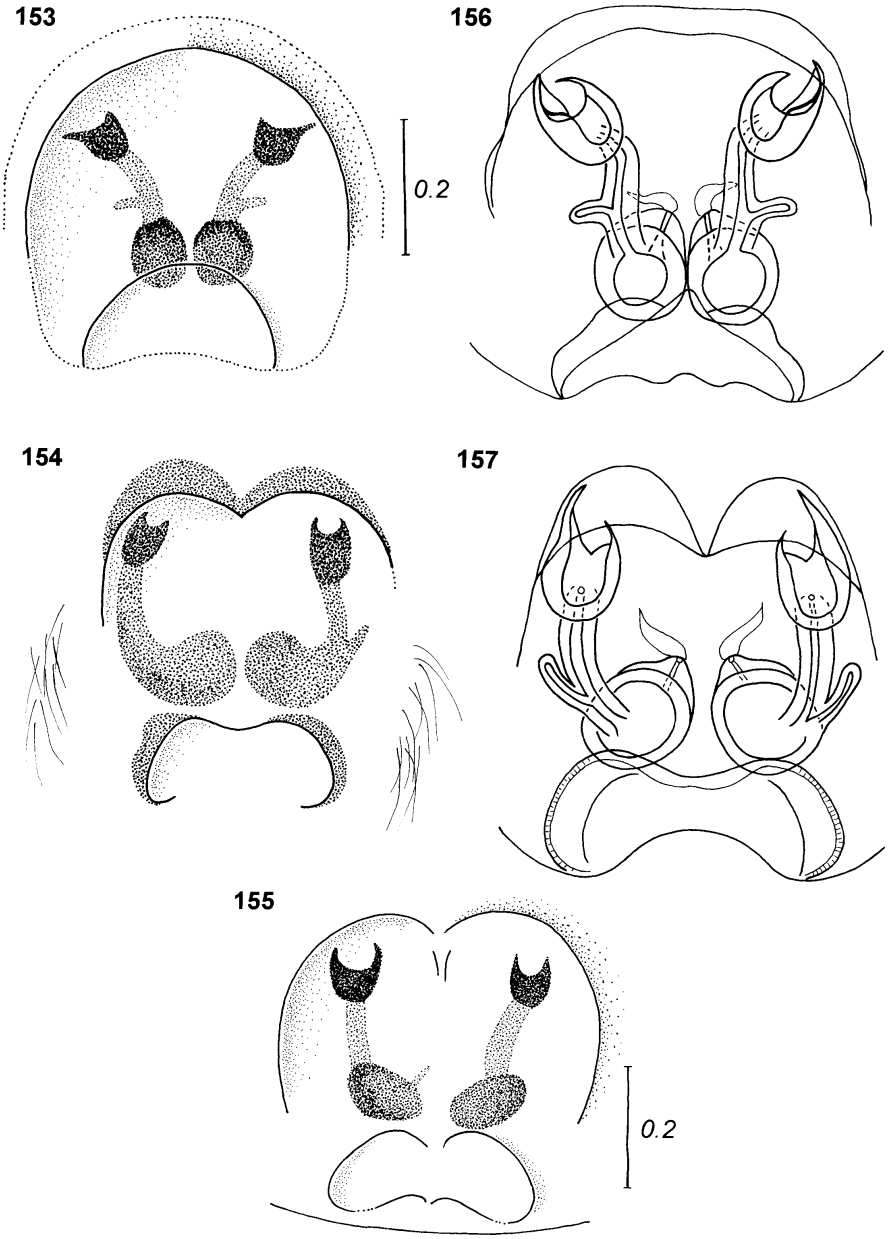
Male. Carapace brown, eyes surrounded by black. Light, white-greyish hairs cover carapace, long brown bristles near eyes. White stripes, composed of light hairs along lateral margins of carapace. Clypeus low, with white hairs. Chelicerae and labium brown, maxillae with pale tips, sternum yellow. Abdomen brownish with yellow leaf-shaped pattern, ventrally yellow. Long light hairs cover abdo-

men, among them single brown bristles. Spinnerets yellow. Legs I and II pairs brown, remaining yellow. Pedipalp dark brown, white hairs on patella. Embolus very short, tibial apophysis bent, patellar apophysis very short (Figs 148-152). Big process at base of palpal femur.

Female. Carapace brown with darker eye field, black rings around eyes. White and brown hairs on carapace. Chelicerae, labium and maxillae dark brown, sternum yellowish with light hairs. Abdomen light, white-yellowish, with brown hairs laterally. Spinnerets light. Legs yellowish-orange, only first and second pairs darker, brown. Epigyne with very large depression, occupying almost whole epigyne, at its posterior edge large pocket (Figs 153-155). Internal structure shown in Figs 156, 157.



148-152. *Menemerus illigeri* (SAV. et AUD.), male, palpal organ, ventral, ventrolateral, lateral and dorsal views



153-157. *Menemerus illigeri* (SAV. et AUD.), female, epigyne and its internal structure

REMARKS

The first description of the male is given here. The comparison of epigynes of *M. illigieri* and O. P.-CAMBRIDGE's *M. interemptor* specimen from Egypt (probably type - shown in PRÓSZYŃSKI 1984) which was found in the Oxford Hope Collection leaves no doubts that these two are conspecific.

DISTRIBUTION

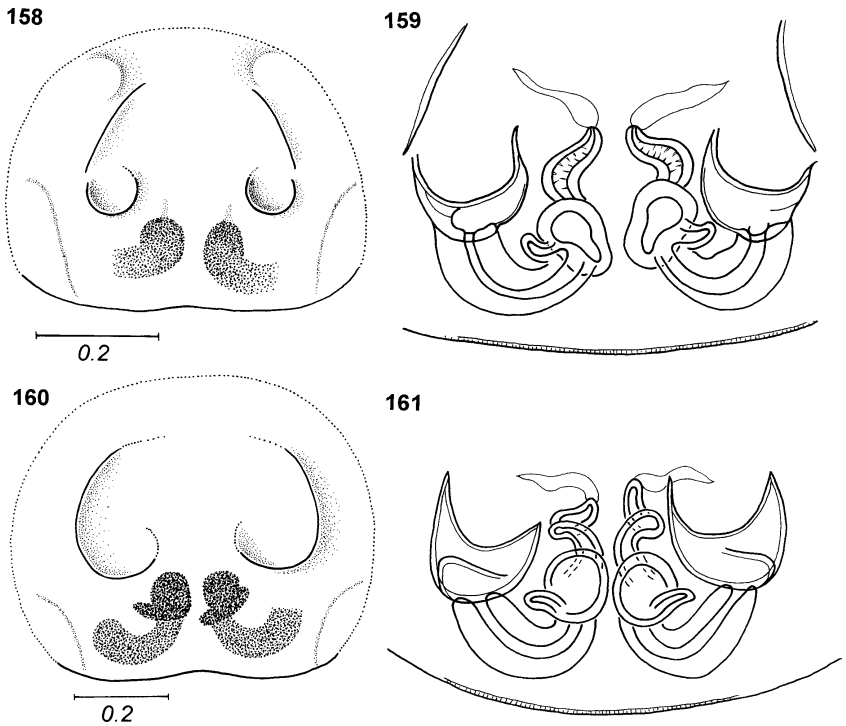
A Mediterranean species, reported also from St Helena Island.

Menemerus insolidus sp. n.

(Figs 158-161)

MATERIAL

Holotype F: **South Africa**: Transvaal, Kimberley (MNHN, 20082 B). Paratype: **Namibia**: Diamond area, 27°17′S 15°55′E, under stones, 1 F, leg. E. GRIFFIN (SMN, 43205).



158-161. *Menemerus insolidus* sp. n., female (160-161 - holotype), epigyne and its internal structure

DIAGNOSIS

This species has dark lines on the epigyne laterally. One of few species without an epigynal pocket, depression in the epigyne is rather indistinct.

ETYMOLOGY

The specific name is derived from Latin word "*insolidus*" meaning "undurable".

DESCRIPTION

Measurements: length of carapace 2.6, width of carapace 2.1, height of carapace 1.0, length of abdomen 3.0, width of abdomen 2.0, length of eye field 1.2, anterior width of eye field 1.7, posterior width of eye field 1.8.

Male unknown.

Female. Carapace dark brown, vicinity of eyes black. Thoracic part of carapace covered with dense light greyish hairs, ocular area with loner brown hairs, long bristles near eyes. Clypeus low, brown. Chelicerae, labium, and sternum brown, maxillae brown with pale tips. Abdomen dark, russet, with not contrasting leaf-shaped pattern. Numerous grey and brown hairs cover whole abdomen, among them scarce long bristles. Venter yellowish-grey. Spinnerets dark. Legs light brown with slightly darker rings at base of segments. Leg hairs numerous, brown and grey, spines brown. Epigyne shown in Figs 158, 160. Its internal structure strongly sclerotized, seminal ducts thick-walled (Figs 159, 161).

DISTRIBUTION

Known from Namibia and South Africa.

Menemerus legalli BERLAND et MILLOT, 1941

Menemerus le galli BERLAND & MILLOT 1941: 350.

This species was described from Mali on the base of a single male. The type-specimen has been lost, but figures in the original description allow to suggest, that this species is closely related to *M. mirabilis* from Ethiopia (cf. Figs 54 A-F in BERLAND & MILLOT 1941 with Figs 197-205).

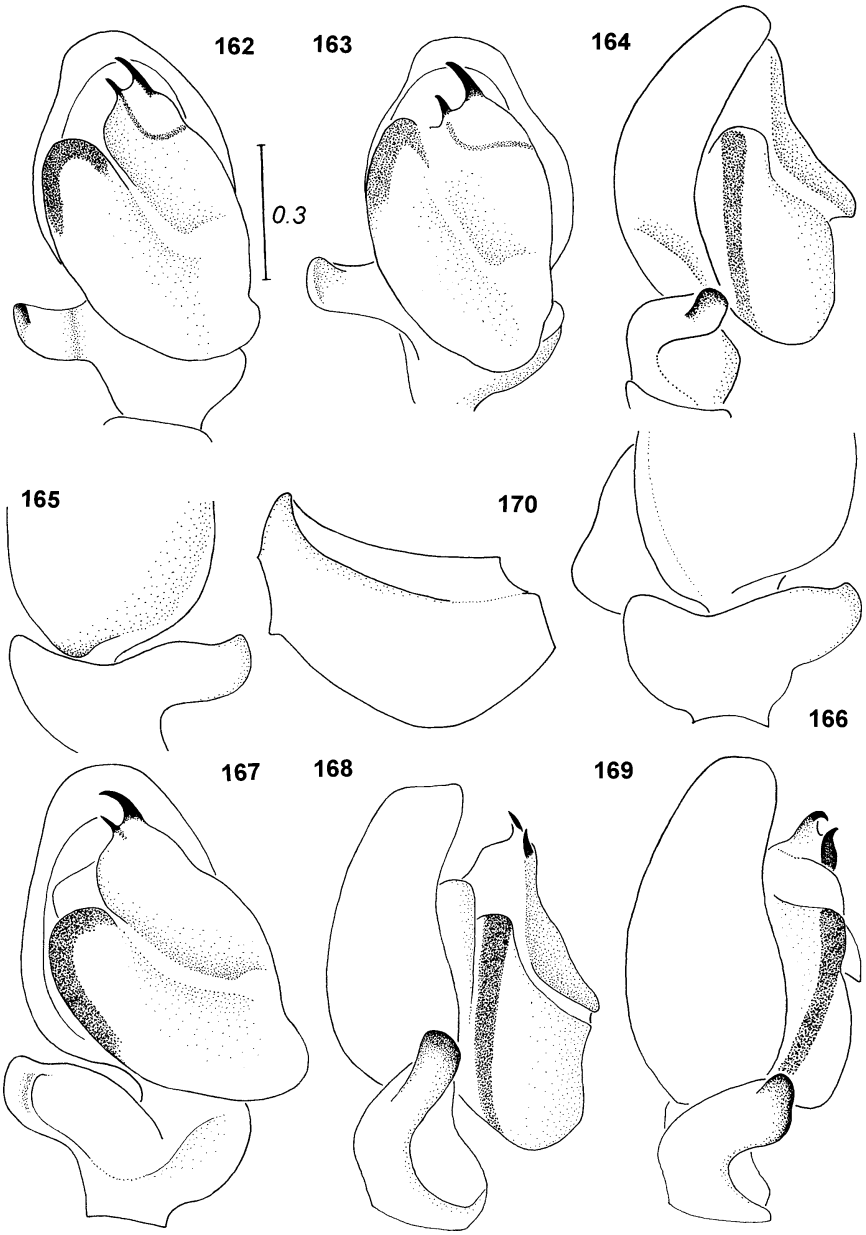
Menemerus lesnei LESSERT, 1936

(Figs 162-170)

Menemerus lesnei LESSERT 1936: 290.

MATERIAL

Botswana (border with Namibia): 2 km S northern Fence, 20°33′S 20°59′E, Hereroland E, pitfall traps, 1 M, 20.XI.-16.XII.1988, leg. E. MARAIS and M. PAXTON



162-170. *Menemerus lesnei* LES., male (162-165 - holotype): 162-169 - palpal organ, ventral, ventroapical, lateral, dorsal and dorsolateral views, 170 - palpal femur

(SMN, 42088); **Mozambique**: Bas Sangarzé, [Komp´hala], 1 M (holotype), leg. P. LESNE (MHN).

DIAGNOSIS

A dictinctive species, can be distinguished by the diagnostic double embolus and long, truncated retrolateral tibial apophysis.

DESCRIPTION

Measurements: length of carapace 1.8-1.9, width of carapace 1.1, height of carapace 0.5, length of abdomen 1.8-2.2, width of abdomen 1.1-1.2, length of eye field 0.8-1.0, anterior and posterior width of eye field 0.9-1.2.

Male. Small spider. Carapace flattened, dark brown, eyes surrounded by black. Long brown hairs on eye field, a few short whitish hairs on thoracic part. White hairs form two narrow stripes on lateral margins of carapace and two small patches on thoracic part; one of them behind eye field, second near posterior edge of carapace. Clypeus low, with few white hairs. Chelicerae and labium brown, maxillae brown with yellow margins, sternum yellowish-brown. Abdomen generally dark, brownish-grey, medially somewhat lighter, with traces of wide russet stripe anteriorly. Delicate brown hairs cover abdomen, only at anterior margin hairs long and dense. Venter yellowish. Spinnerets brownish-grey. Legs brown, clothed in long dense brown hairs. Pedipalps brown. Male copulatory organ as in Figs 162-170, single wide and long tibial apophysis, bulbus oval, embolus very short, lamella slightly longer.

Female unknown.

DISTRIBUTION

A southern African species, known from Botswana and Mozambique.

Menemerus lesserti LAWRENCE, 1928
(Figs 171-176)

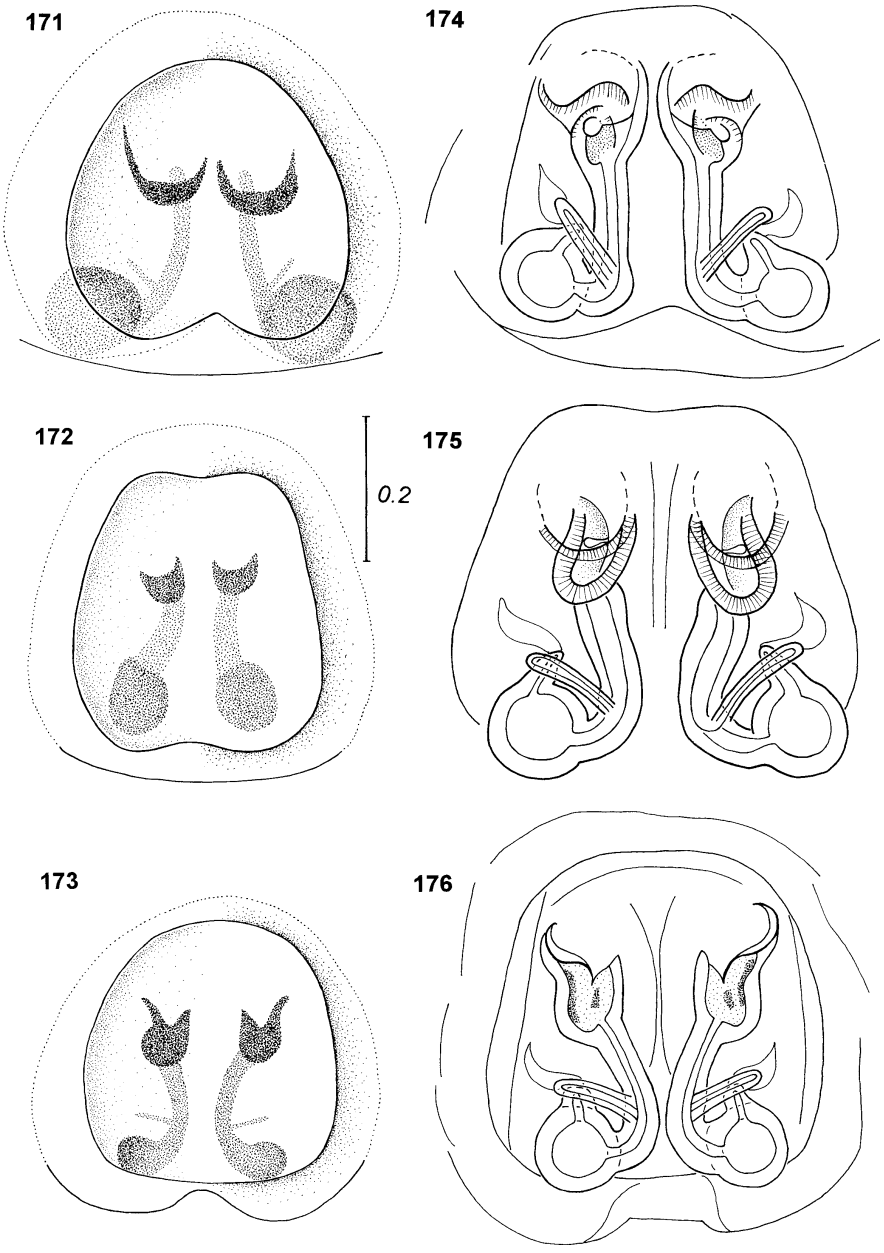
Menemerus lesserti LAWRENCE 1928a: 60; not DENIS, 1955.

MATERIAL

Namibia: Kunene river, 1 F (holotype), R. F. LAWRENCE (SAM, 2432); Rooibank, 1 F (together with lectotype of *Heliophanus trepidus*) V.1905 (MNHU, 17605); **South Africa**: N Transvaal, Tshipise, Hot Springs, 22°20´S 30°05´E, 1 F, VIII.1979, leg. A. C. CAR (NMZ, A785a); **Zimbabwe**: Msuna, 2 F, 1.III.1987, leg. L. KONDOR (NMZ, A5412).

DIAGNOSIS

This species is recognizable by the characteristic epigyne with a very large and deep central depression, very strongly sclerotized vicinity of the copulatory openings and perfectly spherical spermathecae.



171-176. *Menemerus lesserti* LAWR., female (171, 174 - holotype), epigyne and its internal structure

DESCRIPTION

Measurements: length of carapace 1.9-2.2, length of eye field 0.9-1.0, length of abdomen 2.3-3.6, anterior width of eye field 1.2-1.3, posterior width of eye field 1.3-1.4.

Male unknown.

Female. Medium-sized spider. Carapace brown, eye field slightly darker, eyes surrounded by black, in centre of thoracic part lighter not contrasting patches. Adpressed dense brown hairs cover abdomen, scarce short white hairs on eye field, long brown bristles in vicinity ef eyes. Narrow band composed of white hairs on lateral margins of carapace. Clypeus very low, brown. Chelicerae and labium brown, maxillae and sternum light brown. Abdomen light brown to dark russet with light irregular not contrasting longitudinal band medially, ventrally light. Abdomen clothed in dense brown hairs. Spinnerets yellow or brown. Legs yellow or brown, femora darker, remaining segments with darker rings on basal and apical end. Leg hairs and spines brown. Palps light. Epigyne with large and deep depression (Figs 171-173) plugged with waxy secretion. Internal structures shown in Figs 174-176, long accessory glands, spermathecae spherical.

DISTRIBUTION

A southern African species.

Menemerus magnificus sp. n.

(Figs 177-181)

MATERIAL

Holotype M: **Cameroon**: Cameroon Mts, 1000 m a.s.l., 12.II.1956, leg. K. BYSTRÖN (NR).

DIAGNOSIS

This species slightly resembles *M. mirabilis*, but may be recognized by the longer embolus and very characteristic bilobate dorsal tibial apophysis (cf. Figs 177, 180 with Figs 197, 200).

ETYMOLOGY

The specific name is derived from Latin word "*magnificus*" meaning "magnificent".

DESCRIPTION

Measurements: length of carapace 1.9, width of carapace 1.3, height of carapace 0.6, length of abdomen 1.8, width of abdomen 1.3, length of eye field 0.9, anterior and posterior width of eye field 1.1.

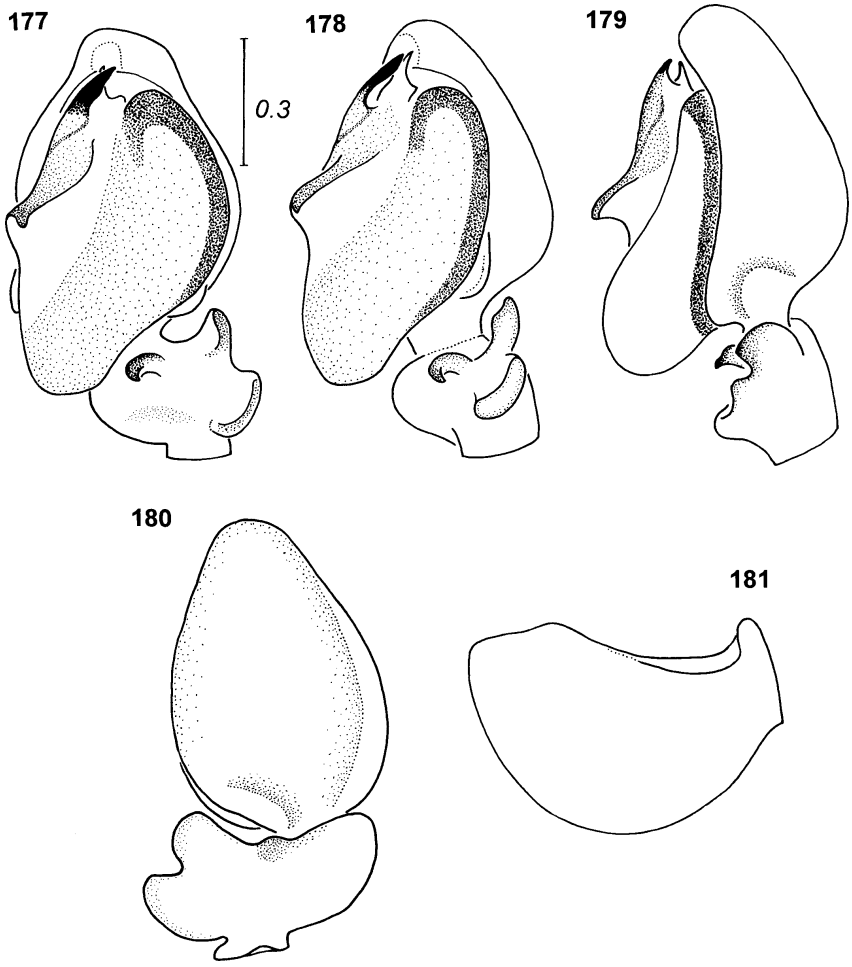
Male. Rather small spider. Carapace brown, eye field black. Adpressed whitish hairs on carapace, brown bristles near eyes. Chelicerae dark brown,

labium, maxillae and sternum brown. Abdomen greyish-beige with two rows of lighter patches composed of translucent guanine. Numerous dark brown hairs on abdomen laterally. Abdominal venter light. Spinnerets beige. Legs yellow, first pair with brown femora. Leg hairs and spines brown. Pedipalp brown, its structure shown in Figs 177-181. Embolus with short and wide conductor.

Female unknown.

DISTRIBUTION

Known from the type locality only.



177-181. *Menemerus magnificus* sp. n., male (holotype): 177-180 - palpal organ, ventral, ventrolateral, lateral and dorsal views, 181 - palpal femur

Menemerus manicus sp. n.

(Figs 182-187)

MATERIAL

Holotype M (with one palp only): **Zimbabwe** (border with Mozambique): ["Mashonaland, Manica Mt"] Mutare, Vumba Mts, Manica Mt, coll. PECKHAMS (MCZ, 990).

DIAGNOSIS

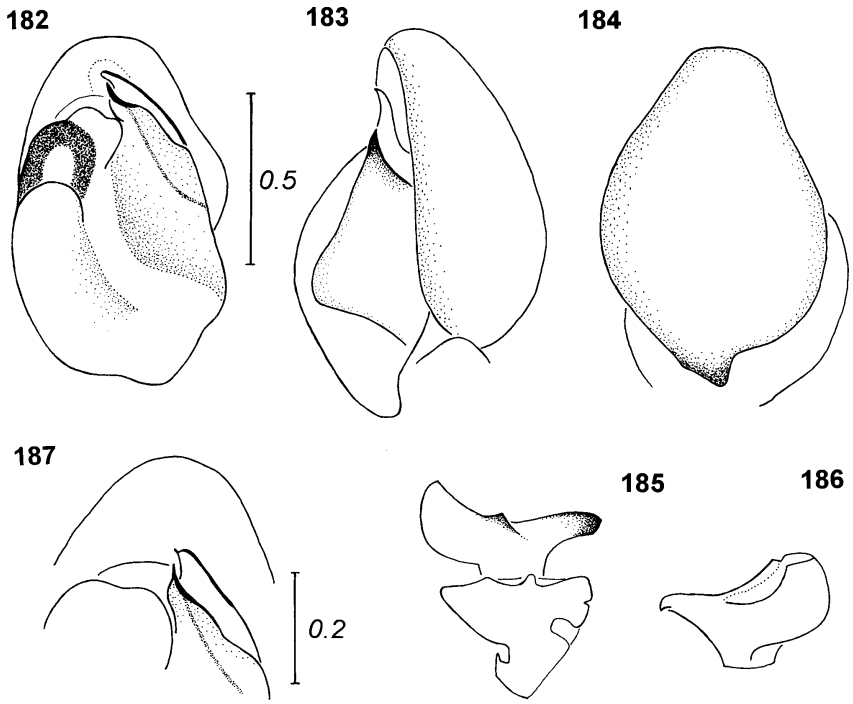
This species may be distinguished by the specific small embolus with an accompanying conductor, which has a sclerotized keel.

ETYMOLOGY

The specific name is derived from the type locality.

DESCRIPTION

Measurements: length of carapace 2.1, width of carapace 1.7, height of carapace 0.7, length of abdomen 2.3, width of abdomen 1.4, length of eye field 1.0, anterior and posterior width of eye field 1.2.



182-187. *Menemerus manicus* sp. n., male (holotype): 182-184- palpal organ, ventral, lateral and dorsal views, 185-186 - palpal tibia, dorsal and ventral views, 187 - embolus

Male. Small spider. Carapace flattened, brown with darker eye field. White lines composed of hairs on lateral margins of carapace. Clypeus very low, with white hairs. Chelicerae, labium, maxillae brown. Sternum light brown. Abdomen dark brown with large leaf-shaped light pattern medially, abdominal sides light. Venter light. Dense long light and brown hairs at anterior edge of abdomen. Spinnerets yellowish-grey. Legs yellow, only first pair brown. Leg hairs light. Palpal organ shown in Figs 182-184. Tibial apophysis rather small (Figs 185-186), bulbus oval with wide furrow, embolus short with accompanying membranous conductor, its prolateral edge grow strengthened by thin sclerotized ridge (Fig. 187).

Female unknown.

DISTRIBUTION

Known from the type locality only.

Menemerus meridionalis sp.n.

(Figs 188-191)

MATERIAL

Holotype M: **South Africa**: district Dendron, Plaas, farm Amsterdam, collected on *Acacia tortilis*, 1967, leg. SCHOEMAN & GENIS (PPRI, 78/306).

DIAGNOSIS

This species may be distiguished by the large, long, lobate retrolateral tibial apophysis and very small, spiked ventral tibial apophysis.

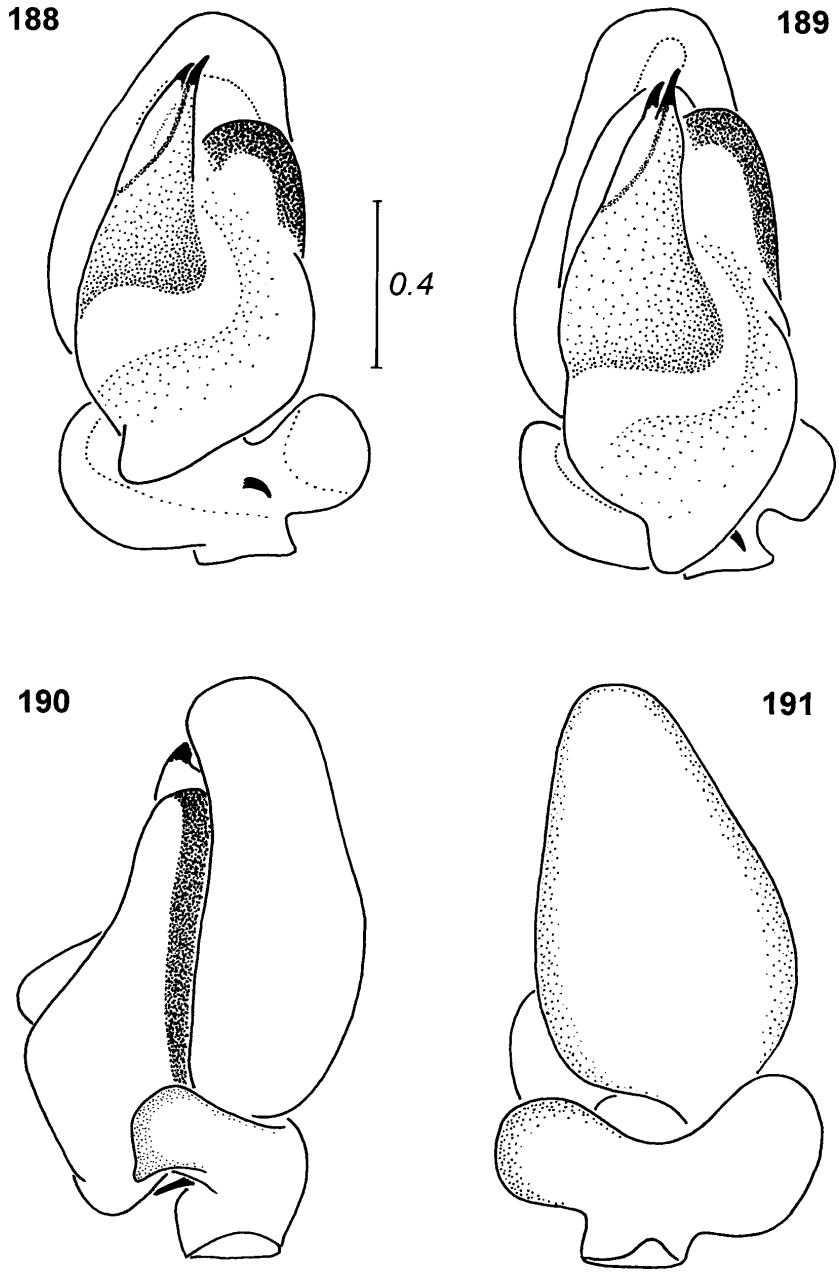
ETYMOLOGY

The specific name is derived from Latin word "*meridionalis*" meaning "southern" and refers to the type locality.

DESCRIPTION

Measurements: length of carapace 2.8, width of carapace 1.9, height of carapace 0.7, length of abdomen 3.3, width of abdomen 1.9, length of eye field 1.2, anterior and posterior width of eye field 1.5.

Male. Carapace flattened, dark brown, eye field almost black. Long brown bristles near eyes. White lines composed of hairs along lateral margins of carapace. White hairs scattered sparsely on carapace, on thorax such hairs form light stripe narrowed posteriorly. Chelicerae, labium and sternum brown, maxillae brown with light tips. Abdomen with very wide dark brown median streak, sides covered with white hairs. Venter with wide brownish stripe. Long and dense brown hairs at anterior abdominal margin. Spinnerets brown. Legs light brown, leg hairs brown. Pedipalp light brown, clothed in white hairs. Palpal tibia large,



188-191. *Menemerus meridionalis* sp. n., male (holotype), palpal organ, ventral, ventrolateral, lateral and dorsal views

retrolateral tibial apophysis lobate and very small spiked ventral one (Figs 188-191). Embolus double (with lamella).

Female unknown.

DISTRIBUTION

Known from the type locality only.

Menemerus minshullae sp. n.

(Figs 192-196)

MATERIAL

Holotype F: **Zimbabwe**: Umtali, 18°58′S 32°38′E, 13.I.1979, leg. C. A. CAR (NMZ, A237). Paratypes: **Malawi**: Chintheche, 11°50′S 34°13′E, 1 F, II.1976, leg. R. JOCQUÉ (MRAC, 148041); **Zimbabwe**: Bulawayo, 20°10′S 28°35′E, 1 F, 10.X.1983, leg. P. LORBER (NMZ, A1957); Bulawayo, hillside, 1 F, X.1989, leg. J. MINSHULL (NMZ, A7687); Hunters Camp Butchery, Setinel Ranch, 1 F, 21.I.1991, leg. J. MINSHULL (NMZ, A2229).

DIAGNOSIS

A distinctive species, can be readily recognized by the shape of the epigyne, which is rather wider than long and has two large oval depressions with strongly sclerotized posterior borders.

ETYMOLOGY

This species is dedicated to the late Jacqui MINSHULL, curator of *Arachnida* at the Natural History Museum of Zimbabwe for many years.

DESCRIPTION

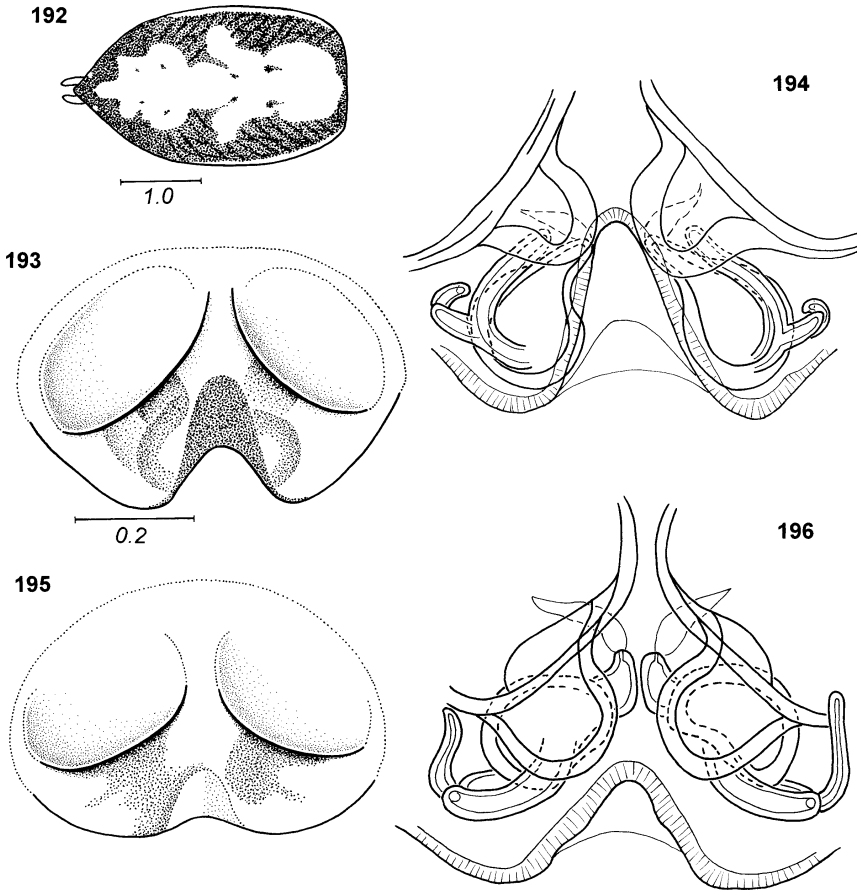
Measurements: length of carapace 1.6-2.1, width of carapace 1.4-1.6, height of carapace 0.5-0.8, length of abdomen 2.1-3.3, width of abdomen 1.5-2.4, length of eye field 0.7-1.0, anterior and posterior width of eye field 1.1-1.3.

Male unknown.

Female. Small to medium-sized spider. Carapace dark brown, eye field black sometimes with metallic lustre. Adpressed long brown hairs on ocular area, among them dispersed single white hairs, long brown bristles near eyes. In some specimens two pairs of light, poorly contrasting patches on thoracic part. White hairs form stripes along lateral margins of carapace. Clypeus low, clothed in white hairs. Chelicerae, labium and sternum dark brown, maxillae brown with light tips. Abdomen brownish with light leaf-shaped pattern (Fig. 192), in some specimens abdomen lighter. Venter pale, sometimes with wide greyish stripe. Spinnerets greyish-yellow. Legs yellow, with brown hairs and spines. First pair of legs sometimes light brown. Epigyne oval, very strongly sclerotized, with two oval depressions and single large pocket near epigastric furrow (Figs 193, 195). Internal structures shown in Figs 194, 196, very long accessory glands.

DISTRIBUTION

Known from Malawi and Zimbabwe.



192-196. *Menemerus minshullae* sp. n., female (192 - holotype): 192 - abdominal pattern, 193-196 - epigyne and its internal structure

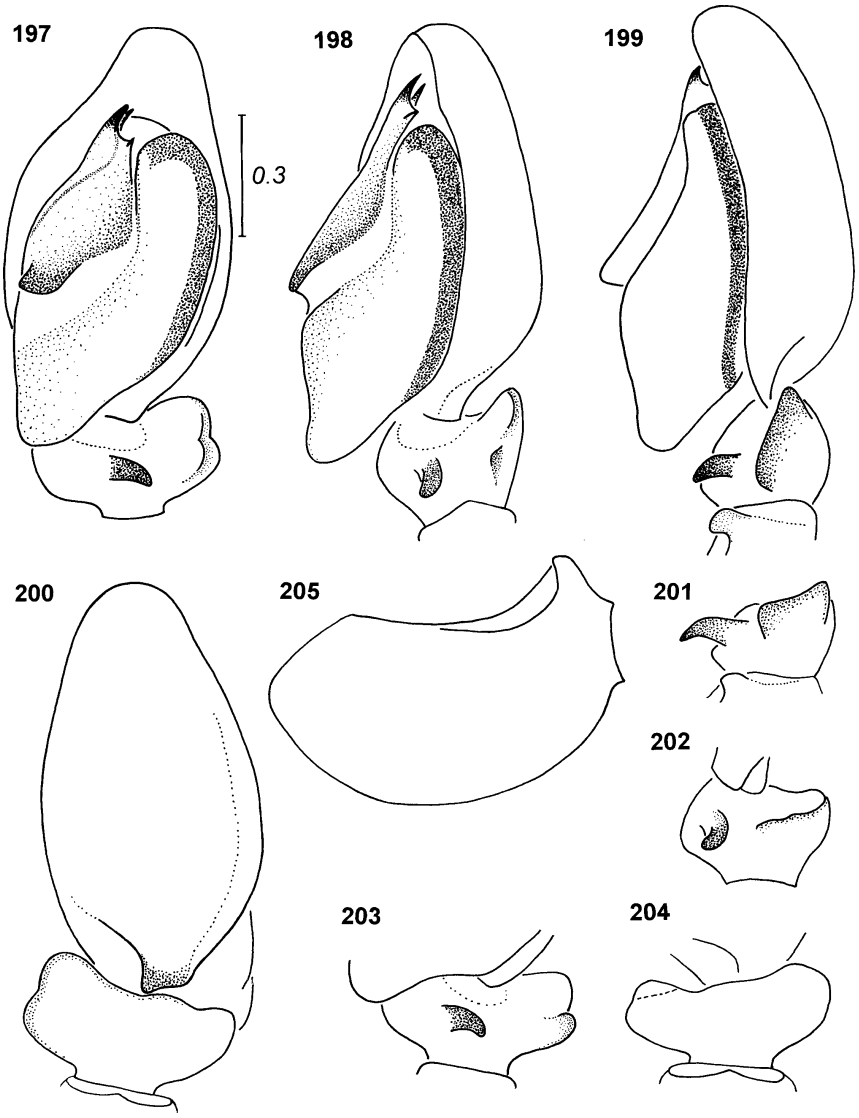
Menemerus mirabilis sp. n.

(Figs 197-209)

MATERIAL

Holotype M: **Ethiopia**: Addis Ababa, 2400 m a.s.l., in house Ilca school, III.1988, leg. A. RUSSELL-SMITH (MRAC). Paratypes: 1 M, together with holotype (MRAC); same locality, 1 M, VIII.-IX.1988 (ARS); same locality, 2 M, 13.II.1985 (ARS); same locality, 1 F, 17.VIII.1980 (MARC); Bambela, 450 m a.s.l., Ras

hotel, 2 M, 1 F, 15.II.1985 (ARS); same data, 2 M, 1 F (MNH). All specimens: leg. A. RUSSELL-SMITH.



197-205. *Menemerus mirabilis* sp. n., male: 197-200 - palpal organ, ventral, ventrolateral, lateral and dorsal views, 201-203 - tibial apophyses, lateral, ventrolateral, ventral and dorsal views, 205 - palpal femur

DIAGNOSIS

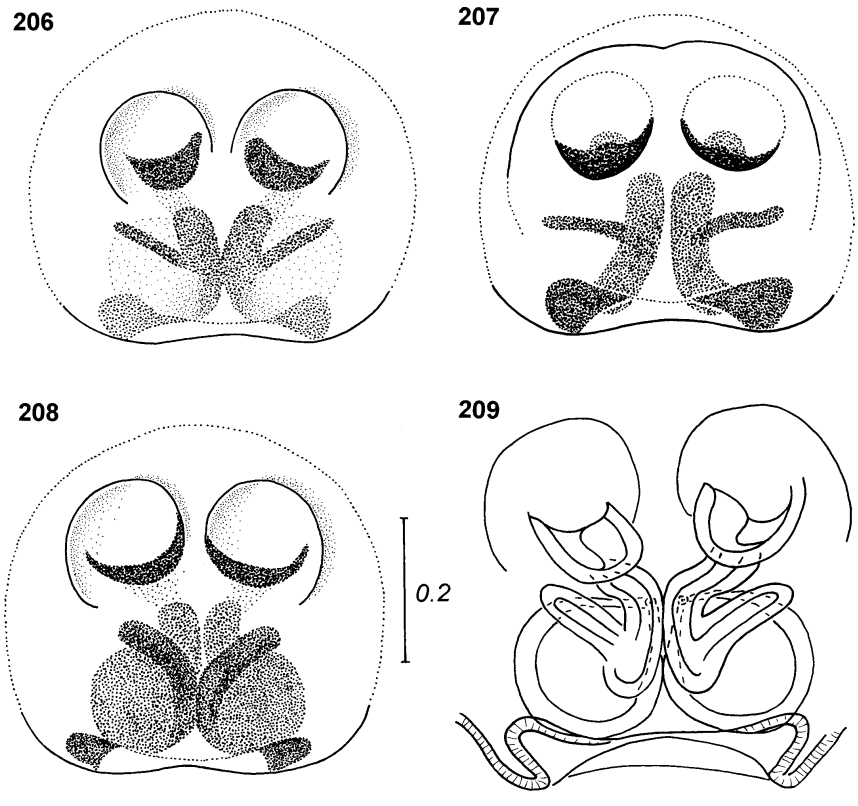
The male slightly resembles *M. magnificus*, but its embolus is short, ventral tibial apophysis more hooked and dorsal tibial apophysis smaller, without a notch (cf. Fig. 2197 and Fig. 177). The internal structure of the epigyne resembles *M. formosus*, but two epigynal depressions are present instead of one in *M. formosus* (cf. Fig. 208 and Fig. 140).

ETYMOLOGY

The specific name is derived from Latin word "*mirabilis*" meaning "admirable".

DESCRIPTION

Measurements (male/female): length of carapace 2.0-2.3/1.8-2.4, width of carapace 1.4-1.6/1.4-1.8, height of carapace 0.7/0.7-0.8, length of abdomen 2.0.-2.4/2.5-3.5, width of abdomen 1.2-1.5/1.4-2.5, length of eye field 0-9-1.1/0.8-1.2, anterior width of eye field 1.1/1.1-1.4, posterior width of eye field 1.2/1.2-1.4.



206-209. *Menemerus mirabilis* sp. n., female, epigyne and its internal structure

Male. Carapace brown, eye field darker. Whole carapace clothed in delicate brown and light greyish hairs, near eyes brown bristles. Whitish stripes along lateral margins of carapace. Chelicerae brown, sternum light brown, maxillae and labium brownish with lighter margins. Abdomen brown with poorly contrasting yellowish leaf-shaped pattern. Venter yellowish-grey. Brown hairs on abdomen, denser and longer at its anterior edge. Spinnerets grey. Legs yellow, bases of their segments often darker. Lateral surfaces of femora brown. Leg hairs and spines brown. Pedipalp brown, white hairs on its femur. Embolus short, double, ventral tibial apophysis rather big, dorsal tibial apophysis has shape of wide lobe with small median notch (Figs 197-204). Big process at base of palpal femur (Fig. 205).

Female. Coloration resembles male. Abdomen slightly darker, medially traces of lighter stripe formed by a few pairs of spots. Venter with silver patches of translucent internal guanine crystals. Legs lighter, yellow. Epigyne rounded with two rounded depressions and wide pocket (Figs 206-208). Internal structure as in Fig. 209.

DISTRIBUTION

Known from Ethiopia.

***Menemerus modestus* sp. n.**

(Figs 210-213)

MATERIAL

Holotype: M: **Tunisia**: Nefzana, leg. VIBERT (MNHN, 22507A).

DIAGNOSIS

This species is closely related to *M. guttatus*. The male may be separated by the structure of the palpal apophyses; ventral one is slighty smaller and dorsal one longer than in *M. guttatus* (cf. Fig. 210 and Fig. 143).

ETYMOLOGY

The specific name is derived from Latin word "*modestus*" meaning "quiet".

DESCRIPTION

Measurements: length of carapace 2.2, length of abdomen 2.1, length of eye field 1.1, anterior width of eye field 1.6, posterior width of eye field 1.5.

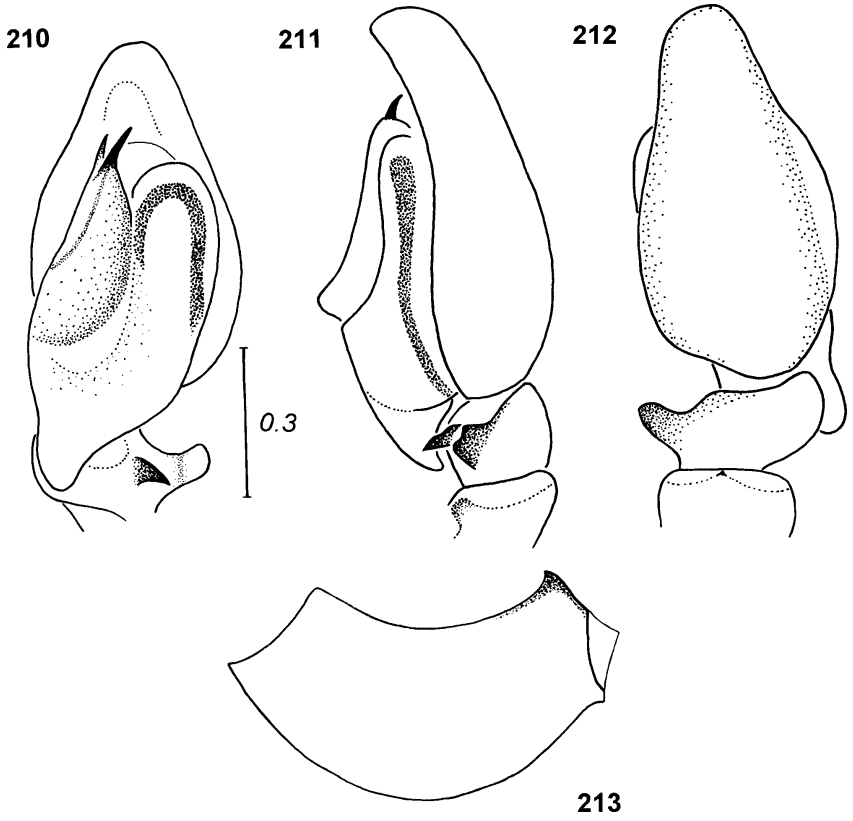
Male. Carapace brown, eye field darker. Dense, long, brown hairs cover whole carapace, numerous greyish-white hairs on ocular area and medially on thorax. Chelicerae dark brown, labium and maxillae brownish, sternum light brown. Abdomen very light, yellowish, only traces of median fawn streak on anterior part. Venter yellow. Spinnerets light. Legs yellow. Pedipalp brown.

Short embolus with small lamella (Fig. 210). Structure of tibial apophyses as in Figs 210-212. Big process at base of palpal femur (Fig. 213).

Female unknown.

DISTRIBUTION

Known from the type locality only.



210-213. *Menemerus modestus* sp. n., male, holotype: 210-212 - palpal organ, ventral, lateral and dorsal views, 213 - palpal femur

Menemerus namibicus sp. n.

(Figs 214-216)

MATERIAL

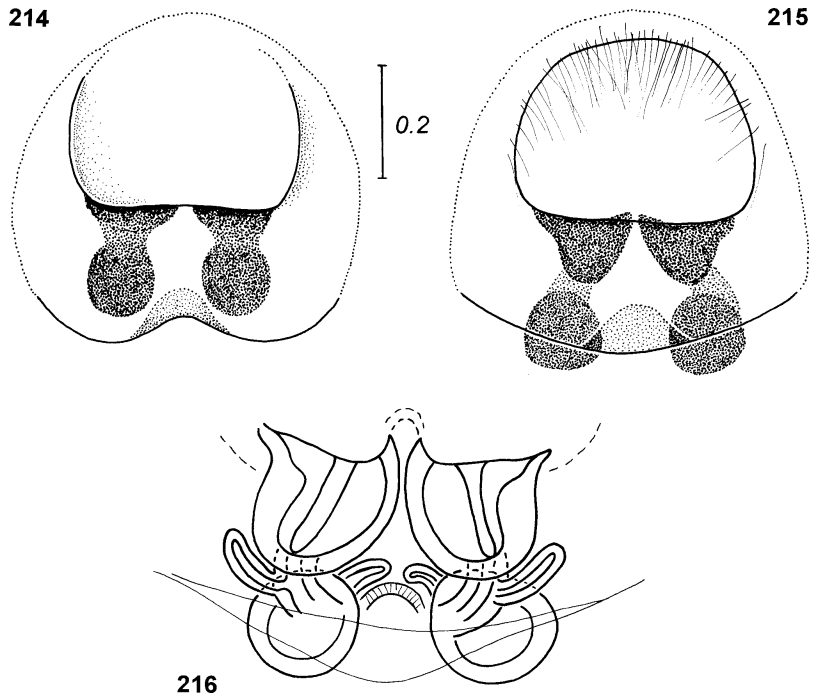
Holotype F: **Namibia**: Dorstland, 18°46´S, 14°44´E, on ground, 9.X.1986, leg. E. GRIFFIN (SMN, 40519). Paratype: **Namibia**: Zais House, mud wasp nest, 1 F, 5.I.1985, leg. M. BRIDGEFORD (SMN, 39906).

DIAGNOSIS

See diagnosis of *M. carlini.*

ETYMOLOGY

The name of the species is derived from Namibia, the country of its type locality.



214-216. *Menemerus namibicus* sp. n., female (214 - holotype), epigyne and its internal structure

DESCRIPTION

Measurements: length of carapace 2.7-3.1, width of carapace 2.0-2.3, height of carapace 0.9-1.1, length of abdomen 3.7-4.9, width of abdomen 2.2-2.8, length of eye field 1.1-1.2, anterior width of eye field 1.7, posterior width of eye field 1.5-1.7.

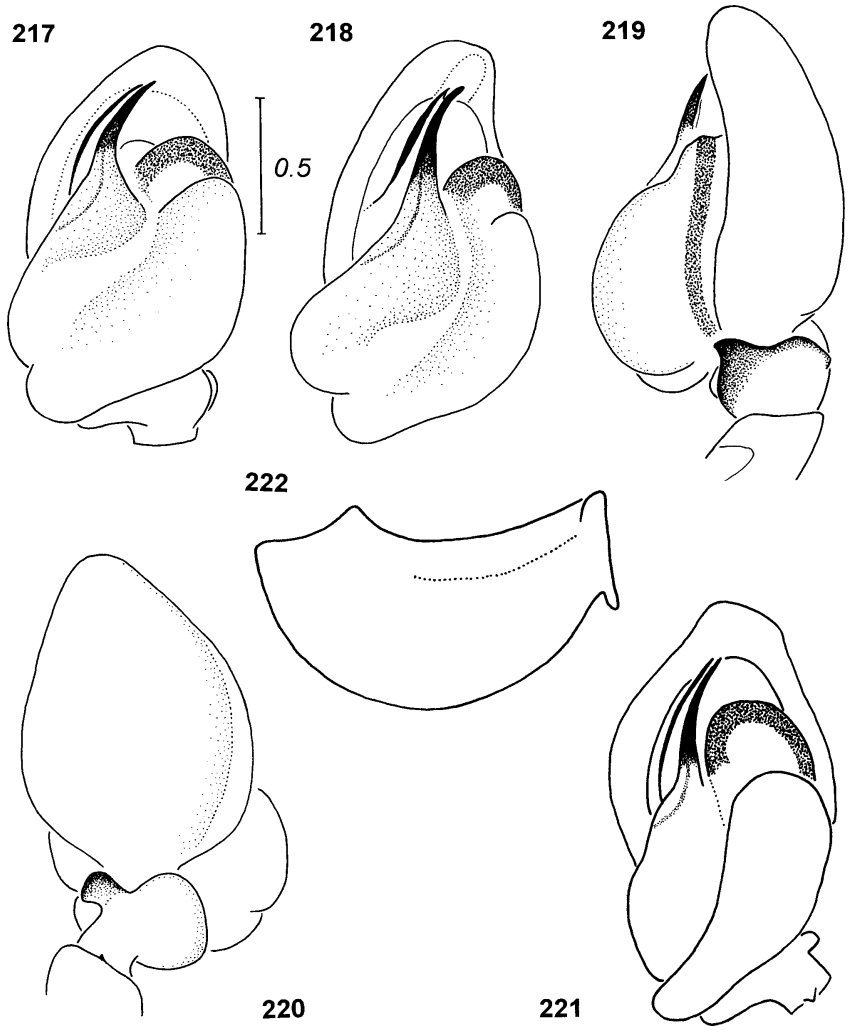
Male unknown.

Female. Carapace dark brown, eye field black. Whole carapace clothed in dense light greyish hairs. Long brown bristles near eyes. Along lateral edges of carapace light narrow lines composed of white hairs. Clypeus low, brown, a few white hairs on it. Chelicerae, labium and sternum dark brown, maxillae brown with pale tips. Abdomen black with not contrasting median stripe composed of light hairs. Venter grey. Spinnerets dark. Legs dark brown, covered with numer-

ous long brown and greyish hairs. Epigyne with large depression (Figs 214, 215). Entrance bowls very strongly sclerotized, seminal ducts short, spermathecae spherical (Fig. 226).

DISTRIBUTION

Known from Namibia.



217-222. *Menemerus natalis* sp. n., male (217-220 - holotype): 217-221 - palpal organ, ventral, lateral and dorsal views, 222 - palpal femur

Menemerus natalis sp. n.

(Figs 217-222)

MATERIAL

Holotype M: **South Africa**: Natal, Ashburton, 10 km SE of Pietermaritzburg, 2.I.1991, leg. D. & B. ROTH (CAS). Paratype: **South Africa**: dictrict Maastroom, farm Al-te-ver, in nest of silk under bark of tree, 1 M, 24.VIII.1976, leg. N. J. DIPPENAAR (PPRI, 76/1508).

DIAGNOSIS

This species is readily distinguished by the charcteristic, longer than in the other species, embolus and very small and narrow tibia with a small apophysis.

ETYMOLOGY

The name of species is derived from Natal, the province of its type locality.

DESCRIPTION

Measurements: length of carapace 3.1-3.3, width of carapace 2.1-2.3, height of carapace 0.9-1.0, length of abdomen 3.1-3.4, width of abdomen 2.0-2.3, length of eye field 1.2-1.3, anterior and posterior width of eye field 1.4-1.7.

Male. Medium-sized spider, its carapace much flattened. Its coloration very dark, brownish-black. White hairs form very thin lines along lateral margins of carapace and thin median stripe on thorax. Three white dots between eyes of first row. Clypeus with white hairs. Chelicerae, labium, maxillae and sternum dark brown. Abdomen russet-brown with not contrasting traces lighter pattern medially. Ventrally abdomen brown. Spinnerets dark. Legs brown. Whole body covered with dense brown hairs. Palpal organ in Figs 217-222. Tibial apophysis wide and short, embolus rather long, with accompanying membranous conductor, its prolateral edge with sclerotized keel.

Female unknown.

DISTRIBUTION

Known from the South Africa.

Menemerus paradoxus WESOŁOWSKA et VAN HARTEN, 1994

(Figs 223-224)

Menemerus paradoxus WESOŁOWSKA & VAN HARTEN 1994: 47.

MATERIAL

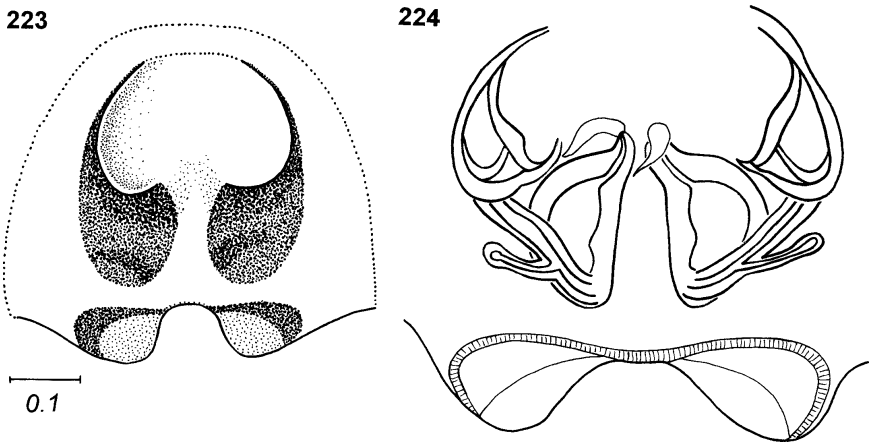
Yemen: Sana'a, 1 F (holotype), V.1991, leg. A. VAN HARTEN (MRAC, 201307).

DIAGNOSIS

This species can be distinguished by the structure of the epigyne with a notch at posterior edge and single depression occupying anterior half.

DESCRIPTION

Measurements: length of carapace 2.5, width of carapace 1.7, height of carapace 0.9, length of abdomen 3.2, width of abdomen 2.1, length of eye field 1.1, anterior and posterior width of eye field 1.3.



223-224. *Menemerus paradoxus* WES. et HAR., female, holotype, epigyne and its internal structure (drawings from WESOŁOWSKA & VAN HARTEN 1994)

Male unknown.

Female. Medium-sized. Carapace dark brown, eye field almost black. Whole carapace clothed in short, dense brown and light greyish hairs, near eyes longer bristles. Chelicerae, labium and sternum brown, maxillae brown with light margins. Abdomen light, yellowish-grey, covered with brown hairs. Venter yellowish. Spinnerets grey. Legs yellow, their hairs and spines brownish. Epigyne large, heavily sclerotized, with big depression in its anterior half and notch at posteror border (Fig. 223). Internal structure of epigyne shown in Fig. 224.

DISTRIBUTION

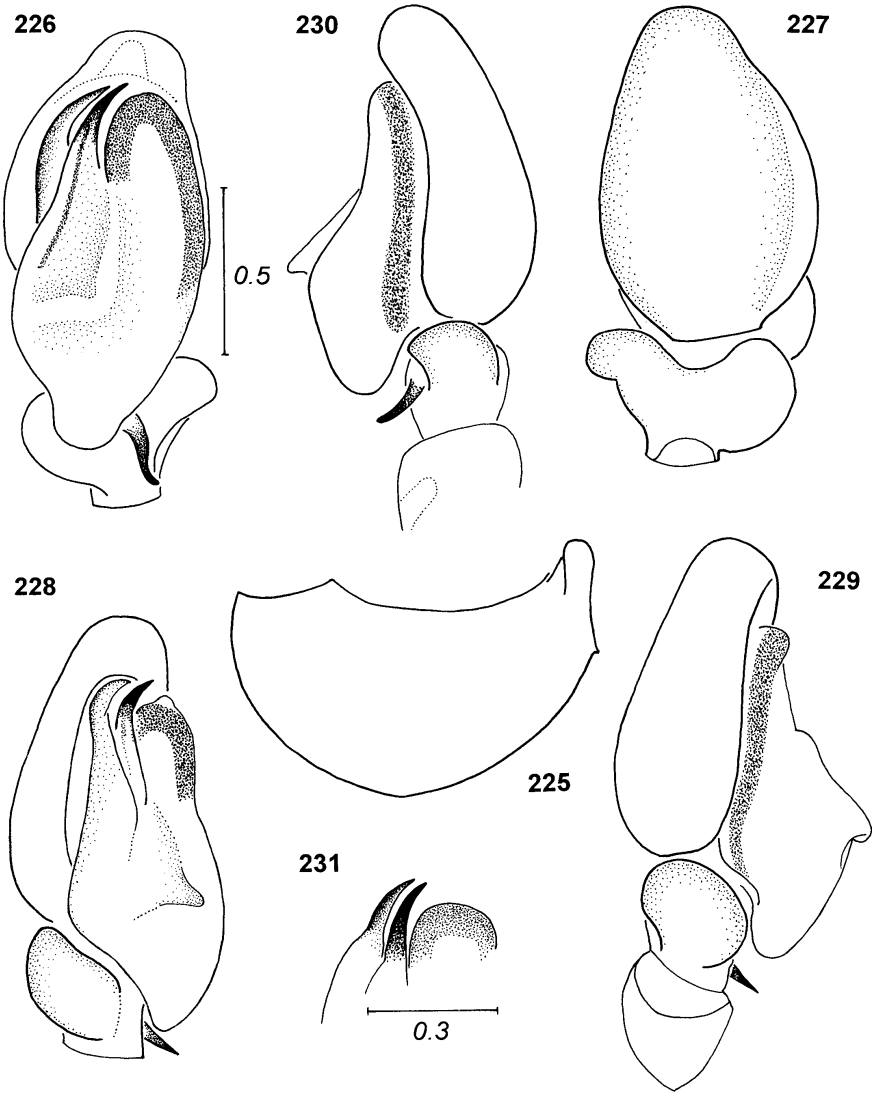
Known from the type locality only.

Menemerus pilosus **sp. n.**

(Figs 225-231)

MATERIAL

Holotype M: **Namibia** [South West Africa]: Ondangua, 1100 m a.s.l., 16.V.1958, leg. E. ROSS & B. LEECH (CAS). Paratype: **Namibia**: Khabus, 26°18´S 18°13´E, distr. Keetmanshoop, on sandy plain, next to dry riverbed, pres. pitfall traps, 1 M, 8.XII.1988-6.I.1989, leg. N. & G. OLIVIER (SMN, 42193).



225-221. *Menemerus pilosus* sp. n., male (235-229 - holotype): 225 - palpal femur, 226-230 - palpal organ, ventral, lateral, dorsal and ventrolateral views, 211 - embolus

DIAGNOSIS

A distinctive species, with a long and narrow bulbus, long embolus with a great lamella, and long thin ventral tibial apophysis.

ETYMOLOGY

The specific name is derived from Latin word "*pilus*" meaning "hair" and refers to very hairy body of this species.

DESCRIPTION

Measurements: length of carapace 2.3-2.7, width of carapace 1.7-2.0, height of carapace 0.7-0.9, length of abdomen 2.5-3.2, width of abdomen 1.5-1.9, length of eye field 1.0-1.2, anterior and posterior width of eye field 1.3-1.5.

Male. Carapace dark brown, eye field black. Whitish hairs cover carapace, especially numerous on eye field, brown bristles near eyes. White bands on lateral carapace margins, clypeus with white hairs. Chelicerae, labium and sternum brown, maxillae brown with light margins. Abdomen dark brown medially and greyish laterally, covered with very dense hairs. Venter yellowish. Spinnerets yellow-greyish. Legs orange, brownish spotted, with dense and long hairs. Pedipalp brown, its hairs whitish. Bulbus elongate, embolus with big prolateral lamella. In paratype this apophysis stronger sclerotized than in holotype (Fig. 230). Two tibial apophyses; retrolateral of them wide and rounded, ventral - perpendicular to the first one, spit-shaped (Figs 226-229).

Female unknown.

DISTRIBUTION

Known from Namibia.

Menemerus placidus sp. n.

(Figs 232-234)

MATERIAL

Holotype F: **Namibia**: Aurus Mts, 27°38′S 16°15′E, rocky hillside under stones, 15.VIII.1983, leg. E. GRIFFIN (SMN, 36818).

DIAGNOSIS

This species can be distinguished by the heart-shaped epigynal depression. The entrance bowls are characteristic; their rims visible as strongly curved lines.

ETYMOLOGY

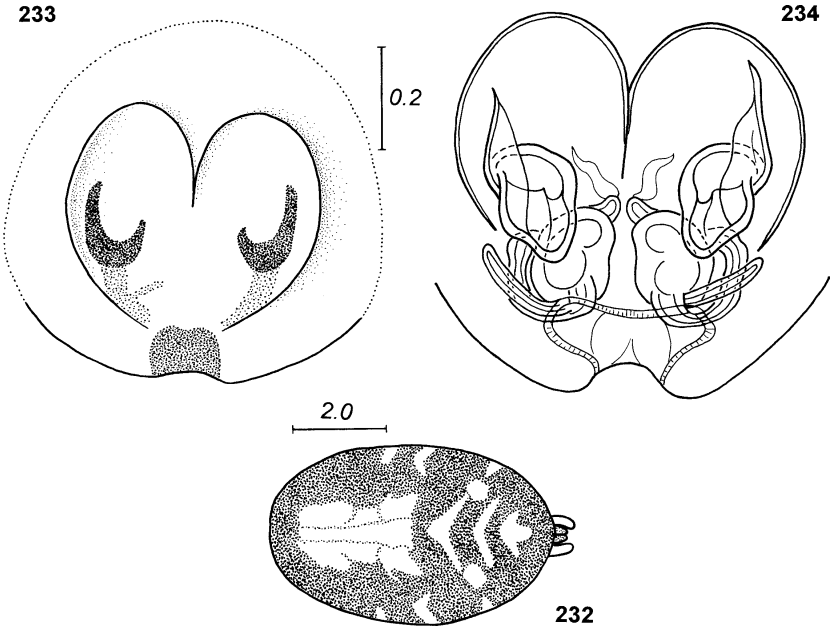
The specific name is derived from Latin word "*placidus*" meaning "mild".

DESCRIPTION

Measurements: length of carapace 2.2, width of carapace 1.6, height of carapace 0.7, length of abdomen 2.6, width of abdomen 1.6, length of eye field 1.0, anterior and posterior width of eye field 1.3.

Male unknown.

Female. Medium-sized. Carapace brown, eye field black. Whole carapace clothed in dense grey-whitish hairs, brown bristles on eye field. Chelicerae and labium brown, maxillae brownish with light tips, sternum orange. Abdomen brown with light pattern (Fig. 232), covered with very dense, grey and brown



232-234. *Menemerus placidus* sp. n, female, holotype: 232 - abdominal pattern, 233-234 - epigyne and its internal structure

hairs. Ventrally abdomen yellowish. Spinnerets yellowish-grey. Legs orange, their hairs and spines brown. Epigyne large with single pocket near epigastric furrow. Centrally large heart-shaped depression (Fig. 233). Copulatory openings hidden in very deep entrance bowls. Walls of these bowls very strongly sclerotized. Seminal ducts rather narrow, spermathecae bean-shaped. Very long accessory glands fall into terminal part of seminal ducts (Fig. 234).

DISTRIBUTION

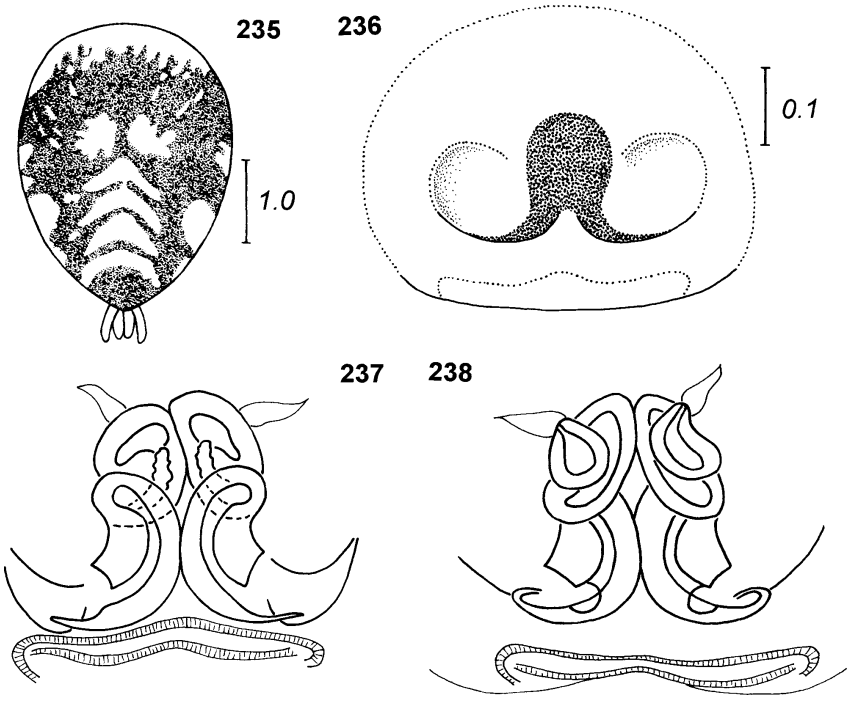
Known from the type locality only.

Menemerus plenus WESOŁOWSKA et VAN HARTEN, 1994
(Figs 235-238)

Menemerus plenus WESOŁOWSKA & VAN HARTEN 1994: 49.

MATERIAL

Yemen: Between Yarim and Ibb, Sumara Pass, 1 F (holotype), 22.III.1992, leg. A. VAN HARTEN (MRAC, 201313).



235-238. *Menemerus plenus* WES. et HAR., female, holotype: 235 - abdominal pattern, 236 - epigyne, 237-238 - internal structure of epigyne, ventral and dorsal views (drawings from WESOŁOWSKA & VAN HARTEN 1994)

DIAGNOSIS

This species is recognizable by the structure of the epigyne, especially very thick-walled seminal duct.

DESCRIPTION

Measurements: length of carapace 2.0, width of carapace 1.9, height of carapace 0.7, length of abdomen 3.3, width of abdomen 1.7, length of eye field 1.1, anterior width of eye field 1.6, posterior width of eye field 1.7.

Male unknown.

Female. Medium-sized. Carapace rather convex, higher than in other species, brown with black rings around eyes. Long brown bristles near eyes, carapace clothed in short brown and greyish hairs. Chelicerae and sternum brown, labium and maxillae brown with pale tips. Abdomen short and more rounded than in remaining *Menemerus* species. Coloration of abdomen greyish-russet with light, yellowish-white pattern (Fig. 235). Dense brownish hairs cover abdomen. Venter greyish. Spinnerets grey. Legs light brown with brown spines and hairs. Epigyne very strongly sclerotized, with two shallow depressions (Fig. 236). Copulatory openings placed posteriorly, seminal ducts with very thick walls (Figs 237, 238).

REMARK

Resembles *M. pulcher* in body proportions and coloration.

DISTRIBUTION

Known from the type locality only.

***Menemerus pulcher* sp. n.**

(Figs 239-244)

MATERIAL

Holotype M: **Mauritania**: 31 km S Nouakchott, XI.1994, leg. F. BORGATO (CAS).

DIAGNOSIS

A distinctive species, readily separated by two large parallel apophyses of the palpal tibia.

ETYMOLOGY

The specific name is derived from Latin word "*pulcher*" meaning "beautiful".

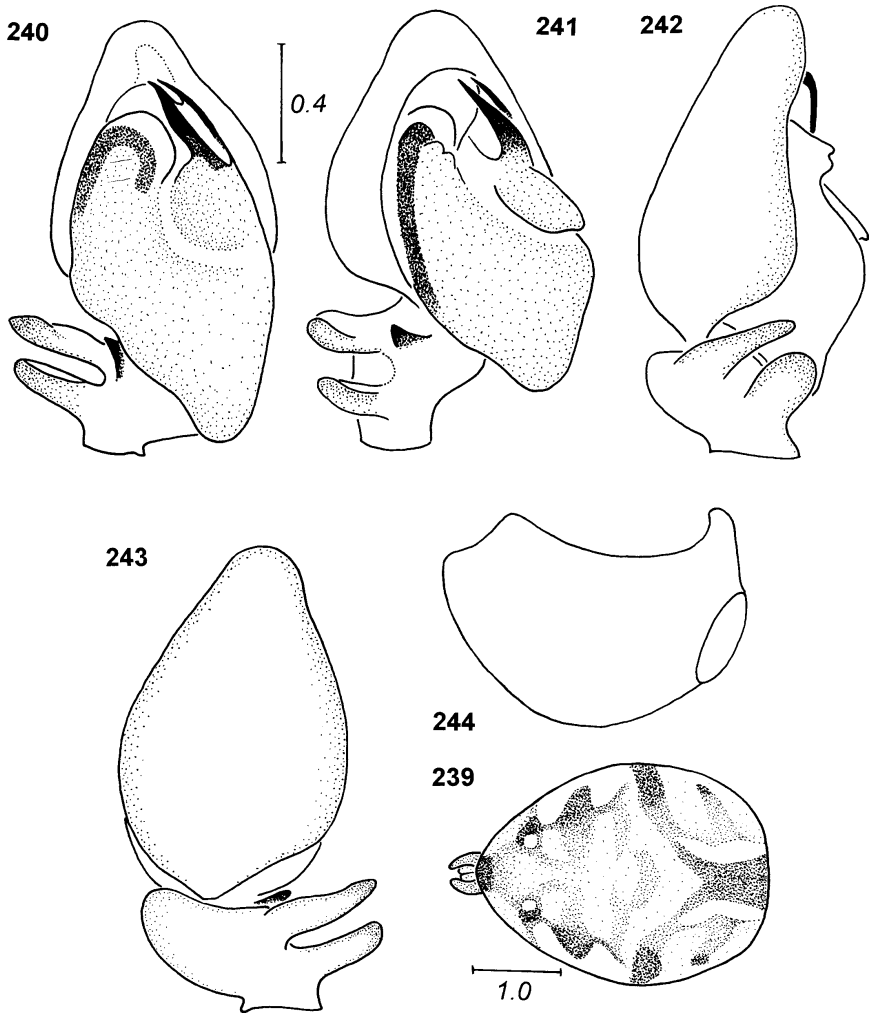
DESCRIPTION

Measurements: length of carapace 2.6, width of carapace 2.0, height of carapace 1.0, length of abdomen 2.8, width of abdomen 2.2, length of eye field 1.0, anterior width of eye field 1.5, posterior width of eye field 1.6.

Male. Medium-sized spider. Carapace somewhat higher than in other *Menemerus* species. Coloration of carapace dark brown, eye field black. Dense whitish hairs cover carapace, brown bristles in vicinity of eyes. White hairs form narrow stripes along lateral margins on carapace. Clypeus clothed in white hairs. Chelicerae brown; sternum, maxillae and labium orange-yellowish. Abdomen more rounded than in other species, its coloration rather light, yellowish-fawn

with slightly darker pattern and russet median stripe anteriorly (Fig. 239). Ventrally abdomen yellow. Greyish and brown hairs on abdomen, bushier at anterior abdominal margin. Spinnerets brown. First legs dark brown, distal segments somewhat lighter. Second pair orange with brown femora, remaining legs yellow. Leg hairs and spines brown. Pedipalp brown. Embolus double, tibia with two very large parallel retrolateral apophyses and very short ventral apophysis (Figs 240-243). Big process at base of palpal femur (Fig. 244).

Female unknown.



239-244. M*enemerus pulcher* sp. n., male, holotype: 239 - abdominal pattern, 240-243 - palpal organ, ventral, ventrolateral, lateral and dorsal views, 244 - palpal femur

REMARK
This species resembles *M. plenus* in body proportions and coloration.

DISTRIBUTION
Known from the type locality in West Mauritania only.

Menemerus rabaudi BERLAND et MILLOT, 1941

Menemerus rabaudi BERLAND & MILLOT 1941: 352.

This species was described from Guinea on the base of the single male. The type-specimen has been lost. Figures in the original description allow to suggests, that this species is related to *M. regius* from Ethiopia (cf. Figs 55 A-C in BERLAND & MILLOT 1941 with Figs 245-248).

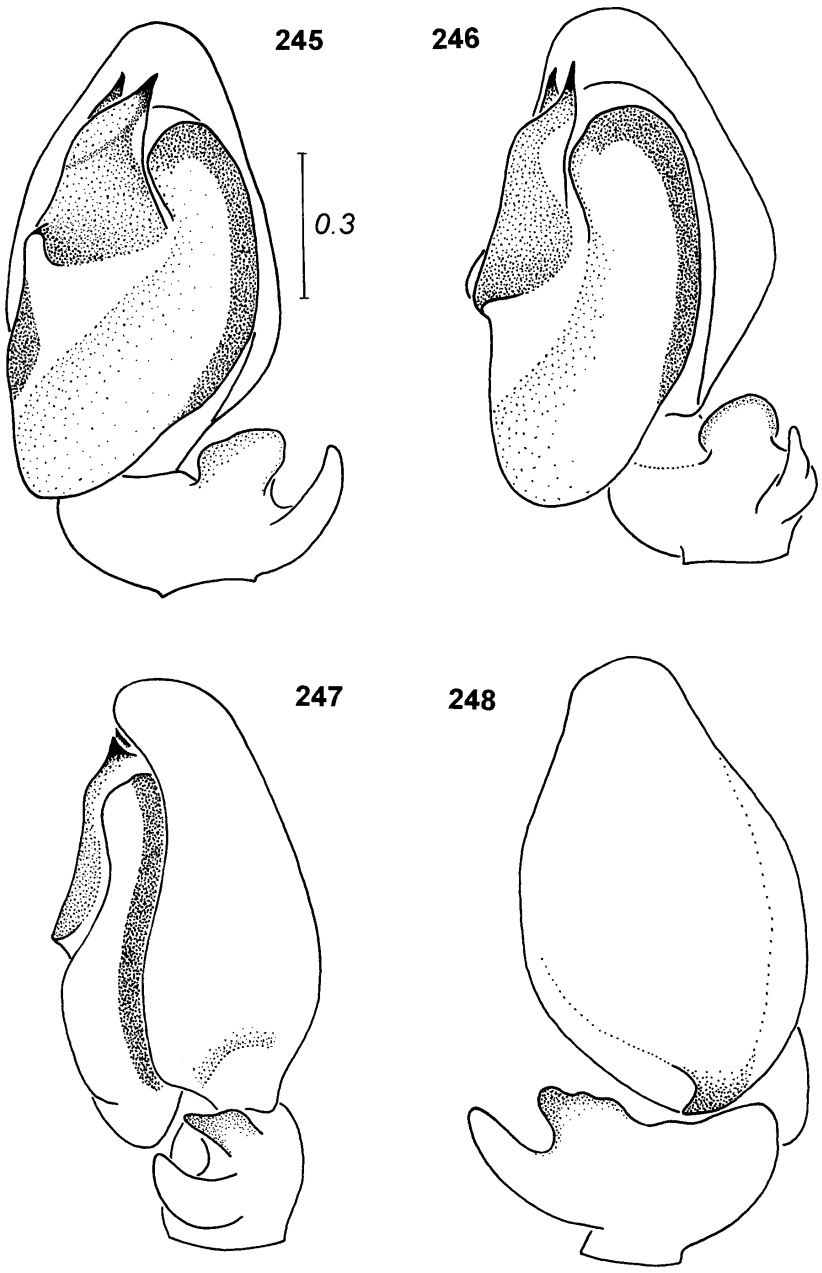
Menemerus regius sp. n.
(Figs 245-251)

MATERIAL
Holotype M: **Ethiopia**: Hora Crater Lake, Debre Zeyt, 1400 m a.s.l., 6.X.1988, leg. A. RUSSELL-SMITH (MRAC). Paratypes: 1 M, 5 F, together with holotype (MRAC); same locality, 1 F, 21.VI.1988 (ARS); same locality, in forest, rock face, 1 M, 1 F, 6.VI.1987 (ARS); same locality, 1900 m a.s.l., in grass on rock face, 2 M, 4 F, 22.IV.1988 (ARS); same locality, 2 M, 1 F, 26.VIII.1988 (ARS); Awash N. P., 1 F, 13.III.1983 (ARS); Ziway, edge of Ziway Lake, on *Ficus sycamorus* trunk, 2 M, 5 F, 18.VII. 1982 (ARS); Addis Ababa, 2400 m a.s.l., in house Ilca shool, 2 M, 1 F, VIII.-IX.1988 (MNH). All specimens: leg. A. RUSSELL-SMITH.

DIAGNOSIS
A distinctive species. The male can be easily distinguished by the characteristic shape of the tibial apophysis. The female has an epigyne slightly longer than wide, with two posterior recesses.

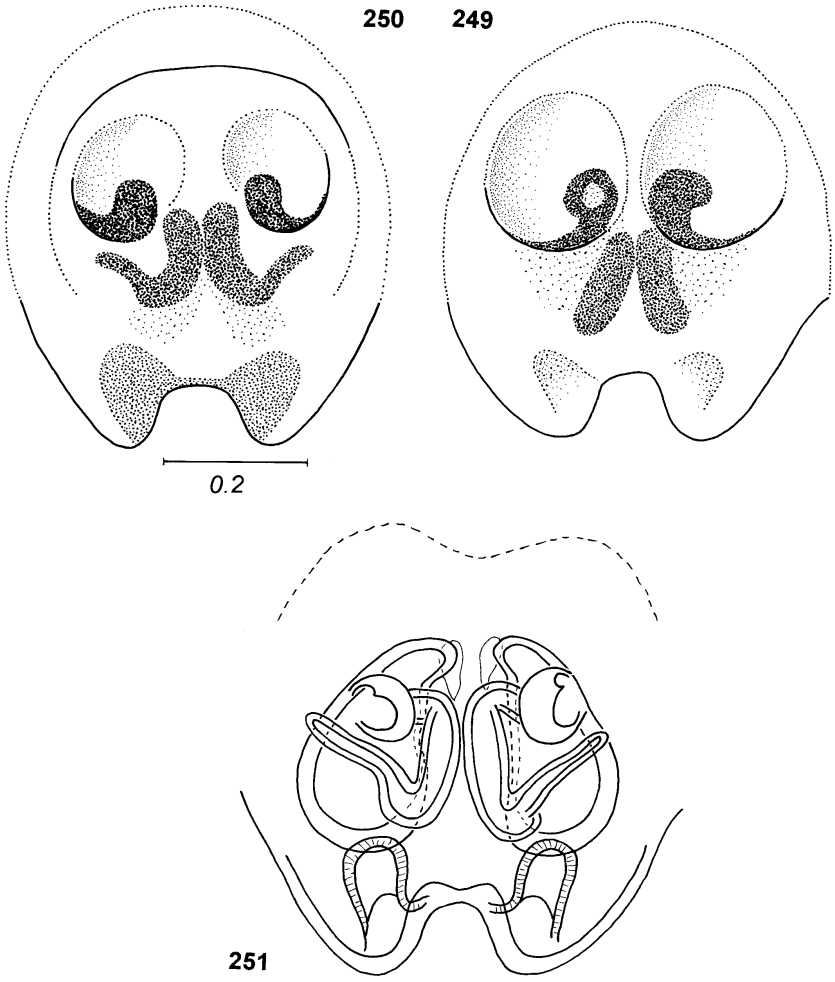
ETYMOLOGY
The specific name is derived from Latin word "*regius*" meaning "royal".

DESCRIPTION
Measurements (male/female): length of carapace 1.9-2.2/2.2-2.4, width of carapace 1.5-1.6/1.5-1.7, height of carapace 0.6/0.6, length of abdomen 2.1.-2.6/ 2.6-3.0, width of abdomen 1.6-1.9/1.7-2.1, length of eye field 0.8-0.9/1.0-1.1, anterior width of eye field 1.2./1.2, posterior width of eye field 1.3/1.3.



245-248. *Menemerus regius* sp. n., male, palpal organ, ventral, ventrolateral, lateral and dorsal views

Male. Carapace brown with dark ocular area. Large yellowish triangular patch behind eye field. Carapace hairs brown, long brown bristles near eyes. Few white hairs on lateral margins of carapace. Chelicerae brown, labium and maxillae light brown, sternum orange-yellowish. Abdomen rather light, yellowish-grey with median brownish stripe. Whole abdomen covered with silver spots of translucent guanine. Ventrally light. Spinnerets yellowish-grey. Legs yellow, only femora of first pair brown. Leg hairs and spines brown. Pedipalp brown, on its femur white hairs. Embolus double (with lamella) (Figs 245, 246). Dorsal tibial apophysis compound with two branches; higher of them lobate, lower - rather spicate, light (Figs 245-248). Big process at base of palpal femur.

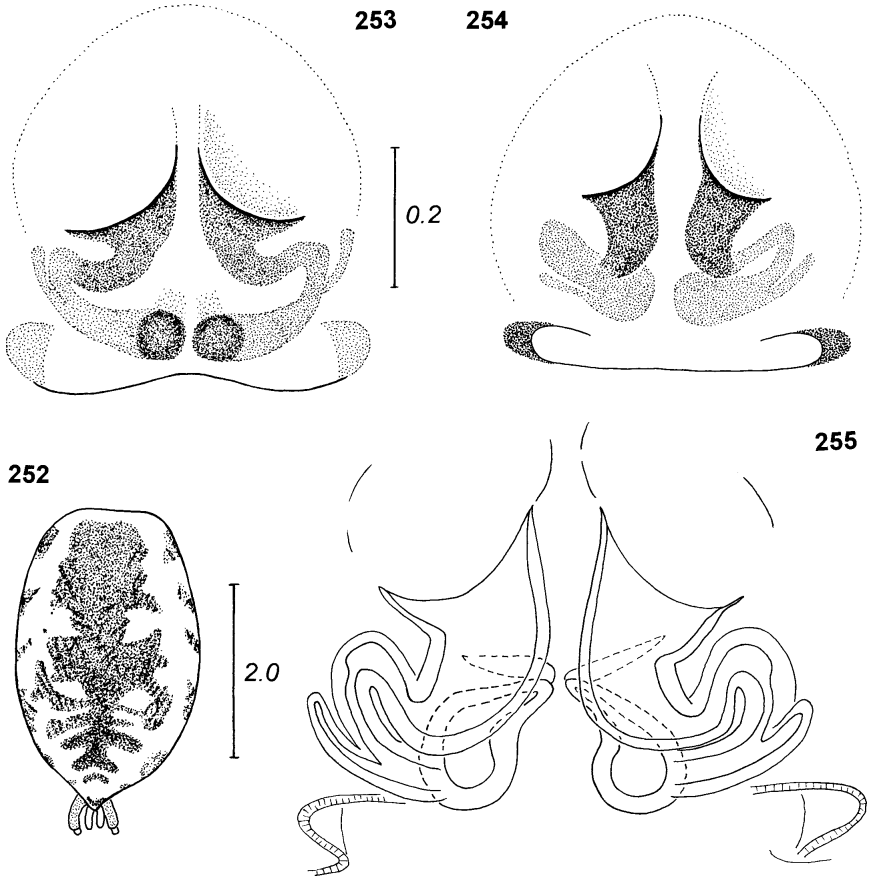


249-251. *Menemerus regius* sp. n., female, epigyne and its internal structure

Female. Slightly bigger than male. Coloration of carapace as in male. Abdomen darker, greyish-beige with light stripe in middle. All legs yellow, unicoloured. Epigyne somewhat elongated with big notch at its posterior edge and two rounded depressions anteriorly (Figs 249, 250). Initial part of seminal ducts curled, accessory glands long, spermathecae bean-shaped (Fig. 251).

DISTRIBUTION

Known from central Ethiopia.



252-255. *Menemerus rubicundus* LAWR., female (253 - holotype): 252 - abdominal pattern, 253-255 - epigyne and its internal structure

Menemerus rubicundus LAWRENCE, 1928

(Figs 252-255)

Menenerus rubicundus LAWRENCE 1928b: 259.

MATERIAL

Namibia: Caimaeis, 1 F (holotype), I.-IV.1926 (SAM, 906); Auas Mts, Windhoek, 1 F, 24.VIII.1968, leg. C. COETZEE (SMN, 35542).

DIAGNOSIS

This species may be separated by the structure of the epigyne. It is weakly sclerotized with a very wide initial part of the seminal ducts.

DESCRIPTION

Measurements: length of carapace 2.5-3.0, width of carapace 1.7-1.9, height of carapace 0.8, length of abdomen 2.4-3.0, width of abdomen 1.6-2.0, length of eye field 1.1-1.4, anterior width of eye field 1.5-1.9, posterior width of eye field 1.4-1.7.

Male unknown.

Female. Medium-sized spider. Carapace dark brown, eye field darker, vicinity of eyes black. White hairs form narrow lines on lateral margins of carapace, also near eyes of II and III rows sparse white hairs. Clypeus low, with white hairs. Chelicerae brown, maxillae and labium light brown with pale margins, sternum orange. Abdomen very light, whitish-yellow, with blackish pattern (Fig. 252). Venter greyish-yellow. Dense white and brown hairs cover abdomen. Anterior spinnerets whitish, posterior brownish. Legs yellowish with darker patches at base of their segments. Leg hairs and spines brown. Epigyne rounded, with medial elevated septum (Figs 253, 254). Fore part of seminal ducts wide, long accessory glands fall into terminal part of seminal ducts, spermathecae heavily sclerotized (Fig. 255).

DISTRIBUTION

Known from Namibia only.

Menemerus sabulosus sp. n.

(Figs 256-257)

MATERIAL

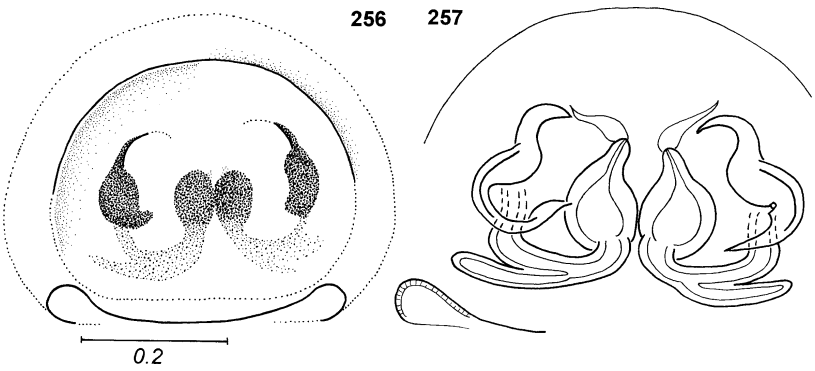
Holotype F: **Namibia**: Khalous, Keetmansh distr., 28°18′S 18°13′E, on sandy plain next to dry riverbed, pitfall traps, 14.III-14.IV.1988, leg. N. & G. OLIVIER (SMN, 42023).

DIAGNOSIS

This species is recognizable by the structure of the epigyne. The entrance bowls are rather shallow and very wide, seminal ducts transverse.

ETYMOLOGY

The specific name is derived from Latin word "*sabulum*" meaning "sand".



256-257. *Menemerus sabulosus* sp. n., female, hototype, epigyne and its internal structure

DESCRIPTION

Measurements: length of carapace 1.9, width of carapace 1.4, height of carapace 0.7, length of abdomen 2.6, width of abdomen 1.9, length of eye field 0.9, anterior and posterior width of eye field 1.2.

Male unknown.

Female. Carapace brown with darker eye field, clothed in adpressed dense light greyish hairs, brown bristles near eyes. Light hairs on clypeus. Chelicerae, labium, maxillae and sternum dark brown. Abdomen yellowish-grey with lighter leaf-shaped pattern, laterally covered with brown hairs. Venter light. Spinnerets yellowish. Legs yellow, their hairs and spines brown. Epigyne with large, deep depression, plugged with waxy secretion. Epigynal pocket wide (Fig. 256). Internal structure shown in Fig. 257, long accessory glands, spermathecae thick-walled.

DISTRIBUTION

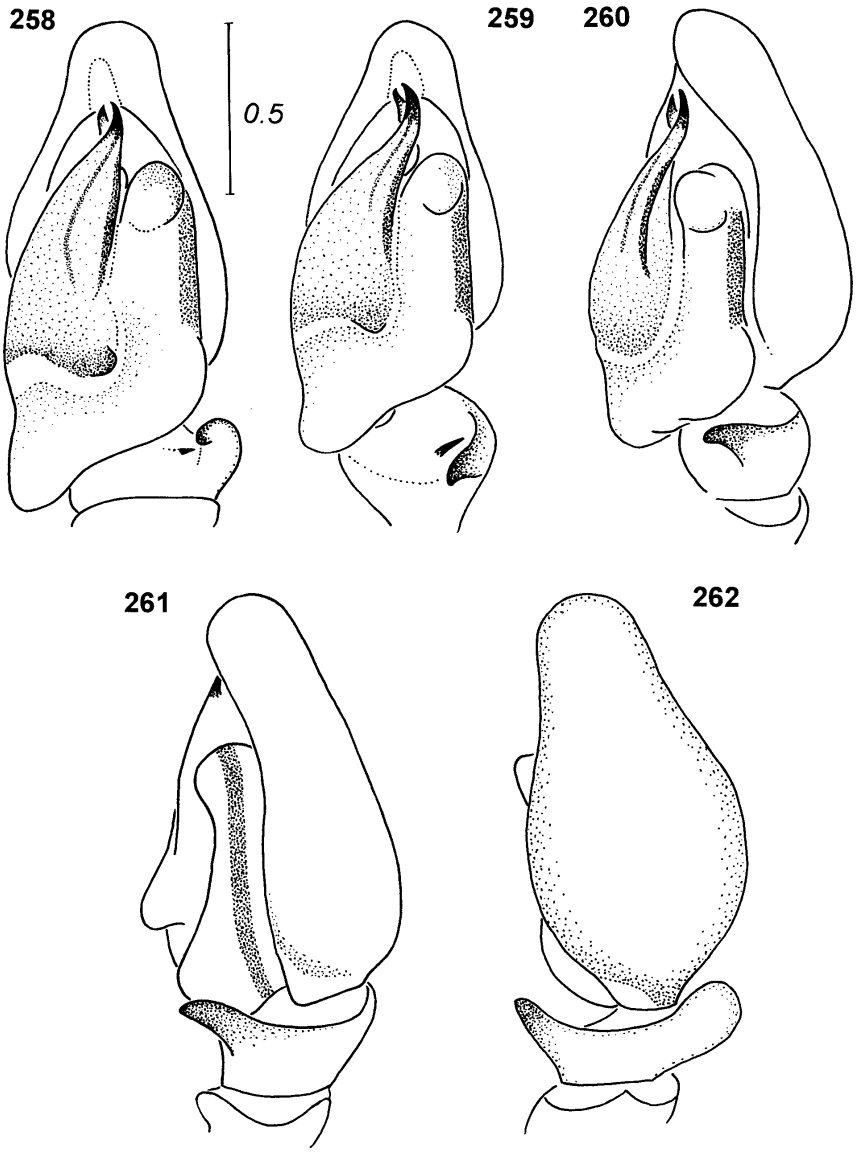
Known from the type locality only.

Menemerus semilimbatus (HAHN, 1827)

(Figs 258-267)

Attus semilimbatus HAHN 1827: 5.
Attus agilis WALCKENAER 1841: 464.

Salticus mauritanicus LUCAS 1846: 140.
Euophrys vigorata C. L. KOCH 1848: 14.
Salticus vigoratus: O. P.-CAMBRIDGE 1872: 324.
Menemerus heydenii SIMON 1868: 665.
Salticus intentus BLACKWALL 1869: 413.

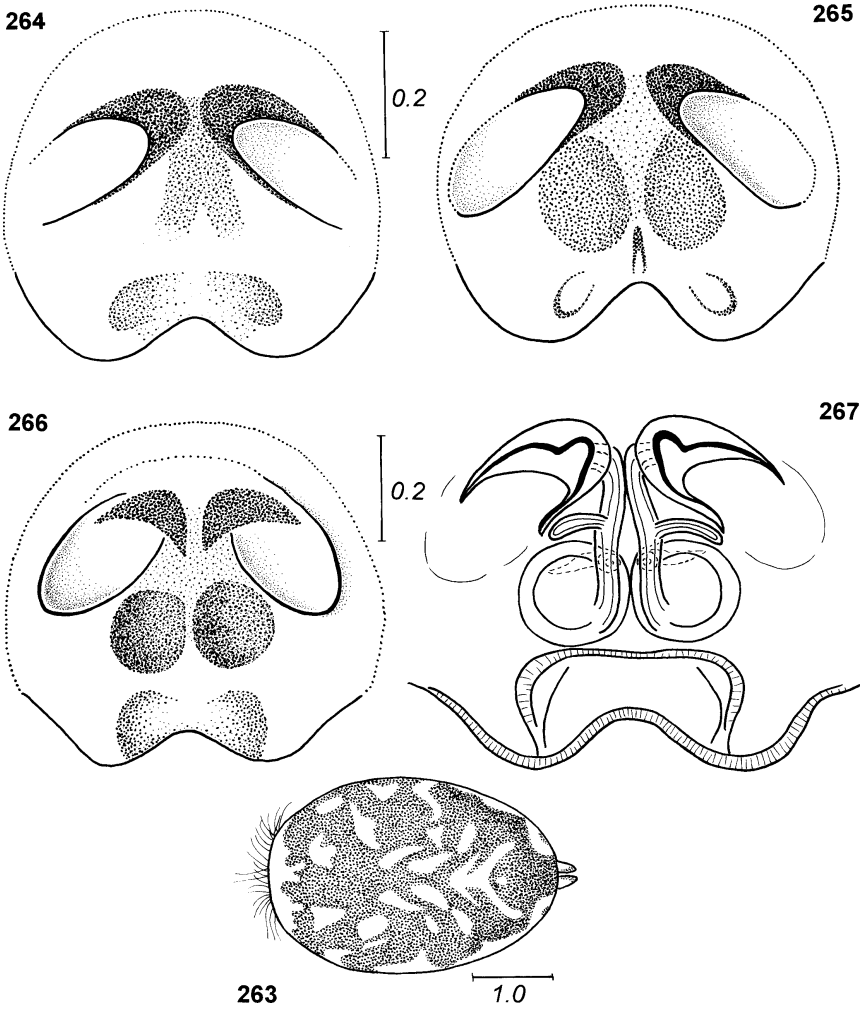


258-262. *Menemerus semilimbatus* (HAHN), male, palpal organ, ventral, ventrolateral, lateral and dorsal views

Menemerus semilimbatus: BACELAR 1929: 255; BARNES 1958: 44; GALIANO 1965: 130; 1984: 6; DUNIN 1979: 39; 1984: 58; 1989: 38; PRÓSZYŃSKI 1979: 313; 1984: 85; in press; WUNDERLICH 1995: 273; RAKOV & LOGUNOV 1997: 276.

MATERIAL

Madeira, Funchal, 3 F, 31.X.1965, leg. P. BENOIT (MRAC, 128722); **Mauritania**: Kefel Akchar, 1 M (MNHN, 5981); **Morocco**: Gibraltar, Benyounes, W. Ceuta, near beach, 1 M, 6.XII.1982, leg. H. ZIBROWINS (MCZ).



263-267. *Menemerus semilimbatus* (HAHN), female: 263 - abdominal pattern, 264-267 - epigyne and its internal structure

DIAGNOSIS

A distinctive species, may be easily separated by the structure of the copulatory organs. The male has a forceps embolus and very small, spiked ventral tibial apophysis. Characteristic feature of the female is presence of the prominent semicircular covers above copulatory openings.

DESCRIPTION

Measurements (male/female): length of carapace 2.4-3.6/2.7-3.7, width of carapace 2.1-2.7/2.2-2.8, height of carapace 1.4-1.5/1.6-1.8, length of abdomen 2.4-4.3/3.6-4.5, width of abdomen 2.1-2.8/3.1.3.9, length of eye field 1.2-1.6/ 1.3-1.5, anterior width of eye field 1.5-1.9/1.8-1.9, posterior width of eye field 1.4-1.8/1.7-1.9.

Male. Medium-sized spider. Carapace brown, eye field black. Numerous brown hairs cover carapace, long brown bristles near eyes. Light stripes composed of white hairs along lateral edges of carapace and medially on thorax. Clypeus low, brown. Labium and maxillae brown with pale tips. Sternum orange. Abdomen brown with subdued leaf-shaped yellowish pattern, venter light, with silver patches ot translucent guanine. Numerous brown and whitish hairs on abdomen. Spinnerets brownish. Legs light brown, first pair with darker femora. Leg hairs and spines brown. Pedipalp brown, dense white hairs on its femur and patella. Structure of palpal organ shown in Figs 258-262. Embolus double, forceps-shaped, small spike near tibial apophysis ventrally. Process at base of femur.

Female. Bigger than male. Coloration similar, but abdomen darker (Fig. 263). Legs light brown with darker rings and patches. Epigyne rounded with two depressions laterally and big pocket near epigastric furrow (Figs 244-266). Internal structures as in Fig. 277.

DISTRIBUTION

A Mediterranean species, reaching Azerbaijan to the East. Reported also from Argentina. First time recorded from Africa.

Menemerus silver **sp. n.**

(Figs 268-269)

MATERIAL

Holotype F (smallest): **Tunisia**: Kizida (?), (MNHN, 7048). Paratypes: 2 F, together with holotype.

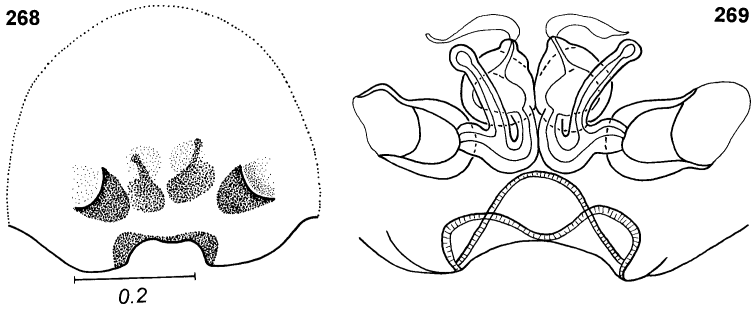
DIAGNOSIS

This species resembles *M. animatus, M. davidi* and *M. guttatus*. It may be distinguished by the presence of the notch at the posterior edge of the epigyne.

The epigynal pocket is distinctly narrower than in other similar species (cf. Fig. 268 with Figs 18, 87, 147). The internal structure is similar to *M. animatus*, but the course of the seminal ducts differs (cf. Fig. 269 and Fig. 19).

ETYMOLOGY

The specific name is derived from Latin word "*silver*" meaning "silvery".



268-269. *Menemerus silver* sp. n., female, holotype, epigyne and its internal structure

DESCRIPTION

Measurements: length of carapace 2.4-2.8, length of abdomen 3.0-3.3, length of eye field 1.1-1.2, anterior and posterior width of eye field 1.4-1.5.

Male unknown.

Female. Carapace light brown, eye field darker, eyes surrounded by black. Whole carapace clothed in dense short whitish hairs, among them brown bristles, dense in vicinity of eyes. Large trangular light patch medially on thorax. Chelicerae brown, labium, maxillae and sternum yellow. Abdomen yellowish with silver patches formed by translucent guanine, laterally brown patches composed of dark hairs. Venter light yellow. Spinnerets pale. Legs yellow. Epigyne large, with notch at posterior edge (Fig. 268). Internal structure as in Fig. 269.

DISTRIBUTION

Known from the type locality only.

Menemerus soldani (SAVIGNY et AUDOUIN, 1825)

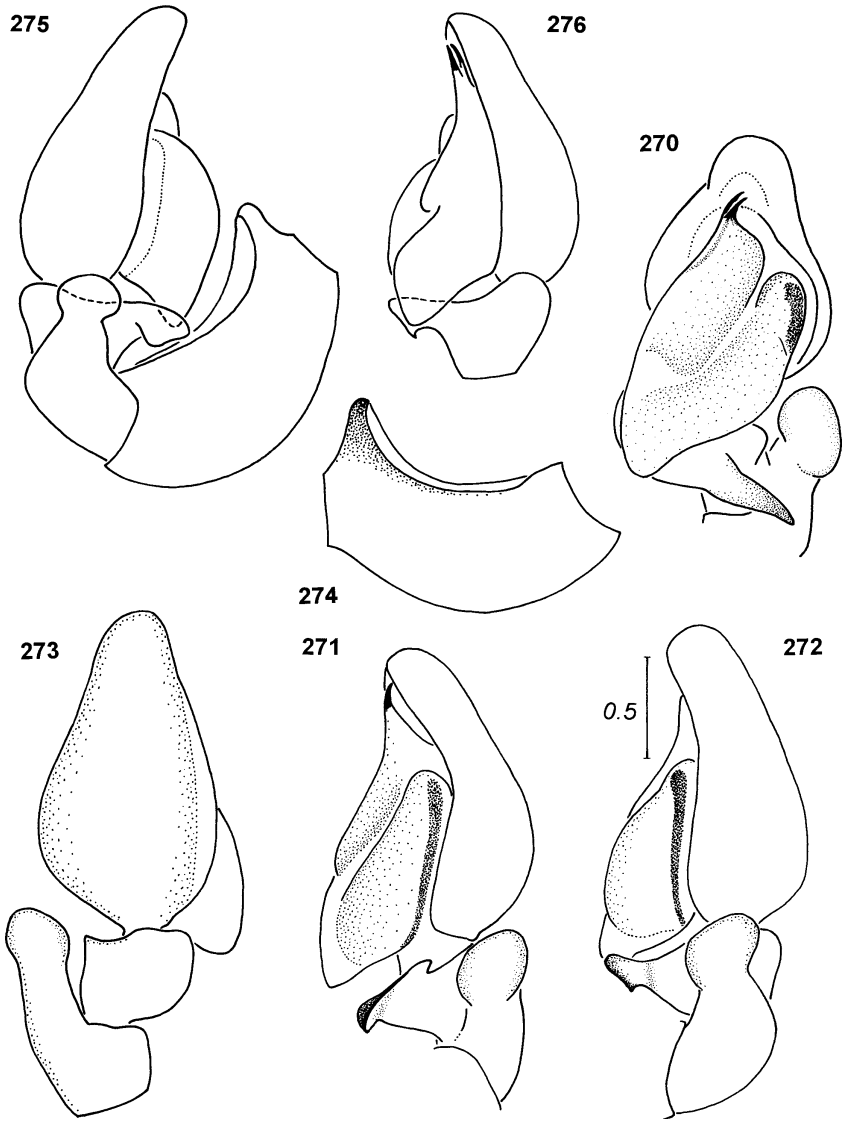
(Figs 270-276)

Attus soldani SAVIGNY & AUDOUIN 1825: 171; O. P.-CAMBRIDGE 1876: 611; SIMON 1901: 603.
Salticus rufolimbatus LUCAS 1846: 176.

MATERIAL (with designation of the neotype)

Neotype M (microscopic slide): **Egypt**: 1930, coll. ROEWER (SMF, 2032) - present designation. **Tunisia**: Nefzana, 1 M, leg. VIBERT (MNHN, 22507 B).

This species was described from Egypt. The type-specimens has been lost. The designation of the neotype is necessary, because the original description is insufficient to identify the species and in museum collections several different species are kept under "*M. soldani*".



270-276. *Menemerus soldani* (SAV. et AUD.), male (275-276 - neotype): 270-273 - palpal organ, ventral, ventrolateral, lateral and dorsal views, 274 - palpal femur, 275-276 - microscopic slides, palpal organ

DIAGNOSIS

This species may be easily distinguished by the big patellar apophysis with a sherical, light tip.

DESCRIPTION

Measurements: length of carapace 2. 3, length of abdomen 2.5, length of eye field 1.1, anterior width of eye field 1.5, posterior width of eye field 1.6.

Male. Carapace brown, eyes surrounded by black. Dense, brown and whitish hairs cover eye field, on thoracic part only brown hairs. Chelicerae, labium and maxillae brownish. Abdomen yellow, laterally clothed in long, dense, fawn hairs. Venter yellow. Spinnerets light. Legs orange with light brown femora, leg hairs and spines brown. Pedipalp brown, with white hairs on femur. Big process at base of palpal femur (Fig. 274). Flat tibial apophysis and very big patellar apophysis with light coloured sperical apex (Figs 270-273).

Female unknown.

DISTRIBUTION

A species distributed in North Africa.

Menemerus taeniatus (L. KOCH, 1867)

(Figs 277-283)

Attus taeniatus L. KOCH 1867b: 875.
Menemerus parietinus SPASSKY 1934:135.
Menemerus taeniatus: SIMON 1937: 1210; DUNIN 1979: 39; 1984: 58; 1989: 38; PRÓSZYŃSKI 1979: 313; in press; FLANCZEWSKA 1981: 212; GALIANO 1984: 6; HANSEN 1986: 109; RAKOV & LOGUNOV 1997: 277.
Menemerus canescens MELLO-LEITAO 1944: 382.

MATERIAL

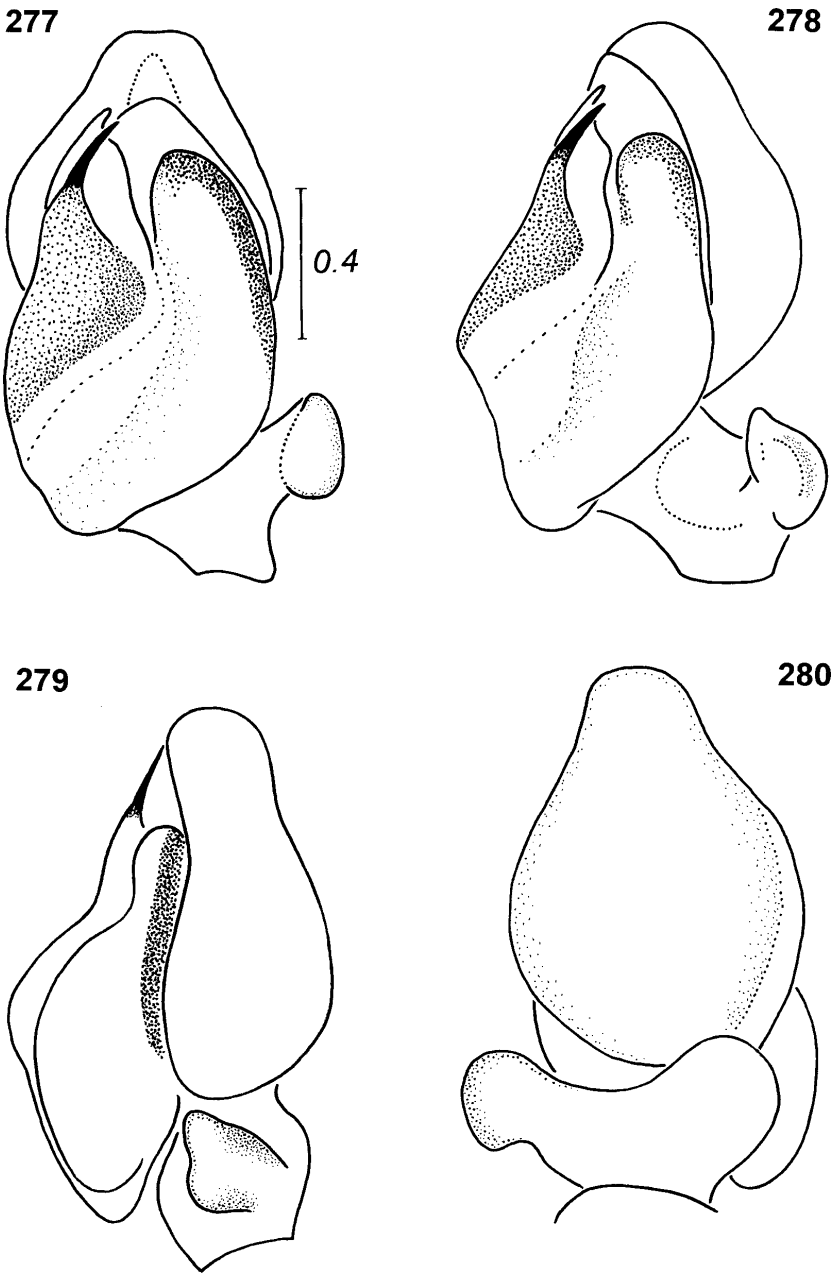
Algeria: Biskra, 2 M, 2 F, 1 juv. (MNHN, 12227); **Djibouti**: Khor Anghar, 1 F (MNHN).

DIAGNOSIS

An easily distinguishable species. The male is recognizable by the single, large, truncated tibial apophysis and single embolus with an accompanying large conductor. The form of the epigyne is characteristic for the female; two indistinct shallow grooves are placed anteriorly, rims of the copulatory openings are heavily sclerotized.

DESCRIPTION

Measurements (male/female): length of carapace 3.1-3.3/3.6-3.8, length of abdomen 3.4-3.6/5.2-5.8, length of eye field 1.2-1.3/1.2-1.3, anterior width of eye field 1.5/1.8-2.1, posterior width of eye field 1.6/1.7-1.9.



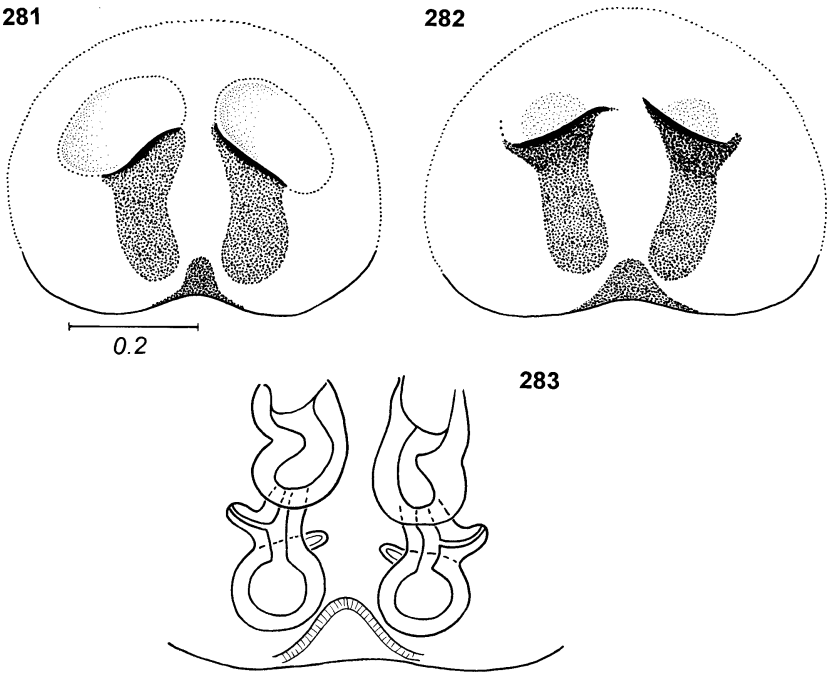
277-280. *Menemerus taeniatus* (L. Koch), male, palpal organ, ventral, ventrolateral, lateral and dorsal views

Male. Rather big spider. Carapace dark brown, ocular area black. Dense brown hairs on carapace, some white hairs medially. Chelicerae, labium, maxillae and sternum dark brown. Abdomen brown, trace of wide lighter stripe along middle. Abdomen clothed in brown hairs, very dense at its anterior margin. Venter dark. Spinnerets brown. Legs brownish, with darker femora. Pedipalp dark. Embolus with large conductor, retrolateral tibial apophysis big (Figs 277-280).

Female. Carapace brown with darker eye field, lighter median streak on thorax. Long brown bristles near eyes, numerous hairs on carapace. Coloration of hairs brown and white. Abdomen very dark, almost black, with very wide light yellow stripe, venter pale. Abdomen clothed in dense hairs, their coloration the same as background. Spinnerets dark. Legs light brown, their hairs and spines brown. Epigyne oval with single pocket (Fig. 281, 282). Vicinity of copulatory openings strongly sclerotized, seminal ducts straight, accessory glands rather short, spermathecae spherical (Fig. 283).

DISTRIBUTION

A Mediterranean species, restricted in the East by the Causasus. Reporded also from Argentina. First time recorded in Africa.



281-283. *Menemerus taeniatus* (L. KOCH), female, epigyne and its internal structure

***Menemerus transvaalicus* sp. n.**

(Figs 284-296)

MATERIAL

Holotype M: **South Africa**: Transvaal, Witwatersrand, Marievale Bird Sanctuary, 26°20´S 28°32´E, 8.XII.1990, leg. D. & B. ROTH (CAS). Paratypes: **South Africa**: 1 M *"M. soldani"*, coll. PECKHAMS, ex coll. Milwaukee Museum (MCZ, 1423); same data, 1 F *"M. soldani"* (MCZ, 4321); "Cape Colony", Queenstown, 1 M, 3 F, 1 juv., 15.V.1899, leg. C. K. BUSHE (BMNH, 1899.7.28.32-36).

DIAGNOSIS

This species is closely related to *M. bifurcus*. The male differs by the structure of the embolus; shape of the lamella and presence of the conductor (cf. Fig. 290 with Fig. 22). The shape of the palpal tibia (as see dorsally) is characteristic too; there is no triangular retrolateral lobe below the dorsal apophysis, which is diagnostic for *M. bifurcus* (cf. Fig. 289 with Fig. 28). The female may be recognized by the sclerotization of the copulatory openings; in *M. bifurcus* this sclerotization is very heavy, while in *M. transvaalicus* only rim of the epigynal depression is bordered by the delicate ridge (cf. Fig. 296 with Fig. 34).

ETYMOLOGY

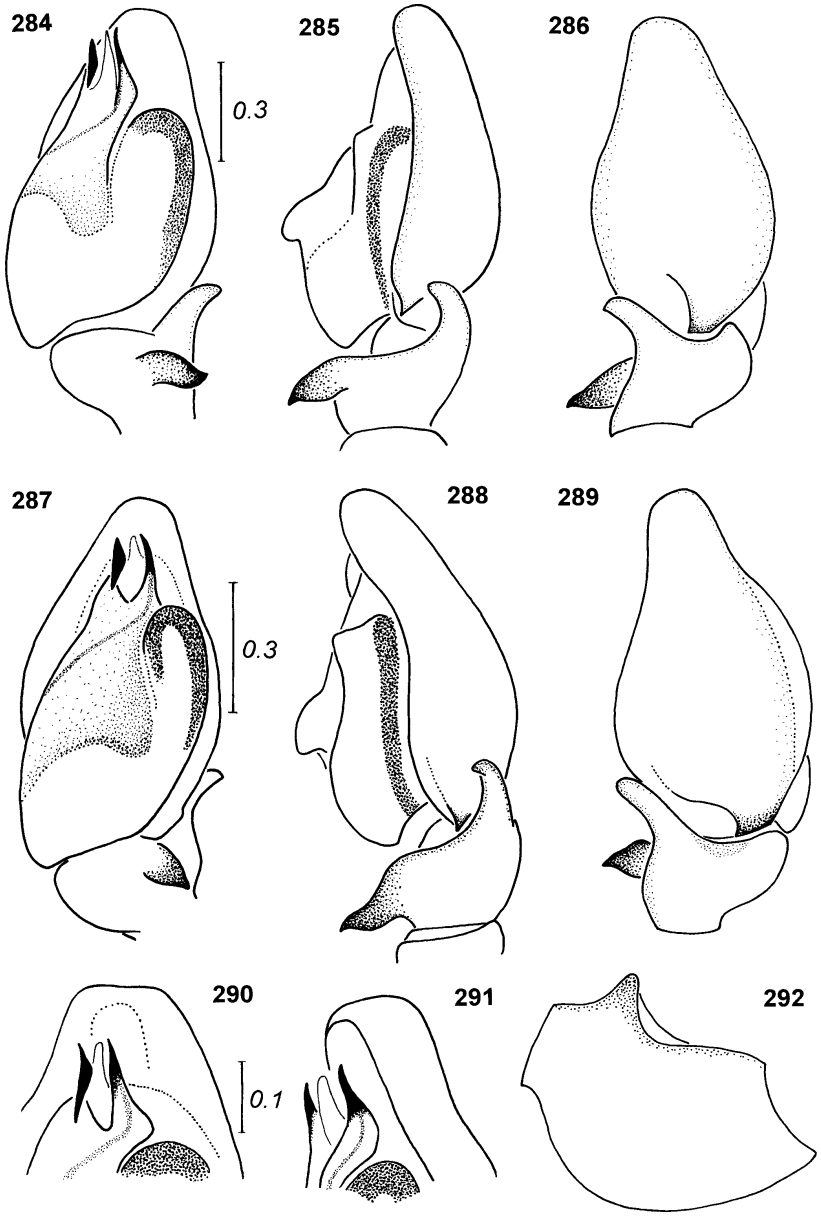
The name of species is derived from Transvaal, the province of its type locality.

Description. Measurements (male/female): length of carapace 2.1-2.4/2.2-2.5, width of carapace 1.5-1.8/1.6-1.9, height of carapace 0.8-0.9/0.8-1.0, length of abdomen 2.0.-2.6/2.5-3.6, width of abdomen 1.6-2.0/1.7-2.0, length of eye field 1.0-1.1/1.1-1.2, anterior width of eye field 1.2.-1.4/1.6-2.1, posterior width of eye field 1.2-1.4/1.2-1.5.

Male. Medium-sized spider. Carapace dark brown, ocular area black. Brown short hairs on carapace, longer bristles near eyes. White hairs form narrow bands along lateral margins of carapace. Clypeus very low, with white hairs. Chelicerae dark brown. Maxillae and labium light brown, sternum brownish-orange. Abdomen fawn to dark brown, with leaf-shaped yellowish pattern, sometimes poorly visible. Numerous yellowish-grey and brown hairs cover abdomen, denser and longer at its anterior edge. Venter light or light with darker wide stripe. Spinnerets light brown. Legs orange to brownish, sometimes with darker rings. Leg hairs and spines brown. First leg with darker femur. Pedipalp brown, white hairs on its femur. Two tibial apophyses, cymbium with dorsal process at its base (Figs 284-289), embolus double with narrow conductor among its branches (Figs 290, 291). Big process on femur (Fig. 292).

Female. Like male, abdominal pattern more contrasted (Fig. 293). On carapace white and brown hairs. Maxillae brown with pale tips. Epigyne with two

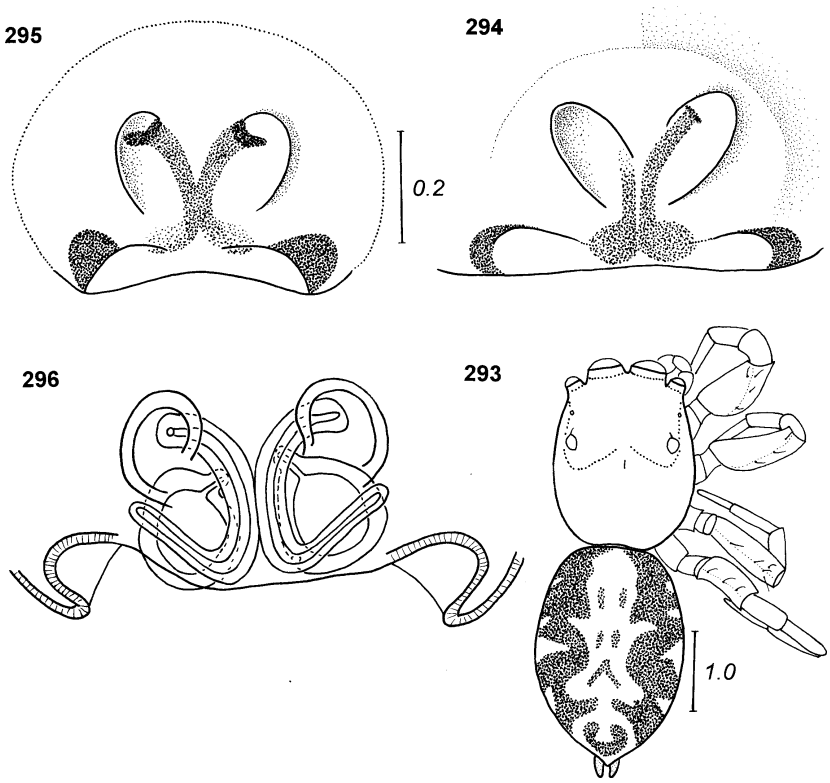
oval depressions centrally and very wide epigynal pocket (Figs 294, 295). Internal structure shown in Fig. 296.



284-292. *Menemerus transvaalicus* sp. n., male (290-291 - holotype): 284-289 - palpal organ, ventral, lateral, dorsal and ventrolateral views, 290-291 - embolus, 292 - palpal femur

DISTRIBUTION

Known from South Africa.



293-296. *Menemerus transvaalicus* sp. n., female: 293 - general appearance, 294-296 - epigyne and its internal structure

Menemerus utilis sp. n.

(Figs 297-299)

MATERIAL

Holotype F: **Tunisia**, Kizida (?), coll. E. SIMON (MNHN, 7048). Paratype: F, together with holotype.

DIAGNOSIS

This species is characterized by the structure of the epigyne. One of few species without an epigynal pocket, with a large and deep central hollow, entries to the copulatory openings from inside, seminal ducts very short, spermathecae placed at the posterior epigynal edge.

ETYMOLOGY

The specific name is derived from Latin word "*utilis*" meaning "useful, beneficial".

DESCRIPTION

Measurements: length of carapace 2.9-3.3, length of abdomen 4.8-6.5, length of eye field 1.2-1.4, anterior and posterior width of eye field 1.5-1.8.

Male unknown.

Female. Medium-sized spider. Carapace brown, eyes surrounded by black. Adpressed light grey hairs cover carapace, among them scarce brown bristles, near eyes bristles denser. Clypeus low, with white hairs. Chelicerae brown, labium and maxillae brown with pale margins, sternum yellow. Abdomen yellowish, laterally covered with brown hairs, medially lighter leaf-shaped pattern. Long brown bristles at anterior abdominal margins. Venter light. Spinnerets yellowish. Legs light brown, with brown hairs and spines. Epigyne large, strongly sclerotized, with median notch at posterior edge. Central depression very large and deep (Fig. 297). Internal structure shown in Figs 298, 299.

DISTRIBUTION

Known from the type locality only.

Menemerus vernei BERLAND et MILLOT, 1941

Menemerus vernei BERLAND & MILLOT 1941: 353.

This species was described from Guinea on the base of a single male. The type-specimen has been lost, but figures in the original description allow to suggest, that this species is closely related to *M. meridionalis* from South Africa (cf. Figs 55 D-G in BERLAND & MILLOT 1941 with Figs 188-191).

Menemerus zimbabwensis sp. n.

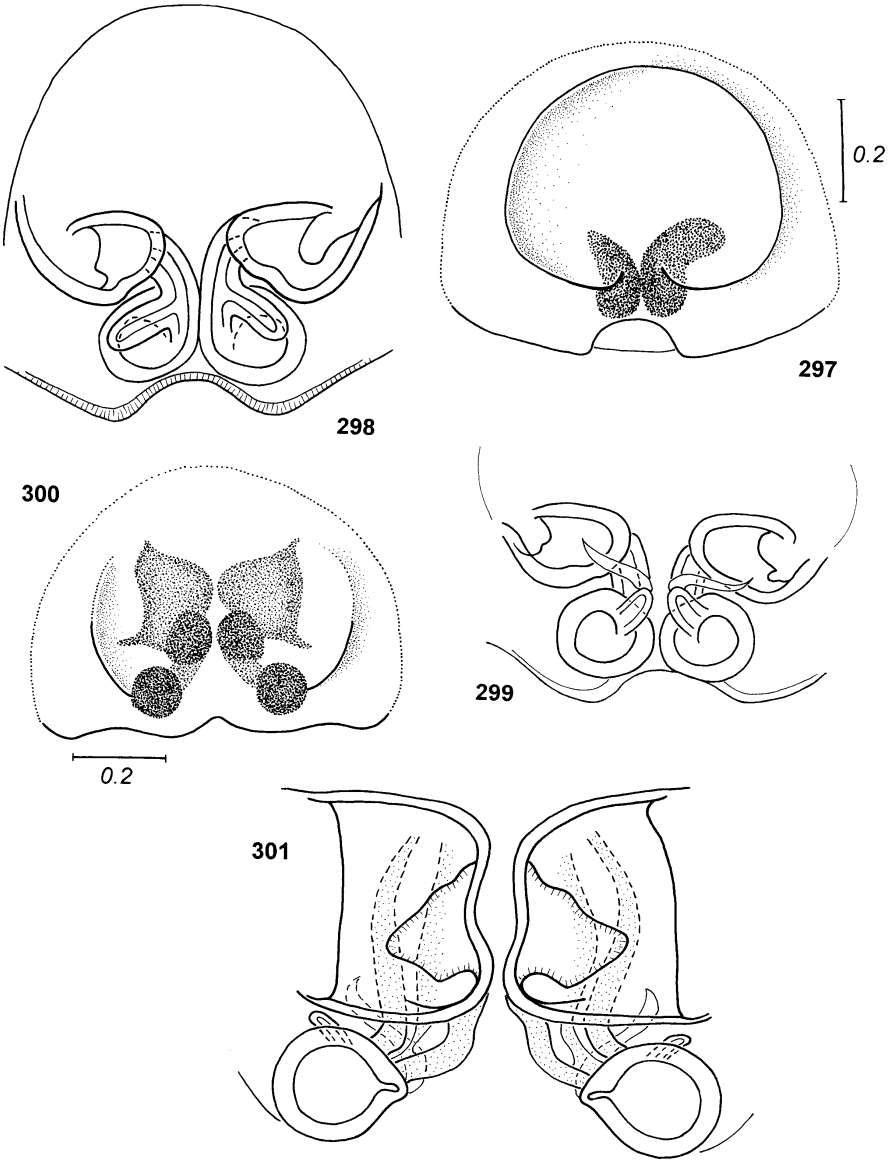
(Figs 300-301)

MATERIAL

Holotype F: **Zimbabwe**: National Parks Camp, 14.IV.1990, [leg.] FALCON (NMZ, A9773).

DIAGNOSIS

This species may be easily distinguished by the strongly sclerotized tremendous entrance bowls. They are several times larger than the spermathecae.



297-299. *Menemerus utilis* sp. n., female: 297 - epigyne, 298-399 - internal structure of epigyne, ventral and dorsal views. 300-301. *Menemerus zimbabwensis* sp. n., female, holotype, epigyne and its internal structure

ETYMOLOGY

The name of the species is derived from Zimbabwe, the country of its type locality.

DESCRIPTION

Measurements: length of carapace 2.7, width of carapace 2.2, height of carapace 1.0, length of abdomen 4.0, width of abdomen 2.6, length of eye field 1.1, anterior and posterior width of eye field 1.5.

Male unknown.

Female. Carapace flattened, dark brown, eye field black. Dense adpressed whitish hairs cover carapace, brown bristles in vicinity of eyes. White belts composed of light hairs along lateral margins of carapace. Clypeus low, clothed in white hars. Chelicerae, labium, maxillae and sternum brown. Abdomen dark brown, covered with very dense white and brown hairs, light hairs concentrated medially and composed lighter longitudinal stripe, lateral abdominal margins yellowish. Venter greyish-yellow. Spinnerets dark. Legs yellowish-orange with brown patches. Leg hairs long, rather light. Epigyne oval with shallow central depression, partially plugged with waxy secretion (Fig. 300). Internal structurese shown in Fig. 301, very strongly sclerotized, oversized entrance bowls.

DISTRIBUTION

Known from the type locality only.

NOMINA DUBIA

Menemerus dubius BERLAND et MILLOT, 1941

Menemerus dubius BERLAND & MILLOT 1941: 348.

This species was described from Guinea on the base of two females. The type-specimens has been lost, the original description is insufficient to identify the species.

Menemerus gesneri (SAVIGNY et AUDOUIN, 1825)

Attus gesneri SAVIGNY & AUDOUIN 1825: 170.

This species was described from Egypt on the base of females. The type-specimens have been lost, the original description is insufficient to identify the species.

Menemerus hottentosus STRAND, 1907

Menemerus hottentosus STRAND 1907a: 547; 1907b: 716.

This species was described from South Africa on the base of a single female. The type-specimen has been destroyed during World War II, species is impossible to identify.

Menemerus hunteri (SAVIGNY et AUDOUIN, 1825)

Attus hunterii SAVIGNY & AUDOUIN 1825: 171.

Description of this species was based on females from Egypt. The type-specimens have been lost, the species is impossible to identify.

Menemerus milloti DENIS, 1966

Menemerus milloti DENIS 1966: 118.

This species was described from Algeria, on a base of the single female. The type-specimen, which was kept in museum in Alger, probably has disappeared; the original description is insufficient to identify the species.

Menemerus niger CAPORIACCO, 1949

Menemerus niger CAPORIACCO 1949: 486.

MATERIAL

Kenya: Nayrobi, 1500 m a.s.l. (1 juv. F, type) 1944, leg. TOSCHI & MENEGHETTI (MCSN, j. 15, v. 141).

The description was based on an immature specimen.

REMARKS ON THE PRESENCE OF STRIDULATORY APPARATUS

Several mechanisms of sound emission are known in spiders (LEGENDRE 1963). A frequent type of stridulatory apparatus in this group consists of a "grater" on chelicerae and of corresponding tubercules with bristles on the ventral surface of the palpal femur (UETZ & STRATTON 1982). Within the *Salticidae*

this type of stridulatory apparatus was described only by PETRUNKEVITCH (1926) for *Stridulattus stridulans* PETRUNKEVITCH, 1926 from the Virgin Islands. Unfortunately this information has never been confirmed, and the type of this species has been lost. However, judging from drawings in PETRUNKEVITCH's paper, one can postulate that the species described by him belongs actually to the genus *Menemerus* SIMON. Lately JASTRZĘBSKI (1997) synonimized *S. stridulans* with *M. bivittatus*.

I have recorded the presence of stridulatory apparatus of the chelicerae - palpal femur type in males of five African species: *M. bivittatus*, *M. brevibulbis*, *M. congoensis*, *M. eburnensis* and *M. fagei*. All species possessing the stridulatory apparatus are relatively large. No such structures have been found in any of smaller species examined. The stridulatory apparatus consists of a numerous long bristles on the palpal femur and of a series of horizontal ridges on the outer side of chelicerae. In majority of specimens stridulatory bristles rub off, only small nodes are visible. These tubercules are situated at base of palpal femur, on its ventral surface (Figs 41, 63, 111). The "grater", composed of a few (about 10–15) ridges, is placed on the outer and partially on the retrolateral surface of chelicerae (Fig. 62). Sound is probably generated, like in other spiders with that type of apparatus, when spider rubs cheliceral ridges up and down against the palpal tooth.

The fact that only males posses such structure suggests that the acoustic communication might be used in courtship displays.

THE STRUCTURE OF THE COPULATORY ORGANS IN *MENEMERUS* - AN OVERVIEW

Within the *Salticidae* the structure of copulatory organs has an enormous diagnostic value and in the taxonomist practice - because of the lack of knowledge of alternative interspecific isolating mechanisms - it is used as a principal criterion. Using the structure of genitalia becomes indispensable within such genera as *Menemerus*, in which narrow variation of morphological characters makes usage of features like body proportions, colour pattern or chaetotaxy deceptive. However, one should not rely too much on the copulatory organs criteria, as the range of variation in the genital structures remains often unknown, and sometimes they show a far-reaching convergence. One should be fully aware that other isolating mechanisms (phenology, habitat, behaviour) can be often more important in nature than the mechanical compatibility of morphological structures. However, in practice we are most often ignorant of everything but the genital morphology. Thus, the reason to use the copulatory organ structure in species identification here is more pragmatic than biological.

In comparison with other spider families, the structure of genitalia in the *Salticidae* is relatively simple. The general structure of pedipalp in *Menemerus* is similar to that of other *Salticidae* but some peculiar features are also noticeable.

Femur is rather massive, slightly bent ventrally, with big protuberance at base of its ventral surface (Figs 85, 94). This protuberance is absent only in few species, which have stridulatory apparatus. In these species it is replaced by stridulatory bristles situated ventrally at femur base (Fig. 63). Palpal femur of similar shape is present in *Yllenus* SIMON, 1868 and in an Australian genus *Grayenulla* ŻABKA, 1992.

Patella is short, only partially sclerotized - mostly on the dorsal surface plus a characteristic sclerotized "tongue" extending on the retrolateral surface (Fig. 51). A similar form of palpal patella is found in two Neotropical genera, *Pachomius* PECKHAM et PECKHAM, 1896 and *Uspachus* GALIANO, 1972.

Only two species have patella with apophysis; it is small in *M. illigeri* (Fig. 149) - and large in *M. soldani* (Fig. 273).

Tibia is very short, narrow at base, it widens apically, in majority of species its prolateral side is strongly swollen (Figs 124, 191). Tibial apophyses vary in size, shape and number (one to three). In some cases the dorsal apophysis forms a large plate, it can be divided into lobes (Fig. 200).

Cymbium is typical for the *Salticidae*, in majority of species with narrow angle along prolateral margins, in some cases with basal protuberance (longest in *M. fagei* - Fig. 124).

Bulbus is oval, rather large, its basal lobe conceals apical part of tibia ventrally. This fact and curvature of femur makes examination of tibial apophyses difficult and it is often necessary to remove the tarsal segment to see them in detail. Bulbus in *Menemerus* is unique - the distinct, long and rather wide tegular furrow marks off distal haematodocha (Fig. 4). Such a sharply outlined separation of the distal haematodocha is rather unusual in the *Salticidae* [but not unique; it is present e.g. in *Leptorchestes* THORELL, 1870 and *Rudra* (PECKHAM et PECKHAM, 1885)]. However, the structure of the distal haematodocha is unique for the genus *Menemerus*. Its membranous inflatable part is hidden inside the furrow, while whole haematodocha is covered by a large sclerite. The sclerite possesses a characteristic tegular protuberance on its posterior edge (Fig. 4).

Embolus is stiletto-like, short or very short. In some species it is a single structure (e.g. in *M. animatus* - Fig. 7*, M. illigeri* - Fig. 148), but in most the embolic part of pedipalp is more complicated. Often the embolus possesses an accompanying conductor (sensu WIJESINGHE 1992) - a white, membranous, thin plate - sometimes poorly visible. Most often it is narrow (*M. bivittatus* - Fig. 37, *M. congoensis* - Fig. 64), sometimes it can be very large, considerably wider than embolus (*M. fagei* - Fig. 125*, M. taeniatus* - Fig. 277). In other *Salticidae* such structure is only rarely recorded (e.g. all species of *Yllenus* SIMON, 1868, *Holcolaetis* SIMON, 1885, some members of *Plexippus* C. L. KOCH, 1846). Frequently the embolus is composed of two branches (e.g. *M. guttatus* - Fig. 143*, M. bifurcus* - Fig. 22*, M. lesnei* - Fig. 162). Because the ejaculatory duct opens in its retrolateral ramus, it is the true embolus (COMSTOCK 1910). The second, prolateral branch should be regarded as distal lamella (sensu GALIANO 1992). The distal lamella in *Menemerus* is heavily sclerotized, at least apically. The presence of similar

additional outgrowths alongside of the embolus was recorded also in other salticid genera (e.g. *Habronattus* F. P.-CAMBRIDGE, 1901, some members of *Cyrba* SIMON, 1876). However it seems extremaly doubtful that these sclerites are homologous - the problem cannot be solved without detailed morphological studies. In rare cases distinction between the conductor and the distal lamella in *Menemerus* may be difficult (*M. natalis* - Fig. 218*, M. pulcher* - Fig. 240). The structures present in these species could be interpreted either as a conductor with sclerotized keel, or being a result of fusion of conductor and lamella. Only one species - *M. transvaalicus* - has both distal lamella and conductor (Fig. 290). Simultaneous presence of two structures acompanying embolus is rather unusual in the *Salticidae*, but not completely unknown (e.g. in some *Cocalodes* POCOCK, 1897, but in this case these are conductor and median apophysis, the latter not being an embolic division element - see MERRETT 1963).

The embolic structures in *Menemerus* are insufficiently known and require further studies. Especially worthwhile in elucidating homology of the palpal sclerites would be examination of expanded palps.

Epigynal structure is less characteristic for the genus than the palpal one. The general plan of female genitalia in *Menemerus* is simple. Epigyne is a very large, generally strongly sclerotized plate. In majority of species epigynal pocket is clearly noticeable, it is often very wide. Considerable part of epigyne is occupied by a depression, which may be shallow (*M. insolidus* - Fig. 160) or deep (*M. lesserti* - Fig.173). Sometimes two depressions (e.g. *M. minshullae* - Fig. 195*, M. semilimbatus* - Fig. 266), or only shallow grooves (*M. taeniatus* - Fig. 281) are present.

Location of copulatory openings is variable, usually one opening is far from another. The most characteristic feature of female genitalia, but rather uncommon in other genera, are strongly sclerotized entrance bowls (Fig. 5). Similar cavities but less sclerotized are also present in *Uspachus* GALIANO, 1992 and in some *Icius* SIMON, 1876. Sclerotization and especially the size of the entrance bowls vary widely, but usually they are prominent. They are developed to the extreme degree in *M. zimbabwensis*, in which the entrance bowls are larger than seminal ducts and spermathecae together (Fig. 301).

Seminal ducts in majority of species are rather short and simple (e.g. *M. utilis* - Fig. 298*, M. bivittatus* - Fig. 47). Only exceptionally seminal ducts are longer and more complicated (*M. rubicundus* - Fig. 255).

All species have accessory glands. The length of glandular ducts varies; they can be longer (in *M. davidi* - Fig. 88*, M. lesserti* - Fig. 175) or shorter (*M. eburnensis* - Fig. 118). Accessory glands fall into seminal ducts, sometimes very close to spermathecae.

Spermathecae are usually spherical (*M. lesserti* - Fig. 176*, M. mirabilis* - Fig. 209), sometimes pear-shaped (*M. regius* - Fig. 251).

All internal parts of epigyne are normally heavily sclerotized, thick-walled.

RELATIONSHIPS

Indication of genera closely related to *Menemerus* is quite difficult. Assuming the structure of male copulatory organs as a criterion, the genus seems related to *Yllenus* SIMON, 1868, particularly to species from the *albocinctus* group (PRÓSZYŃSKI 1968). Both genera have similar general plan of male palp structure, they share: solid connection of tarsal segment with tibia, identical shape of palpal femur, as well as its curvature and presence of process at base, short tibia and membranous conductor. The structure of female genitalia in *Menemerus* and *Yllenus* is different.

There are some similarities in the structure of genitalia with a Neotropical genus *Uspachus* GALIANO, 1992. General structure and proportion of the male palp are alike and sclerotization of palpal patella is almost analogical. In *Uspachus* there also occurs a distal membranous lamella (probably homologous with lamella in *Menemerus*), situated prolaterally from embolus. A charactaristic feature of the female genitalia in *Uspachus* is the presence of great entrance bowls, resembling the ones found in *Menemerus* (see GALIANO 1992). Also short seminal ducts, spherical spermathece, and strong sclerotization of whole structures are similar.

In the previous classifications of the family *Salticidae* the genus *Menemerus* was placed in the *Marpissinae* (SIMON 1901-1903, PETRUNKEVITCH 1928) or in the *Aelurillinae* (PRÓSZYŃSKI 1976). The system proposed by SIMON and only slightly modified by PETRUNKEVITCH is based on cheliceral dentition and general body proportions. There is no proof, however, that these criteria are phylogenetically valid. Though the classification of PRÓSZYŃSKI is based on features of genital structures, yet his decison to place *Menemerus* in the *Aelurillinae*, well-delimited subfamily consisting of several, clearly closely related genera (see LOGUNOV 1996a, b, LOGUNOV & HĘCIAK 1996) seems erroneous. Unfortunately construction of natural, based on phylogenetical criteria, system for this family remains still an open question.

However it is impossible now to decide whether observed similarities reflect the real relationships or should only be regarded as the result of convergence.

I postpone attempts to make a phylogenetical reconstruction of the relationships within *Menemerus* as I feel that in situation when:

- for numerous species only one sex is known (25 of 43 species recorded in Africa),
- knowledge of the species geographical distribution is very cursory (18 African species are known only from the type locality),
- natural history and behaviour remain practically unexplored,

it would be clearly premature.

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REFERENCES

BACELAR, A., 1929. Notas Aracnologicas II. Bull. Soc. Port. Sci. Nat., Lisbonne **10** (21): 245-262.

BADCOCK, H. D., 1932. Reports of an expedition to Paraguay and Brazil in 1926-1927. *Arachnida* from the Paraguay Chaco. Journ. Linn. Soc., London **38**: 1-48.

BARNES, R. D., 1958. North American jumping spiders of the subfamily *Marpissinae*. Am. Mus. Novit., New York **1867**: 1-50.

BERLAND, L., 1936. Mission de M. A. CHEVALIER aux iles du Cap Vert. Rev. franc. Ent., Paris **3**: 67-88.

BERLAND, L., MILLOT, J., 1941. Les Araignées de l´Afrique occidentale francaise. I. Les Salticides. Mém. Mus. Hist. nat., Paris **12**: 297-424.

BLACKWALL, J., 1869. A list of spider captured by Wright in the prov. Lucca. Journ. Linn. Soc., London **10**: 303-434.

BOHDANOWICZ, A., PRÓSZYŃSKI, J., 1987. Systemaiic studies on East Palaearctic *Salticidae* (*Araneae*), IV. *Salticidae* of Japan. Ann. zool., Warszawa **41** (2): 43-151.

BRYANT, E. B., 1942. Notes on the spiders of the Virgin Islands. Bull. Mus. Comp. Zool. Harvard, Cambridge **89**: 317-366.

CAMBRIDGE, F. P-., 1901. *Arachnida. Araneida.* Biol. Centr. Amer. Aran. **2**: 193-312.

CAMBRIDGE, O. P-., 1869. Notes on some spiders and scorpions from St. Helene. Proc. Zool. Soc., London **1869**: 531-544.

-. 1872. General list of spiders of Palestine and Syria. Proc. Zool. Soc., London **1872**: 212-354.

-. 1876. Catalogue of a collection of a spiders made in Egypt, with descriptions of new species and characters of a new genus. Proc. Zool. Soc., London **1876**: 541-630.

CAPORIACCO, L., di. 1934. Aracnidi. In: Missione zoologie del Festa in Cirenaica. Boll. Mus. Zool. Univ. Torino (3) **44** (47): 1-28.

-. 1949. Aracnidi della colonia del Kenya raccolti da Toschi e Meneghetti. Commen. pontif. Acad. Scient., Citta del Vaticano **13**: 309-492.

COMSTOCK, J. H., 1910. The palpi of male spiders. Annls Entom. Soc. Am., College Park **3**: 161-185.

CRANE, J., 1950. Biology of Salticid spiders at Rancho Grande, Venezuela II. Zool. Sci. Contrib. N. York Zool. Soc. **35** (4): 253-261.

CHRYSANTUS, P., 1968. Spiders from South New Guinea. X. Tijdschr. Ent. , Amsterdam **111**: 49-74.

DENIS, J., 1947. Results of the Armstrong college expedition to Siwa Oasis (Libyan Desert), 1935. Bull. Soc. Fouad I-er d'Entom., Caire **31**: 17-104.

-. 1955. Contribution a l'etude Air. Araignées. Bull. Inst. fr. Afr. noire, Dakar 17 (A): **99**-146.

-. 1966. Les Araignées du Fezzan. Bull. Soc. Hist. nat. Afr. noire, Dakar **55**:103-144.

DOLESCHALL, C. L., 1859. Tweade Bijdragetot de Kennis del Arachniden van den Indischen Archipel. Act. Soc. Sci. Ind.-Neerl., Batavia **5**: 1-60.

DUFOUR, L., 1831. Description et figuration de quelques Arachnides nouvelles ou mal connus. Ann. Sci. Nat. Zool., Paris **22**: 355-371.

DUNIN, P. M., 1979. [Materials on the spider fauna (*Salticidae*) of Azerbaijan]. Utchonye zapiski Azerbaijanskogo Universiteta (biologya), Baku **1**: 35-40. [in Russian].

-. 1984. [Fauna and ecology of spiders (*Aranei*) of the Apsheron Peninsula (Azerbaijanskaya SSR)]. In: UTOTCHKIN A. S. (ed.), Fauna i ekologiya paukoobraznykh, Perm, pp. 46-60. [in Russian].

-. 1989. [Fauna and altitudinal distribution of spiders (*Arachnida, Aranei*) of the Azerbaijan part of south sloping of the Caucasus Major] In: LANGE A. B. (ed.). Fauna i ekologiya paukov i scorpionov, Moskwa, Nauka, pp. 31-39. [in Russian].

FLANCZEWSKA, E., 1981. Remarks on *Salticidae* (*Aranei*) of Bulgaria. Ann. zool., Warszawa **36**: 186-228.

GALIANO, M. E. 1965. Algunas especies de *Salticidae* (*Araneae*) nuevas para la Argentina. Physis, Buenos Aires **25** (69): 129-133.

-. 1978. Nuevos sinonimos en la familia *Salticidae (Araneae)*. Rev. Soc. Ent. Argentina, Buenos Aires **37** (1-4): 33-34.

-. 1984. Las especies de *Menemerus* Simon, 1868 (*Araneae, Salticidae*) en la Argentina. Physis, C., Buenos Aires **42** (102): 6.

-. 1992. Description de *Uspachus*, nuevo genero (*Araneae, Salticidae*). Physis, C., Buenos Aires **50** (118-119): 121-142.

HAHN, C. W., 1827. Monographie der Spinnen. 5. Heft. Nürnberg.

HANSEN, H., 1986. Die Salticidaen der Kollektion CANESTRINI (*Arachnida: Araneae*). Soc. Veneziana Sci. Nat. **11**: 97-120.

JACKSON, R., 1986. Communal jumping spiders (*Araneae: Salticidae*) from Kenya: interspecific nest complexes, cohabitation with web-building spiders, and intraspecific interactions. New Zealand Jour. Zool.**13**: 13-26.

JASTRZĘBSKI, P., 1997. *Salticidae* from the Himalayas. Genus *Menemerus* Simon, 1868 (*Araneae: Salticidae*). Entom. basil., Basel **20**: 33-44.

KARSCH, F., 1879. Westafrikanische Arachniden, gessamelt von Herrn Dr Falkenstein. Zeits. gesam. Naturw., Berlin - Halle **52**: 329-373.

KOCH, C. L., 1846. Die Arachniden. 13 Band. Nürnberg, 234 pp.

-. 1848. Die Arachniden. 14 Band. Nürnberg, 210 pp.

KOCH, L., 1867a. Beschreibungen neuer Arachniden und Myriapoden. Verh. Zool. Bot. Ges., Wien **17**: 173-250.

-. 1867b. Zur Arachniden und Myriapoden-Fauna Sued-Europas. Verh. Zool. Bot. Ges., Wien **17**: 857-900.

-. 1879. Die Arachniden Australines, Nürnberg **1**(2): 1045-1156.

KULCZYŃSKI ,W., 1910. *Araneae* et *Arachnoidea Arthrogastra*. Denkschr. Ak. Wiss., Wien **85**: 389-411.

LAWRENCE, R. F., 1928a. Contributions to a knowledge of the *fauna* of South-West Africa. V. *Arachnid*a. Ann. S. Afr. Mus., Cape Town **25**: 1-75.

-. 1928b. Contributions to a knowledge of the fauna of South-West Africa. VII. *Arachnida*. Ann. S. Afr. Mus., Cape Town **25**: 217-312.

LEGENDRE, R., 1963. L'audition et l'emission de sons chez les Aranéides. Ann. Biol. anim. Biochem. Biophys., Jouy-en-Josas **2**: 371-390.

LESSERT, R. 1927., Araignées du Congo. I. Rev. Suisse Zool., Geneve **34**: 405-475.

-. 1936. Araignées de l'Afrique orientale portugaise recueillies par MM. P. LESNE et H.-B. COTT. Rev. Suisse Zool., Geneve **43**: 207-306.

-. 1942. A. Contribution to the Araneid Fauna of Natal and Zuzuland. Ann. Natal Mus., Pietermaritzburg **10** (2): 141-190.

LOGUNOV, D. V., 1996a. A review of the genus, *Phlegra* Simon, 1876 in the fauna of Russia and adjacent countries (*Araneae: Salticidae: Aelurillinae*). Genus, Wrocław **7** (3): 533-567.

-. 1996b. *Salticidae* of Middle Asia. 3. A new genus *Proszynskina* gen. n., in the subfamily *Aelurillinae* (*Araneae, Salticidae*). Bull. Br. arachnol. Soc., Dorset **19** (5): 171-177.

LOGUNOV, D. V., HĘCIAK, S., 1996. *Asianellus*, a new genus of the subfamily *Aelurillinae* (*Araneae: Salticidae*). Ent. scand., Copenhagen **27** (1): 103-117.
LUCAS, H., 1838. Arachnides. Hist. Nat. Canar., Paris **2** (2): 19-52.
-. 1846. Histoire Naturelle des Animaux articules. In: Exploration scientifique de l'Algerie pendant les annes 1840-42. Paris. Zoologie, Araneides: t. IV, pp 89-271.
MARX, G., 1889. A contibution to the knowledge of the spider fauna of the Bermuda Islands. Proc. Ac. Nat. Sci. Philad. **1889**: 98-101.
MERRETT, P. 1963. The palpus of male spiders of the familly *Linyphiidae*. Proc. zool. Soc. Lond. **140**: 347-467.
MELLO-LEITAO, C. F., 1944. Aranas de la provincia de Buenos Aires. Rev. Mus. La Plata (NS, Zool.) **3** (24): 311-393.
NAKATSUDI, K. 1943. Some *Arachnida* from Micronesia. J. agric. Sci., Tokyo **2**: 181-194.
PECKHAM, G. W., PECKHAM, E. G., 1883. Descriptions of new or little known spiders of the family *Attidae* from the various parts of the United states of North America. Milwauke, 35 pp.
-. 1886. On the genera of the family *Attidae*. Proc. Ac. Sci. Wiscons., Madison **4**: 255-342.
-. 1888. *Attidae* of North America. Trans. Wisc. Acad. Sci. Arts Let., Madison **7**: 1-104.
-. 1903. New species of the familly *Attidae* from South Africa. Trans. Wiscons. Acad. Sci. Arts Let., Madison **14**: 173-278.
-. 1909. Revision of the *Attidae* of North America. Trans. Wisc. Acad. Sci. Arts Let., Madison, **16** (1): 355-646.
PETRUNKEVITCH, A., 1925. *Arachnida* from Panama. Trans. Connect. Ac. Arts Sci., New Haven **27**: 51-248.
-. 1926. Spiders from the Virgin Islands. Trans. Connect. Ac. Arts Sci., New Haven **28**: 21-78.
-. 1928. Systema Araneorum. Trans. Connect. Acad. Arts Sci., New Haven **29**: 1-270.
-. 1930. The spiders of Portorico. III. Trans. Connect. Ac. Sci., New Haven **31**: 1-191.
PRÓSZYŃSKI, J., 1968. Systematic revision of the genus *Yllenus* SIMON, 1869 (*Araneida, Salticiade*). Ann. zool., Warszawa **26** (19): 409-494.
-. 1976. Studium systematyczno-zoogeograficzne nad rodziną *Salticidae* (*Aranei*) Regionów Palearktycznego i Nearktycznego. WSP, Siedlce, 260 pp.
-. 1979. Systematic studies on East Palaearctic *Salticidae* III. Remarks on *Salticidae* of the USSR. Ann. zool., Warszawa **34** (11): 299-369.
-. 1984. Atlas rysunków diagnostycznych mniej znanych *Salticidae* (*Araneae*). Zesz. nauk. WSRP, Siedlce, 2, 177 pp.
-. 1989. *Salticidae* (*Araneae*) of Saudi Arabia. Fauna of Saudi Arabia **10**: 31-64.
-. 1993. *Salticidae* (*Araneae*) of Saudi Arabia II. Fauna of Saudi Arabia **13**: 27-54.
-. in press. *Salticidae* of Levant. Fauna Palestina. Israel Academy of Sciences and Arts, Jerusalem.
RAKOV, S. Yu., LOGUNOV, D. V., 1997. Taxonomic notes on the genus *Menemerus* SIMON, 1868 in the fauna of Middle Asia (*Araneae, Salticidae*). Proc. 16th Europ. Coll. Arachnol. Siedlce, WSRP, 271-279.
ROEWER, C. F., 1954. Katalog der *Araneae* von 1758 bis 1940. tome 2b. Bruxelles, 927-1751.
[SAVIGNY J. C.], AUIDOUIN, V., 1825. Explication sommaire des planches d'Arachnides de l'Egypte et de la Syrie, publiees par J. C. SAVIGNY, membre de l'Institut; offrant un expose des caracteres naturels des geners avec la distinctiondes especes in "Description de l'Egypte". Histoire Naturelle. vol. 1, part 4: 99-186.
SIMON, E., 1868. Monographie des especes européennes de la famille des Attides (*Attidae* SUNDEWALL - *Saltigradae* LATREILLE). Ann. Soc. ent. Fr., Paris **8**: 11-72, 529-726.
-. 1876. Les Arachnides de France. 3. Paris, 360 pp.
-. 1877. Etudes arachnologiques. 5e Memoire. IX. Arachnides recueillis aux Iles Philippines. Ann. Soc. Ent. Fr., Paris (5) **7**: 53-96.
-. 1882. Etude sur les Arachnides de l'Yemen méridional. Ann. Mus. civ. Stor. nat., Genova **18**: 207-260.
-. 1885. Matériaux pour servir a la faune des Arachnides du Sénégal. Ann. Soc. Ent. Fr., Paris (6) **5**: 345-396.
-. 1901-1903. Histoire naturelle des Araignées. Paris **2**: 381-1080.

-. 1906. Ergebnisse der mot Subvention aus deer Erbschaft Treitl unternommenen zoologischen Forschungsreise Dr F. WERNER's nach dem agyptischen Sudan und Nord-Uganda VII. *Araneida*. Sitz-.ber. Ak. Wiss. Wien **115** (I): 1159-176.

-. 1937. Les Arachnides de France. Paris 6 (5): 979-1298.

SCHENKEL, E., 1963. Ostasiatische Spinnen aus dem Muséum d'Histoire Naturelle de Paris. Mém. Mus. Hist. nat., Paris **25**: 289-481.

SCHMIDT, G., 1976. Zur Spinnenfauna von Fuerteventura und Lobos. Zool. Beitr. (N. F.), Berlin **22** (2): 315-335.

SPASSKY, S. A., 1934. Aranearum species novae III. Rev. fr. Ent., Paris **1**: 135-139.

STRAND, E., 1907a. Zwei neue Spinnen aus dem Würtemberg Hölen. Zool. Anz., Leipzig **31** (17-18): 570-576.

-. 1907b. Africanische Spinnen hauptsächlich aus dem Kaplande. Zool. Jahrb. Syst., Jena **25** (5-6): 557-731.

-. 1909. Nordafrikanische, hauptsächlich von Erlanger gesammelter Oxyopiden und Salticiden. Societ. Entom., Stuttgart **23**: 155-1556, 173-175, 180-181, 187-188.

TACZANOWSKI, L., 1871. Les Araneides de la Guyane francaise. Horae Soc. Ent. Ross., S. Peterburg **8**: 32-132.

-. 1878. Les Araneides du Peru. Famille des Attides. Bull. Soc. Imp. Nat., Moscou **53**: 278-374.

THORELL, T., 1878. Studi sui ragni Malesi e Papuanii. II. Ann. Mus. civ. Stor. nat., Genova **13**: 5-317.

-. 1887. Vaggio di L. Fea in Birmania e regioni vicine II. Primo saggio siu Ragni birmani. Ann. Mus. civ. Stor. nat., Genova **2**, 5: 5-417.

-. 1892. Studi sui Ragni Malesi e Papuani. Part IV. Ann. Mus. civ. Stor. nat., Genova **31**: 1-490.

UETZ, G. W., STRATTON, G. E., 1982. Acoustic communication and reproductive isolation in spiders. In: Spider communication. Mechanisms and ecological significance (ed. P. N. WITTS & J. S. ROVNER), pp. 123-159. Princeton, New Jersey, Princeton Univ. Press.

VINSON, A., 1863. Arachnides des Iles de la Réunion, Maurice et Madagascar. Paris, 337 pp.

WALCKENAER, C. A., de. 1837. Histoire naturelle des Insectes Apteres, Paris, **1**: 682 pp.

-. 1841. Histoire naturelle des Insectes Apteres, Paris, 2: 548 pp.

WANLESS, F. R., 1983. *Araneae-Salticidae*. Contributions a l'etude de la faune terrestre des iles granitiques de l'archipel des Sechelles. Ann. Mus. roy. Afr. centr., Tervuren, ser. 8, **241**: 1-84.

WESOŁOWSKA, W., 1981. Redescriptions of the E. Schenkel's East Asiatic *Salticidae* (*Aranei*). Ann. zool., Warszawa **36**: 127-160.

-. 1989. Notes on the *Salticidae* (*Aranei*) of the Cape Verde Islands. Ann. Mus. civ. St. nat., Genova **87**: 265-273.

WESOŁOWSKA, W., HARTEN, A., van. 1994. The jumping spiders of Yemen. Yemeni-German Plant Protection Project, Sana'a, Horizonts Printing & Publishing, 86 pp.

WESOŁOWSKA, W., RUSSELL-SMITH, A., in press. Jumping spiders from Mkomazi Game Reserve in Tanzania (*Araneae: Salticidae*). Tropical Zoology.

WIJESINGHE, D. P., 1992. A new genus of jumping spiders from Borneo with notes on the *Spartaeinae* palp (*Araneae: Salticidae*). Raffles Bull. Zool. **40** (1): 9-19.

WUNDERLICH, J., 1995. Die Spinnen der Kanarischen Inseln und Madeiras. Jörg Wunderlich Verlag, Straubenhardt, 435 pp.

ŻABKA, M., 1985. Systematic and zoogeographic study on the family *Salticidae* (*Araneae*) from Viet-Nam. Ann. zool., Warszawa **39**: 197-485.