A GENERIC REVISION OF THE SPIDER FAMILY ZODARIIDAE (ARANEAE)

R. JOCQUÉ

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A GENERIC REVISION OF THE SPIDER FAMILY ZODARIIDAE (ARANEAE)

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ABSTRACT

The family Zodariidae is revised at the generic level. All available type specimens of species were examined. The family history is reviewed, morphology is described, and polarity of the character variations is established. The phylogeny for the genera is derived from a cladistic analysis using HENNIG86. A list of all generic names used in Zodariidae and a key to the genera are provided.

Zodariidae is diagnosed by the absence of a serrula, the presence of lateral teeth on the tarsal claws, long anterior spinnerets, and the burrowing habit. Six subfamilies are recognized: Cyriocteinae, new subfamily, Lachesaninae, new subfamily, Cydrelinae Simon, Storenomorphinae Simon, Storeninae Simon and Zodariinae Simon. The family contains 47 genera, 13 of which are new: *Antillorena* (type *Storena pollii* Simon), *Aschema* (type *A. pallida,* new species), *Asteron* (type *A. reticulatum,* new species), *Forsterella* (type *Forsterella faceta,* new species), *Madrela* (type *M. madrela,* new species), *Nostera* (type *N. lynx,* new species), *Platnickia* (type *Drassus elegans* Nicolet), *Psammoduon* (type *Caesetius deserticola* Simon), *Psammorygma* (type *P. caligata,* new species), *Ranops* (type *R. caprivi,* new species), *Storamia* (type *Storena meadii* O. P.-Cambridge), *Storosa* (type *S. obscura,* new species), and *Suffasia* (type *Suffucia tigrina* Simon).

Thirteen new generic synonymies are established: *Suffucia* Simon and *Doosia* Kishida with *Asceua* Thorell; *Hyltoniella* Mello-Leitão and *Valcheta* Mello-Leitão with *Cybaeodamus* Mello-Leitão; *Langbiana* Hogg with *Mallinella* Strand; *Tijucaia* Mello-Leitão and *Naibena* Chamberlin with *Tenedos* O. P.-Cambridge; *Patiscana* Strand with *Cicynethus* Simon; *Cydrelichus* Pocock and *Trysoclitus* Simon with *Caesetius* Simon; *Systenoplacis* Simon with *Capheris* Simon; *Zodariellum* Andreeva and Tyschenko with *Acanthinozodium* Denis; *Hermippella* Lessert with *Palfuria* Simon.

The following genera were removed from the Zodariidae and transferred to the family in brackets: *Arushina* Caporiacco (Clubionidae), *Hoplolathys* Caporiacco (Dictynidae), *Mevianops* Mello-Leitão (Agelenidae), *Tymbira* Mello-Leitão (Amaurobiidae), and *Zodariops* Mello-Leitão (Gnaphosidae). The status of *Cryptothele* L. Koch is uncertain. *Nanahua* Badcock and *Tristichops* Taczanowski remain incertae sedis.

INTRODUCTION

Zodariidae is a medium-size, widely distributed family, represented mainly in tropical and subtropical areas. It has long been poorly known and poorly defined. The last revision dates from Simon's "Histoire naturelle des Araignées" (1893b). Mello-Leitão (1940) attempted to produce a key to genera that apparently has hardly been used.

Since then, relatively few revisional studies have been made in the family (*Lutica* [Gertsch, 1961], *Mallinella* [Bosmans and Van Hove, 1986a, 1986b; van Hove and Bosmans, 1984] and *Cyrioctea* [Platnick, 1986; Platnick and Griffin, 1988]) and the few other comments (Machado, 1945; Lehtinen, 1967; Brignoli, 1982) witness how desperately obsolete the systematics of the family have become.

The confusion in zodariid systematics probably came about by the poor definition of the family and the lack of usable descriptions and drawings for most taxa, as well as the former practice of describing new genera on very sparse material. Of the ±70 generic names still in use when the study started, more than 20 proved to designate genera belonging in other families (see list below). Of the remaining 46 nominate genera, 16 turned out to be junior synonyms of earlier described genera. These conclusions could only be made after examination of the type specimens of the type species. This, however, has proved to be highly problematic because out of 46, 9 types have been lost or are untraceable, 17 genera were described on juveniles only, 18 were described on only one sex, and one type is deposited in a private collection, but unavailable (another argument to discourage deposition of types in personal collections). This means that of the 46 genera to be investigated, only 1 was entirely unproblematic, although that taxon (*Cybaeodamus*) was originally described in the Agelenidae!

The lack of types has created some remarkable problems; the case of *Storena* is exemplary. Walckenaer apparently did not designate types. His description (1805) of the first zodariid ever studied depicts a peculiar juvenile spider from Australia, peculiar because of the leg formula 1234 (for details see

under *Storena,* below). It would not have caused many problems were it not for O. P.-Cambridge (1869: 52), who "recognized at once" Walckenaer's genus in a few new species he attributed to *Storena.* Since then, many taxa have been added to that genus, apparently blindly, as its putative representatives are now included in 15 different genera, 8 of which are new!

In this context I started my studies on the Zodariidae. The original aim was to revise the African representatives of the family, but it soon became clear that a global generic revision would be necessary to allow generic identifications. However, some genera (*Hermippus, Leprolochus*) proved easy to define and were revised before this generic revision was completed. A number of new genera had to be described (Jocqué, 1987a) to allow the decription of different types of the femoral organ found in the Zodariinae (Jocqué and Billen, 1987).

HISTORY

The history of the family begins with the description of the enigmatic genus *Storena.* This genus is the only member of Walckenaer's (1805) group XXIII, which is in fact the first delimitation of the family. However, in later papers by this author, several zodariid genera were placed quite far away from each other in the system: *Zodarion* can be found near *Uroctea* in *Clotho* as well as near the Erigoninae in *Argus*; *Lachesana* (as *Lachesis*) was placed near *Agelena*; and *Storena* near the Lycosidae. A quite complex nomenclatural mixture arose with the names *Clotho, Enyo,* and *Zodarion,* which we now know are synonyms. All three were used (by Walckenaer, 1837; Gervais, 1840; Lucas, 1840) to designate the family Zodariidae (Clothéiens, Enydes, Zodarions) although the first mentioned taxon also included *Uroctea, Oecobius,* and some Prodidomidae. The family was part of Simon's (1864) group Clothéiens which included the already mentioned non-Zodariidae.

Thorell (1869) delimited the family for the first time in a way that approximates the present limits, but based his definition on *Zodarion* only. As a character he used the long tarsi of these spiders, which is evidently insufficient to place them. Simon (1870) provided a new definition of the family, this time based on several genera (*Zodarion, Lachesana, Selamia*) and later (Simon, 1873) discussed its position in relation to other spiders. These papers also mentioned for the first time two real zodariid characters: long anterior spinnerets and short cheliceral fangs. Simon (1874) published the first key to genera. It included *Ceto,* which is now placed in the Corinnidae. The main importance of this paper was to unite the Australian *Storena* and *Habronestes* and the African *Cydrela* with the Palaearctic *Zodarion, Lachesis, Palaestina,* and *Selamia,* which goes further than O. P.-Cambridge (1870), who united *Storena, Lachesana,* and *Cydrela.*

The name Zodarioidae, later changed to Zodariidae, was used for the first time by Thorell (1881). The milestone in the development in our knowledge of the Zodariidae is doubtlessly Simon's (1893b) "Histoire naturelle des Araignées." It provided a complete description of morphology including the placement of teeth on the tarsal claws, which, for that time, was a remarkable observation. The work also gave a thorough taxonomic analysis of the family, recognizing five subfamilies including the Homalonychinae, now considered a separate family and the Cryptothelinae, the taxonomic status of which is uncertain. Of the other subfamilies, the Storenomorphinae, the Cydrelinae, and the Zodariinae still exist although the latter has undergone an important change in limits. Since then, many new genera and species have been created. It is clear, from the high number of synonymies and the number of new combinations needed in the present work, that the genera were poorly defined and the classification of Simon is difficult to use. The situation in the Cydrelinae is exemplary. Many genera were created as the classification was based on eye position. In this family, however, that character is usually irrelevant on the generic level. This explains why most species have been misplaced even though there are excellent generic characters other than the eye position.

After Simon (1893b), no new general studies of the family were produced except for the key of Mello-Leitão (1940), which divided the family into seven subfamilies. How-

ever, his classification is less accurate than the divisions proposed by Simon (1893b). Mello-Leitão included the Huttoniinae and the Cithaeroninae which have proven to be remote taxa. The removal of these and other genera (*Cryptothele, Homalonychus*) is about the only change that has been made to the taxonomy of the Zodariidae since Simon's (1893b). Some generic revisions have been published (Denis, 1937; and others, see above) but these have hardly added to the general knowledge of the family.

Some authors (Lehtinen, 1967; Brignoli, 1982) have argued that the family is not homogeneous and should be split. However, Davies (1985) found an important autapomorphy for the group i.e., the absence of a serrula. This character, together with that of the lateral teeth on the tarsal claws (Jocqué, 1986b), now defines the family unequivocally (except *Cyrioctea*), and shows that animals with such different habitus as *Neostorena* and *Palfuria* belong to the group.

MATERIALS AND METHODS

Format

As this is a generic revision it might have been sufficient to provide descriptions of the type species of each genus. However, as indicated above, in many cases the types are either lost or in poor condition. Very often the species is represented by only one sex or by no adults at all. I therefore decided to give a description of both sexes, and, if necessary, describe some additional species, often new, in order to provide some idea of the variation within a genus. For a few small genera, e.g., *Palaestina* and *Palfuria,* all known information was gathered, and the data can be considered a full revision of the genus.

The descriptions of the subfamilies are short because the limits of some are not entirely clear, and some alterations can be expected in the future. On the other hand, the descriptions of genera are extensive.

All measurements are in millimeters except those used for eye size and position, which are expressed as a fraction of the diameter of the anterior lateral eyes (see Abbreviations) in order to allow relative comparison with the eyes in other taxa.

Drawings of the carapace (in some cases also of the abdomen) are shown in dorsal, lateral, and frontal views. In some cases one of these views is omitted (e.g., in *Cydrela unguiculata,* the type of which is pinned!). The epigynes were not consequently presented in drawings or photographs. The spermathecae were sometimes so large and sclerotized that it was impossible to get enough light through to photograph them. In those cases, a drawing of the dorsal side is given, in a few cases only of the ventral side, after clearing in methyl salicylate.

Male palps are drawn in lateral and ventral view. Unless otherwise stated, the right palp is shown.

Abbreviations

Spination

d	dorsal
dw	distal whorl, see under *w*
disp.	dispersed, not in obvious rows
f	a "fan" of spines, only found in *Psammoduon*
pl	prolateral
rl	retrolateral
spul	spinules
v	ventral
w	whorls, meaning a number of spines which stay in a whorl on a particular segment of the legs, though not always exactly on the section. It is often difficult to tell whether these spines are dorsal, ventral, or lateral.
*	spines in a row
**	spines in two rows
o	setae which are not as rigid as spines and not as supple as hairs

Eyes and their position

a	always = 1.00; diameter of AME, taken as base for the calculation of the distances b–i; the absolute diameter (in mm) of the AME is given between brackets.
b,c,d	diameter of ALE, PME, and PLE expressed as a fraction of a.
e	AME-AME; f: AME-ALE; g: PME-PME; h: PME-PLE; i: PLE-ALE, all expressed as fraction of a.
AER	anterior eye row
ALE	anterior lateral eyes
AME	anterior median eyes
AOQ	anterior ocular quadrangle
MOQ	median ocular quadrangle
PER	posterior eye row
PLE	posterior lateral eyes
PME	posterior median eyes

Other abbreviations

AW	anterior width
AS	anterior, median, and posterior spinnerets
cd	copulatory duct
descr.	description
F	femur
fd	fertilization duct
Ht	holotype
imm.	immature
juv.	juvenile
L	length
Lt	lectotype
MS	median spinnerets
Mt	metatarsus
Nt	neotype
P	patella
PS	posterior spinnerets
Pt	paratype
PW	posterior width
sa	subadult
t	tarsus
T	tibia
TA	tegular apophysis
W	width

Institutions

AM	Australian Museum, Sydney (M. R. Gray)
AMA	Auckland Museum Institute, Auckland (K. A. J. Wise)
AMNH	American Museum of Natural History, New York (N. Platnick)
BMNH	British Museum (Natural History), London (P. Hillyard)
CAS	California Academy of Sciences (W. Pulawski and D. Ubick)
DBUJ	Department of Biosciences, University, Jeddah (A. Faragalla)
EDA	Entomology Division, D.S.I.R., Auckland (J. F. Longworth)
HMNH	Hungarian Museum of Natural History, Budapest (S. Mahunka)
KBIN	Koninklijk Belgish Instituut voor Natuurwetenschappen, Brussels (L. Baert)
MACN	Museo Argentino de Ciencias Naturales, Buenos Aires (E. Maury)
MC	personal collection of J. and F. Murphy, London
MCSG	Museo Civico di Storia Naturale, Genoa (G. Arbocco, G. Doria)
MCSV	Museo Civico di Storia Naturale, Verona (G. Osella)
MCZ	Museum of Comparative Zoology, Cambridge (H. Levi)
MHNB	Musée d'Histoire Naturelle de Bâle (C. Stocker)

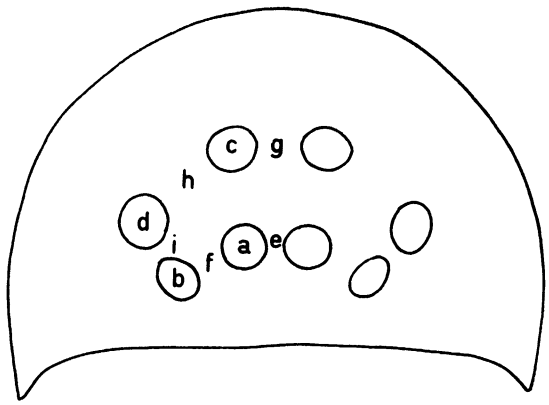

Fig. 1. Frontal view of eyes with codes for measurements in function of a = 1.00.

MHNG	Musée d'Histoire Naturelle, Genève (B. Hauser)
MLP	Museo La Plata (F. Arrozpide)
MNHN	Muséum National d'Histoire Naturelle, Paris (J. Heurtault, C. Rollard; M. Emerit for the collections temporarily deposited at the University of Montpellier)
MNRJ	Museu Nacional, Rio de Janeiro
MRAC	Musée Royal de l'Afrique Centrale, Tervuren (R. Jocqué)
NHRB	Natural History Research Center Bagdad (H. A. Ali)
NHRS	Naturhistoriska Riksmusset, Stockholm (T. Kronestedt)
NHMW	Naturhistorisches Museum, Wien (J. Gruber)
NM	Natal Museum, Pietermaritzburg (P. Croeser)
NMBA	National Museum, Bloemfontein, Arachnida (L. Lotz)
NMW	National Museum, Wellington (R. Palma)
NMZ	National Museum, Zimbabwe, Bulawayo (J. Minshull)
NCP	National Collection of Arachnida, Pretoria (A. Dippenaar)
OMD	Otago Museum, Dunedin (R. Forster)
QM	Queensland Museum, Brisbane (R. Raven)
RMNH	Rijksmuseum voor Natuurlijke Historie, Leiden (P. Van Helsdingen)
SAM	South African Museum, Cape Town (V. Whitehead and H. Robertson)
SAMA	South Australian Museum, Adelaide (D. Hirst)
SMF	Senckenberg Museum, Frankfurt (M. Grasshoff)
SMWN	State Museum, Windhoek, Namibia (E. Griffin)

TM	Transvaal Museum, Pretoria (W. Haacke)
UMO	University Museum, Hope Entomological Collections, Oxford (J. Lansbury)
USNM	United States National Museum, Smithsonian Institution, Washington (J. Coddington)
UWA	University of Western Australia, Nedlands (B. Y. Main)
VM	Victoria Museum, Melbourne (M. Harvey)
ZSMC	Zoologische Sammlung des Bayerischen Staates, Munchen (B. Baehr)
ZMB	Zoologisches Museum, Berlin (M. Morris)
ZMH	Zoologische Museum, Hamburg (G. Rack)

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LIST OF GENERIC NAMES USED IN THE ZODARIIDAE

(Boldfaced names are valid genera, italicized names are synonyms in the Zodariidae, others do not belong in the family.)

Acanthinozodium Denis (1952)

Akyttara Jocqué (1987)

Antillorena, new genus

Arushina Caporiacco (1947); type species *A. dentichelis* Caporiacco (1947: 102) (Ht in HNHM, examined); described in the Dictynidae; Lehtinen (1967: 216) transferred the genus to the Zodariidae without examination of the types, and supposed it to be synonymous with *Hermippus*; belongs in the Clubionidae s.l., genus unknown.

Asceua Thorell (1887)

Aschema, new genus

Asteron, new genus

Argus Walckenaer (1842); preoccupied; synonym of *Zodarion*.

Caesetius Simon (1893b)

Capheris Simon (1893b)

Ceto Simon (1874), type species *Drassus laticeps* Canestrini, now placed in the Corinnidae; mentioned under Enyoidae by Simon (1874).

Chariobas Simon (1893b)

Cicynethus Simon (1910)

Cithaeron O. P.-Cambridge (1872); belongs in the Cithaeronidae (Caporiacco, 1938).

Clotho Walckenaer (1837); preoccupied; synonym of *Zodarion*.

Cryptothele L. Koch (1872); taxonomic status uncertain but considered a family on its own. However, since they lack a serrula and have a typical litter-inhabiting behavior, they may be primitive Zodariidae, branching off near the root just as *Cyrioctea*.

Cybaeodamus Mello-Leitão (1938)

Cydippe O. P.-Cambridge (1870) (preoccupied); synonym of *Cydrela.*
Cydrela Thorell (1873)
Cydrelichus Pocock (1900), synonym of *Caesetius.*
Cyrioctea Simon (1889)
Diores Simon (1893b)
Dolophones Walckenaer (1837); belongs in Araneidae; mentioned under Enyoidae in Koch (1872).
Doosia Kishida (1940); synonym of *Asceua.*
Dusmadiores Jocqué (1987)
Enyo Savigny and Audouin (1825); preoccupied, synonym of *Zodarion.*
Eterosonycha Butler (1932); type species *E. alpina* Butler; belongs in Micropholcommatidae (Davies, 1985; Platnick, 1989).
Forsterella, new genus
Glieschiella Mello-Leitão (1932); type species *G. halophila* Mello-Leitão; belongs in the Lycosidae (Dondale, 1986).
Habronestes C. L. Koch (1872)
Heradida Simon (1893)
Hermippella Lessert (1936); transferred from the Palpimanidae; synonym of *Palfuria.*
Hermippoides Gravely (1921); synonym of *Hermippus* (Jocqué, 1986b).
Hermippus Simon (1893b)
Hetaerica Rainbow (1916); status uncertain because only known from juveniles.
Homalonychus Marx (1891); type species *H. selenopoides* Marx (1891); belongs in the Homalonychidae (Simon, 1893b).
Hoplolathys Caporiacco (1947); type species *H. aethiopica* Caporiacco, 1947: 101; (Ht in HMNH, examined); described in the Dictynidae; according to Lehtinen (1967: 239) it should be transferred to the Zodariidae and regarded a synonym of *Trygetus*; examination has proved that the taxon belongs in the Dictynidae where it was described.
Huttonia O. P.-Cambridge (1879); type species: *H. palpimanoides* O. P.-Cambridge (1879); specimens examined; non-Zodariidae.
Hyltoniella Mello-Leitão (1940); type species *H. birabeni* Mello-Leitão 1940; synonym of *Cybaeodamus.*
Ishania Chamberlin (1925)
Laches Thorell (1869) (preoccupied); synonym of *Lachesana* Strand.
Lachesis Savigny and Audouin (1825) (preoccupied); synonym of *Lachesana* Strand.
Laestrygones Urquhart (1893); type *L. proxima* (Urquhart); transferred to the "Zodariides" by Lehtinen (1967: 265) but placed in the Toxopidae, now considered a subfamily of the Desidae, by Forster (1964); specimens examined; does not belong in the Zodariidae.
Langbiana Hogg (1922); synonym of *Mallinella.*
Leprolochus Simon (1892b)
Lestes Gistel (1848); nomen novum for *Lachesis*; preoccupied; synonym of *Lachesana.*
Lucia C. L. Koch (1837); preoccupied; synonym of *Zodarion.*
Lutica Marx (1891)
Macedoniola Strand (1932); nomen novum for *Platycephala* (see Davies 1985).
Madrela, new genus
Mallinella Strand (1906)
Mallinus Simon (1893b); status uncertain because only known from juveniles.
Mastidiores Jocqué (1987)
Metargus F. O. P.-Cambridge (1902); nomen novum for *Argus*; preoccupied; synonym of *Zodarion.*
Mevianops Mello-Leitão (1941); type species *M. fragilis* Mello-Leitão (1941) (Ht in MNRJ, examined); this taxon was originally described in the Agelenidae, although considered as exceptional and possibly belonging to the Zodariidae by Roth (1967); it was erroneously transferred to the Zodariidae by Lehtinen (1967) as a likely synonym of *Cybaeodamus.* As these spiders have a serrula and typical agelenid-like spinnerets and cheliceral fangs they should be retained in the Agelenidae.
Microdiores Jocqué (1987)
Moenkhausiana Petrunkevitch 1910; type species *M. brasiliensis* Petrunkevitch; belongs in Lycosidae (Dondale, 1986).
Naibena Chamberlin (1925); synonym of *Tenedos.*
Nanahua Badcock (1932); type species *N. carteri* Badcock (Ht in BMNH, examined); type a juvenile ♀ with only one complete leg left; possibly a senior synonym of *Cybaeodamus* but regarded incertae sedis for the sake of stability.
Neostorena Rainbow (1914)
Nicodamus Simon (1887b); type species *N. bicolor* L. Koch; originally described in the Theridiidae; transferred to the Zodariidae by Levi and Levi (1962) and transfer approved by Lehtinen (1967); placed in the Nicodamidae by Forster (1970).
Nostera, new genus
Palaestina O. P.-Cambridge (1872)
Palfuria Simon (1910)
Patiscana Strand (1934), nomen novum for *Patiscus.*
Patiscus Simon (1893b); synonym of *Cicynethus.*
Perissopmeros Butler (1932); synonym of *Sternodes*; belongs in the Malkaridae (Moran, 1986; Platnick and Forster, 1987).
Platnickia, new genus
Platycephala Butler (1932); preoccupied; synonym of *Macedoniola.*
Psammoduon, new genus
Psammorygma, new genus

Ranops, new genus
Selamia Simon (1870)
Storamia, new genus
Storena, Walckenaer 1805
Sternodes Butler (1929); type species *S. foraminatus* Butler (1929); belongs in the Malkaridae (Moran, 1986; Platnick and Forster, 1987).
Storenomorpha Simon (1884b)
Storenosoma Hogg (1900); type species *S. lycosoides* (Hogg) 1900 (Ht in BMNH; examined); belongs in the Amaurobiidae (Davies, 1985).
Storosa, new genus
Suffasia, new genus
Suffucia Simon (1893b); synonym of *Asceua.*
Systenoplacis Simon (1907); synonym of *Capheris.*
Tenedos O. P.-Cambridge (1897)
Thaumastochilus Simon (1897)
Tijuca Mello-Leitão (1925); synonym of *Tenedos.*
Tristichops Taczanowski (1874); type species *T. caerulescens* Taczanowski; incertae sedis; whereabouts of types unknown; probably synonymous with *Cydrela.*
Trygetus Simon (1882)
Tryssoclitus Simon (1910); synonym of *Caesetius.*
Tymbira Mello-Leitão (1944); type species *T. brunnea* Mello-Leitão 1944 (Ht in MLP, examined); belongs in the Amaurobiidae.
Valcheta Mello-Leitão (1940); synonym of *Cybaeodamus.*
Zodariellum Andreeva and Tychchenko (1968); probable synonym of *Acanthinozodium*; Ht in personal collection of Andreeva, not available.
Zodarion Walckenaer (1825)
Zodariops Mello-Leitão (1939); type species *Z. juninianus* Mello-Leitão (1939) (Ht in MHNB; examined); belongs in the Gnaphosidae.
Zodarium auctores; misspelling of *Zodarion.*

INCERTAE SEDIS

Most of the problems with lost or juvenile type specimens are solved, either by the creation of a neotype on the basis of the original description, or by interpretation of the characters of the juvenile. However, a few uncertainties remain. *Nanahua* Badcock (1932) is a South American spider based on a single juvenile female kept in the BMNH (examined). The specimen is in bad shape and only has one complete leg left (leg I) which is insufficient to diagnose it. The abdominal pattern strongly resembles that of *Cybaeodamus ornatus* Mello-Leitão. As the type locality (Chaco, Paraguay) falls within the range of that species, *Nanahua* could well be a senior synonym of *Cybaeodamus.* However, considering the state of the type specimen and the fact that it is an immature, it is impossible to synonymize these genera with certainty. I think it is in the interest of stability to consider *Nanahua* as incertae sedis.

The second problem is *Tristichops* Taczanowski: this genus is considered congeneric with *Cydrela,* of which it is a possible senior synonym. However, the types of *T. coerulescens* Taczanowski (1873) cannot be found. Strangely enough, the species is described from Guyana whereas the entire subfamily, the Cydrelinae, to which it apparently belongs is restricted to the Palaeotropics. This genus is also considered incertae sedis.

Further, there are two genera described from juveniles only: *Hetaerica* Rainbow (1916) from Australia and *Mallinus* Simon (1893) from Africa. The former cannot be defined unambiguously on the basis of the type specimen and is also considered incertae sedis although it is obvious to what subfamily it belongs. The latter is defined on the basis of the abdominal shape but may prove to be paraphyletic if more material becomes available.

MORPHOLOGY

COLORATION

Relatively little is known about colors in spiders (Holl, 1987). However, a particular pigment seems to be typical for the zodariids, i.e., a dark bluish-brown tinge which I have called "sepia." It may be restricted to the Zodariidae as I have not found it to occur elsewhere in spiders.

CARAPACE

The carapace of the Zodariidae is quite variable in shape. In general it is oval, narrowed in front, usually more strongly so in males than in females.

The more primitive members of the family tend to have well-developed cephalic grooves and the cephalic part is clearly raised above

the thoracic part of the carapace. This character appears to be linked with the faculty of digging in hard substrata. This is rather surprising as zodariids which live on, and dig in, soft substrata, such as forest litter, tend to have domed carapaces on which the cervical grooves are absent or very superficial. One would expect that the stronger muscles needed to dig into harder substrata are lodged in a higher carapace but this line of thinking is apparently fallacious.

In the Zodariinae, some genera have developed flat carapaces which must be regarded as a further development. The most remarkable shape is found in *Palfuria,* in which the high cephalic lobe slants backward and overhangs the thoracic part, at least in adult specimens.

The fovea is usually well developed and deep. In a few genera of the Zodariinae it is very poorly developed or absent (*Akyttara, Palaestina, Trygetus*).

The texture of the carapace integument varies from entirely smooth to densely granulated. Hair cover may be completely absent or the carapace may be covered entirely with hairs, which may stand in rows on circular supports (*Cicynethus*).

In *Dusmadiores* and *Mastidiores* males have numerous tiny perforations (see Jocqué and Billen, 1987; Jocqué, 1988a).

Eyes

The unmodified eye arrangement, with AER slightly procurved and PER almost straight, occurs in the primitive members of the family. A common modification is the procurved PER. In most Australian and some other zodariids the PER is procurved such that the PLE are situated next to the AME, whereas the ALE are slightly further forward just in front of the PLE. In the Cydrelinae the AER is so strongly procurved that it appears as two rows of two eyes each. In a number of genera of that subfamily, this is combined with a strongly recurved PER. In principle, the eyes are rounded although there is a tendency in the Zodariinae for the smaller eyes to become oval. The AME are usually dark, but in the Storenomorphinae they are pale. This may be linked with the lifestyle of this subfamily which appears to be different from that of the other families.

Eye size is very variable and even within one genus there may be much variation (e.g., *Heradida*). In the Zodariinae there is a tendency for the AME to become larger and for the PME to become smaller. In *Trygetus* the PME have disappeared altogether.

Chilum

The chilum may be called a forgotten sclerite, which is situated between the clypeus and the chelicerae. It was only mentioned once by Simon (1893b: 15) who called it "une étroite bande transverse indurée" and compared it with the epistomum of the Opiliones. Simon considered it as homologous to the epimeral sclerites.

Since then the sclerite has not been mentioned again although it occurs in a great number of spiders and may be seen with the naked eye in some larger species (e.g., *Cupiennius* spp.). Sometimes it is difficult to see as it may be folded back under the clypeus. Some traction must then be exerted on the chelicerae to make it visible.

The name chilum (from the Greek *cheilos*: lip) was chosen because the sclerite can be considered an upper lip so far as its position is concerned. Indeed the real upper lip, the labrum, is situated ventrally of the chelicerae, whereto it migrates during embryogenesis (Seitz, 1966).

What the chilum is the homolog of is not clear. It may well be that it is linked to the chelicerae as the epimeral sclerites are linked to the legs as suggested by Simon (1893b).

In the Zodariidae, the chilum is well developed in a number of taxa (Jocqué, 1986b: fig. 1B; Bosmans and Van Hove, 1986a), or only slightly so in some other taxa (Platnick, 1986). In the more primitive genera, it is not strongly sclerotized and poorly delimited, usually broad and low, and provided with a number of hairs. In more derived genera it becomes higher, double, and with a few hairs or hairless, whereas a single, high, strongly sclerotized and hairless chilum is considered the most derived state. In the Zodariinae the chilum is lost, except in *Suffasia* where it is single and high.

Chelicerae

The chelicerae of the Zodariidae are usually strong and with a well-developed lateral

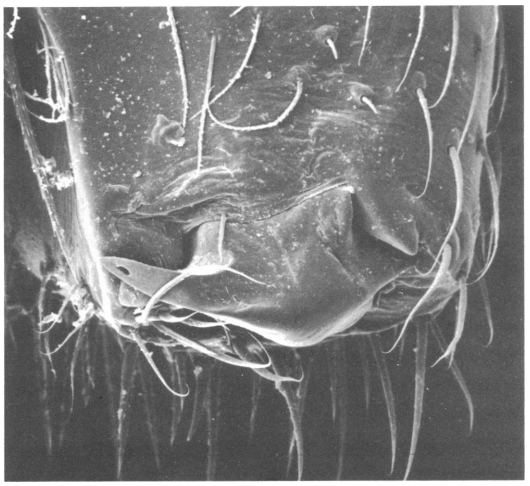


Fig. 2. *Zodarion* sp.: chelicera with toothed cusp; ventral view.

condyle. The presence of marginal teeth appears to be plesiomorphic. *Cyrioctea* has pro- and retromarginal teeth. In all other Zodariidae the teeth are restricted to the promargin or absent. In some Zodariinae there is a distal cusp with a toothlike excrescence and curved setae (fig. 2). See also note under the diagnosis of *Zodarion.*

The chelicerae of some Zodariidae are fused (see Wunderlich, 1980: 117). On the back, about one-third from the base there is a strong sclerotization uniting the chelicerae. This is the case in all Zodariinae except in *Suffasia.* This character is probably linked with the compulsory ant-eating behavior.

In the same subfamily there is a tendency for the dorsal base of the chelicerae to be separated by a membranous intercheliceral triangle. This is linked with a less narrowed carapace.

A remarkable tendency is the shortening of the fang, which is still quite normal in *Cyrioctea* but tends to become thick in more derived genera (a fang is called short if the thin part is shorter than the thick part). It reaches its most derived state in the Zodariinae, where the fang is thicker at the base than its length.

In *Hermippus* the males of some species have a knob in the middle of the fang. In *Psammorygma* there is a similar, but smaller, excrescence at the base of the fang in both sexes. The most spectacular modification is found in *Lachesana,* in which the males have a recurved fang.

The chelicerae may be densely haired as in *Cyrioctea* and many other genera, or almost devoid of hair as in the derived state. In the last case a mediodorsal group of hairs remains. This, however, does not give the impression of a densely haired appendage.

Endites

The endites are strongly converging. They have an anteromesal scopula. In some groups there is a basolateral extension which makes the implantation plane of the palp transverse. Otherwise, as in the plesiomorphic state of *Cyrioctea,* the plane of implantation makes an angle with the body axis.

Sternum

An oval sternum is plesiomorphic: it occurs in *Cyrioctea* and the Lachesinae and in a few more derived genera such as *Selamia, Aschema* and some species of *Neostorena.* The sternum is considered oval when the anterior width is clearly less than the maximum width.

In quite a number of genera, the sternum has triangular extensions (fig. 120). These correspond with slight concavities in the coxae. Sometimes there are intercoxal extensions in addition.

In the Cydrelinae there are precoxal sclerites (figs. 280, 306), which are small, independent, and situated between the sternum and the coxae. Their number may vary from one to four pairs. In *Capheris* they are particularly well developed. In the same genus the anterior margin of the sternum is incurved to accommodate the endites and labium (fig. 280).

In a few genera the sternum may be rebordered. This is very obvious in *Heradida* and *Akyttara.* It also occurs in the males of a few species of *Neostorena.*

Legs

The basic leg formula is 4123 or 4132. (Both these formulas are common and may occur in members of the same genus. Therefore no difference is made between them in the cladistic analysis, where they are regarded as a single state of the leg formula character; this

also applies for other pairs of leg formulas mentioned below.) The formula is often modified to 4321 or 4312 in taxonomically distant taxa that live in dry sandy areas (*Ranops, Leprolochus, Lachesana*). In the Storenomorphinae the first legs have become the longest (1423 or 1432), a development that culminates in *Thaumastochilus* (1243), the only zodariid genus for which both anterior leg pairs are longer than the posterior ones.

The spination of the legs is usually strongly developed. In connection with the digging behavior, the posterior legs have more numerous and stronger spines than both anterior pairs. In several genera, though, the number of spines is reduced. This occurs in taxa that live on soft substrata such as leaf litter (*Asceua*), or have changed the habit of burrowing and instead construct an igloo-shaped retreat (Zodariinae, fig. 3). In a few genera the anterior legs have stronger spines than the posterior legs. This is linked with an elongate habitus and is supposed to be an adaptation to living in burrows in wood or hard substrata above ground level (*Chariobas, Thaumastochilus*).

Few zodariids have scopulae. However, in many genera there is what I have called a **spiniform scopula** (figs. 4, 5). Instead of a dense matting of short hairs there are numerous short spines on the ventral side of the tarsus.

In many genera the extremity of the metatarsi is swollen and provided with a ventral tuft of hairs that might be regarded as a metatarsal scopula. The structure of these hairs is very typical (figs. 6–8) and may be described as hollow chisels with a sharp point. The character is typical for the Storeninae. Metatarsal hair tufts also occur in some Cydrelinae, but in these taxa the hairs are not chisel-shaped but cylindrical with rows of short excrescences. For the cladistic analysis the presence of chisel-shaped hairs was considered apomorphic; other metatarsal tufts were not taken into consideration. In *Platnickia* the metatarsal tuft is hardly developed but there are chisel-shaped hairs.

In addition to spines, the legs may be provided with spinules, flattened incised hairs, and hinged hairs. **Spinules** are very short spines which may easily be distinguished from real spines (figs. 9, 10). They are typical for *Diores*. **Flattened incised hairs** (figs. 11, 12)

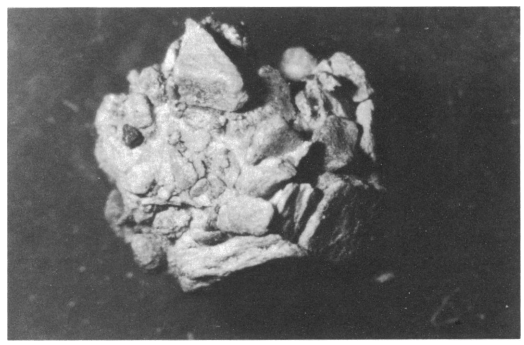
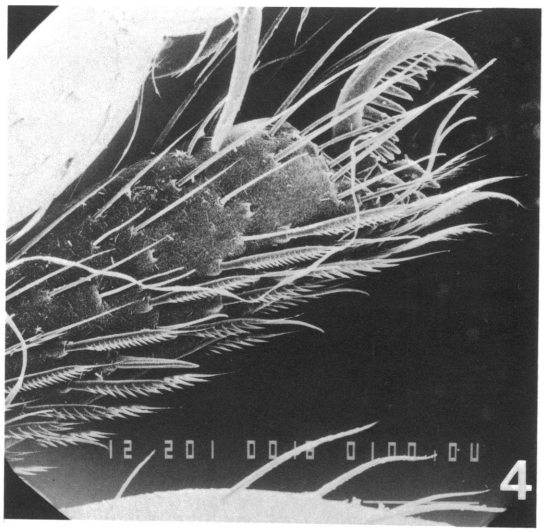


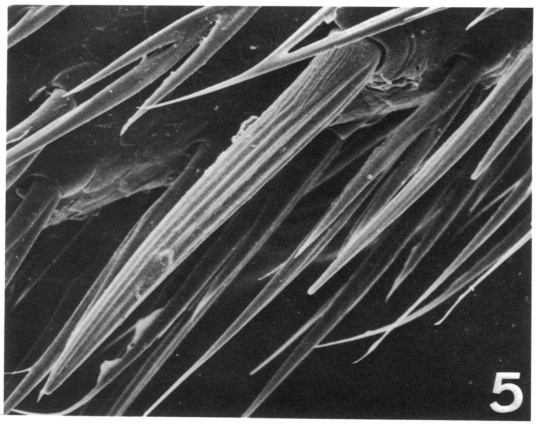
Fig. 3. Igloo-shaped retreat of *Zodarion nigriceps*.

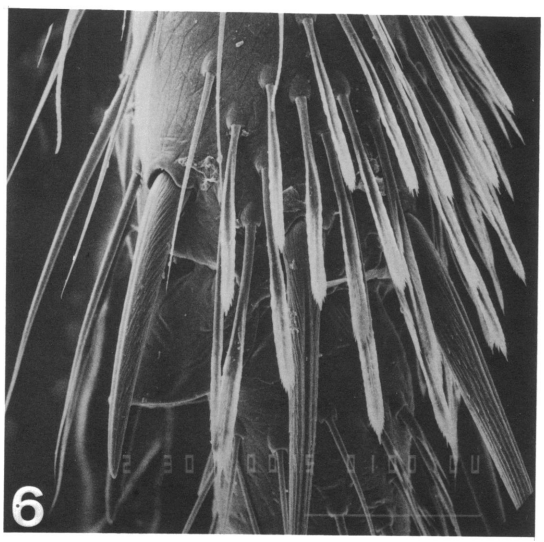
are found in all members of the Zodariinae and a few members of the Storeninae. They may cover part of the legs, excluding the femora, or the entire legs including a dense cover on these segments. In some genera the flattened hairs are also found on other parts of the body. **Hinged hairs** (called "long hairs" by Jocqué, 1986b: fig. 1e) are long supple hairs, clearly different from spines. They are implanted in such a way (figs. 13, 14) that they do not break or come loose when put in a different position, hence the name "hinged." Hinged hairs are numerous on T and sometimes on Mt of the more primitive members of the family. They tend to become less numerous and are only found on the dorsal side of the T in a large number of Storeninae. They are absent in some Storeninae and in the Zodariinae. Hinged hairs are found in quite a number of spiders (e.g., Lycosidae, Salticidae). This is an interesting character that might be used in interfamilial relationships.

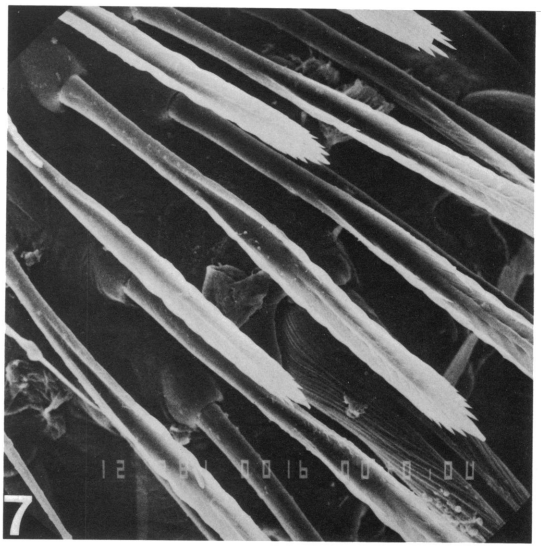
Trichobothria are present in rows. In *Cyrioctea* there are three rows on T, two on Mt, and one on t. In all genera, the terminal one on Mt is long and curved back. The tarsal trichobothria increase in length distad. The number of rows tends to decrease in more derived genera. The bothria are quite simple with a long crescent-shaped ridge (Platnick, 1986: fig. 6), which may be double (fig. 15).

The tarsal claws are three in number, at least in the plesiomorphic state. In a few cases the number of tarsal claws is restricted to two. The unpaired claw is often situated on an onychium. The paired claws have numerous teeth varying from minimum of 5 to about 20. In *Cyrioctea* these teeth originate from









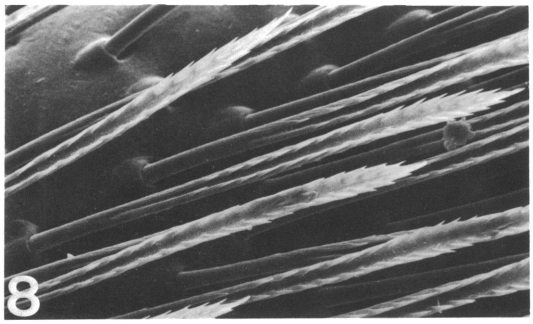
Figs. 4–7. *Mallinella vittiventris*. **4.** Spiniform scopula. **5.** Same, detail. **6.** Chisel-shaped hair of metatarsal tuft. **7.** As previous, detail.

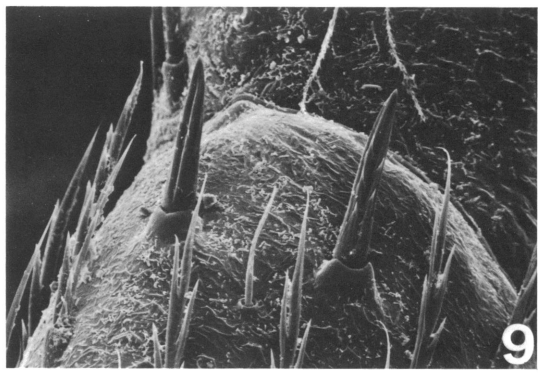
the ventral edge of the claw, whereas in all the other genera they are implanted on the lateral side, facing the other claw (figs. 17, 18). In the Lachesaninae, the proximal teeth stand on the edge whereas the distal ones are implanted on the side of the claw (fig. 16). This clearly is an intermediate stage between the situation in *Cyrioctea* and in the other genera.

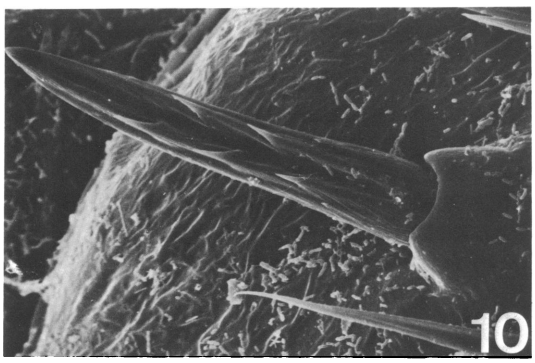
In the Storenomorphinae the claws, at least these of the anterior leg pairs, have a different shape as compared to those of the other subfamilies. They are shorter and more strongly curved. They are situated in a sort of terminal tarsal alveolus (figs. 18, 19).

In a few genera of the Cydrelinae, the hind legs may be modified (fig. 266). In these cases the Mt is curved and may have unusually curved spines.

According to Platnick (1986: fig. 7), the **tarsal organ** is of the capsulate type. The same type of tarsal organ is found in some other







Figs. 8–10. **8.** *Tenedos barronus.* Chisel-shaped hair of metatarsal tuft. 9–10. *Diores* sp. **9.** Spinules. **10.** As previous, detail.

genera (*Diores, Psammoduon, Storenomorpha, Mallinella*) (fig. 20) and it is supposed that this is so throughout the family.

The **femoral organ** is restricted to the Zodariinae. For a detailed description of the shape of this organ see Jocqué and Billen (1987) and Jocqué (1988a). The transformation series is supposed to be as follows: 0. femoral organ absent; 1. organ small; hairs of organ smooth; 2. hairs barbed (fig. 21); 3. hairs barbed and shallowly grooved; 4. hairs few; grooved; 5. one club-shaped hair in deep alveolus. The states 0–4 are a logical series. However, the club-shaped, finely barbed hairs as found in *Heradida* only are not clearly derived from one of the former although state 3 appears to be the best candidate to give way to state 5. The cladistic analysis suggests that states 3, 4, and 5 were independently derived of state 2.

In *Zodarion,* some species have apparently lost the organ for reasons explained in Jocqué and Billen (1987) and Jocqué (1988a). It is thus obvious that the acquisition of the organ is reversible.

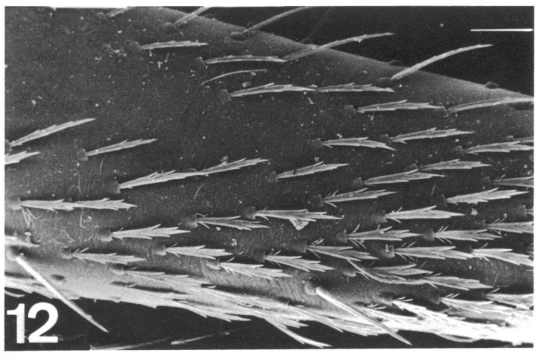
Female Palpus

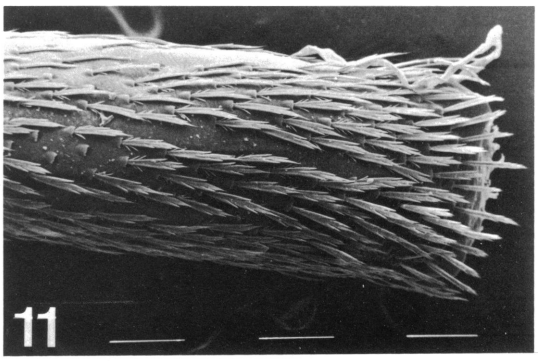
The female palpal tarsus may have different shapes: conical, cylindrical, or triangular and flattened (*Capheris*). The tarsal claw is usually finely toothed but may be strong and toothless (*Capheris*). A remarkable feature of the claw is that it tends to be turned inward over 30 to 90°. It appears to be turned more in the more apomorphic genera. It is possible that this is a family character although some female Agelenidae appear to have a slightly turned tarsal claw.

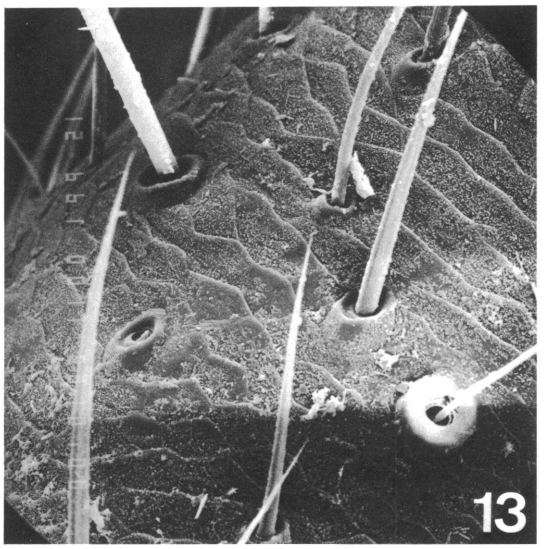
In taxa with a femoral gland, the palpal tarsus is provided with modified hairs (see Jocqué and Billen, 1987; Jocqué, 1988a).

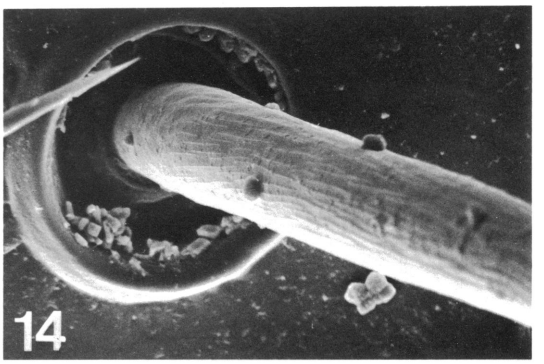
Abdomen

The abdomen is normally an elongate oval. A few modifications occur. The shape may be elongate and more than twice as long as wide in some Storenomorphinae (*Chariobas* and *Thaumastochilus*), pointed as in *Madrela,* higher in the back than in front (*Akyt-*









Figs. 11–12. *Zodarion kabylianum.* **11.** Leg IV, tibia dorsal, flattened incised hairs. **12.** Leg IV, femur, dorsal, flattened incised hairs.

Figs. 13–14. **13.** *Mallinella vittiventris,* leg I, tibia, showing normal hairs, hinged hair (in background) and trichobothrium (in front). **14.** *Storena* sp. leg I, tibia, base of hinged hair.

tara), or provided with circumferential folds as in *Palfuria.*

There seems to be an evolution in the abdominal pattern. Complex patterns appear to be more common in the more primitive taxa whereas simple patterns, a few spots, blotches, or chevrons tend to be commoner in the more advanced genera.

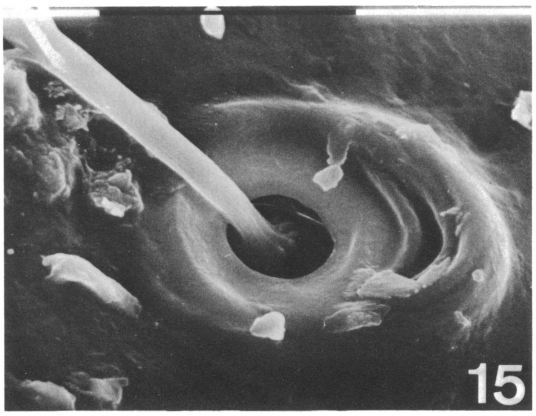
The number of muscle points varies between zero and three pairs. In *Chariobas* and *Thaumastochilus* there is an extra pair of elongate muscle points in front. This may have to do with the elongation of the opisthosoma and the strong muscles it needs to keep it in the horizontal position.

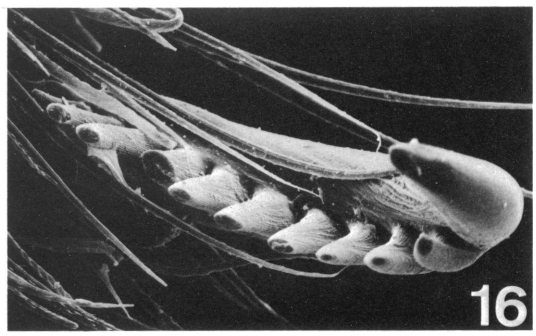
Scuta

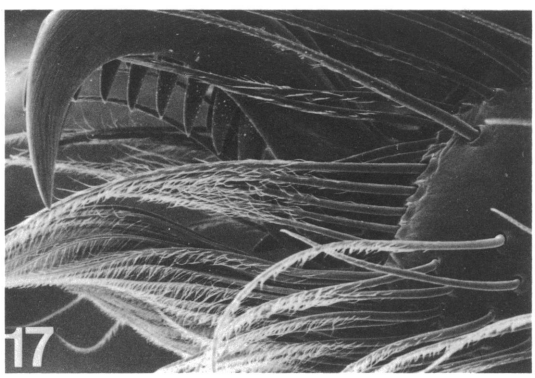
Scuta occur in many genera. In many males there is an ill-defined narrow dorsal scutum, absent in the corresponding females.

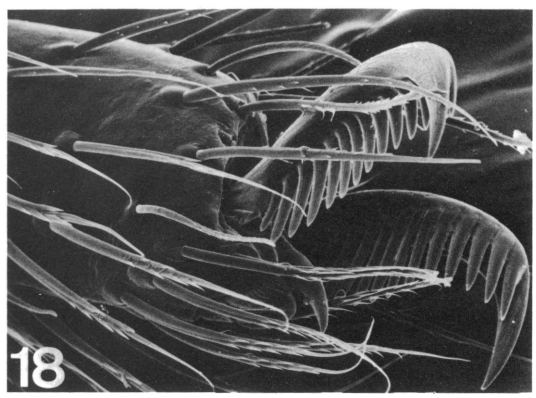
In some genera there is what I call a **structural scutum**. This is different from the average scutum in that it is a separate, well delimited sclerite and not a simple sclerotization of the integument as is found in many Zodariidae. Structural scuta are found in *Akyttara, Palaestina,* and *Trygetus.* They are commonly found in Oonopidae.

I do not agree with Lehtinen (1978: 260) who considered the presence of "abdominal









Figs. 15–18. **15.** *Psammoduon deserticola,* bothrium. **16.** *Lachesana blackwalli,* leg I, tarsal claw. **17.** *Tenedos barronus,* leg III, tarsal tip. **18.** *Madrela madrela,* leg IV, tarsal tip.

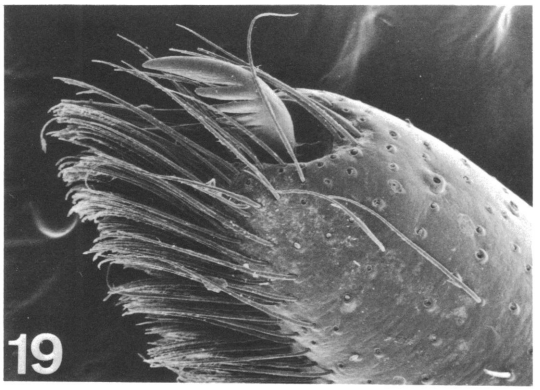
scuta" an irrelevant taxonomic character. He indeed made no distinction between the scuta of, for instance, Erigoninae and those of Oonopidae. It is true that the scutum may be absent in specimens of a species that normally has a sclerotized abdominal dorsum (Jocqué, 1984) but it is unlikely that such exceptions occur in species with a structural scutum.

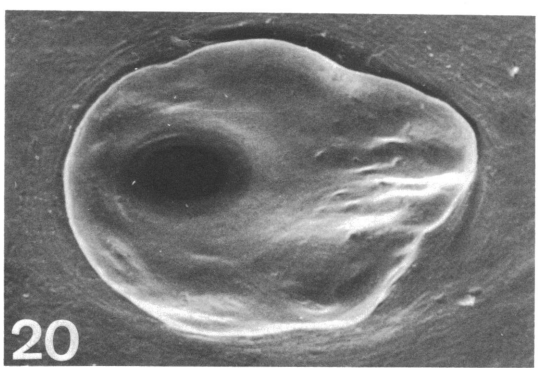
A remarkable feature is found in the genus *Storena.* In between the dorsal white spots is a pale brown scutumlike patch. Close examination reveals that its surface is deeply pitted. I have therefore called it a "**pitted shield**" (figs. 22, 23).

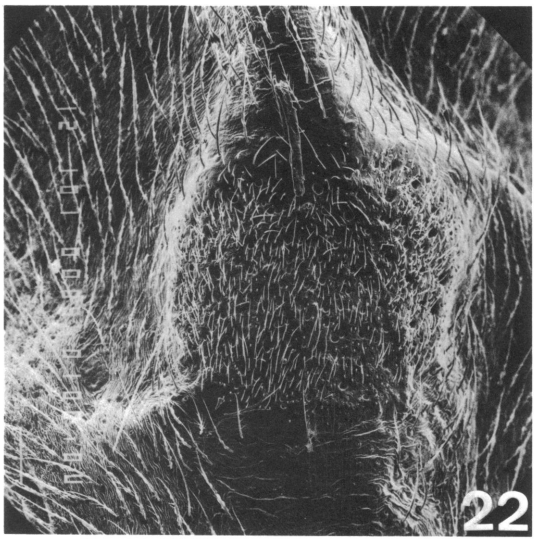
Tracheae

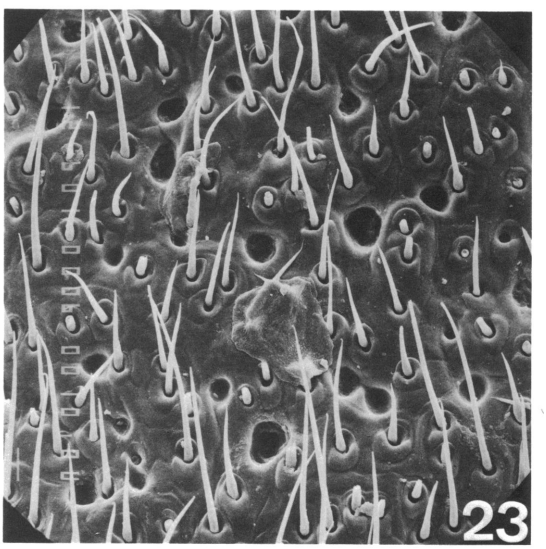
The tracheal spiracle is relatively narrow, often with a sclerotized rim. In a few genera it is relatively wide (*Acanthinozodium*) and the anterior rim provided with one or more rows of modified setae (*Mallinella*). Usually it is situated just in front of the spinnerets but in some cases it is moved slightly forward (*Cydrela, Psammorygma*) to ±0.25 times the distance between the epigastric furrow and the spinnerets.

The tracheae of some Zodariidae were studied by Lamy (1902), who described both the main tracheal systems of the family. It appears that the basic system is composed of four tracheae originating from a common atrium. The bifurcations which lead to these ducts are situated near the atrium (figs. 24–31). In this system the tracheae apparently do not reach the prosoma. The lateral ducts may bifurcate once at about half their length, in the middle of the abdomen. The most common system is only slightly different from the basic one in that the stems are very thin. Slightly aberrant forms have been found in







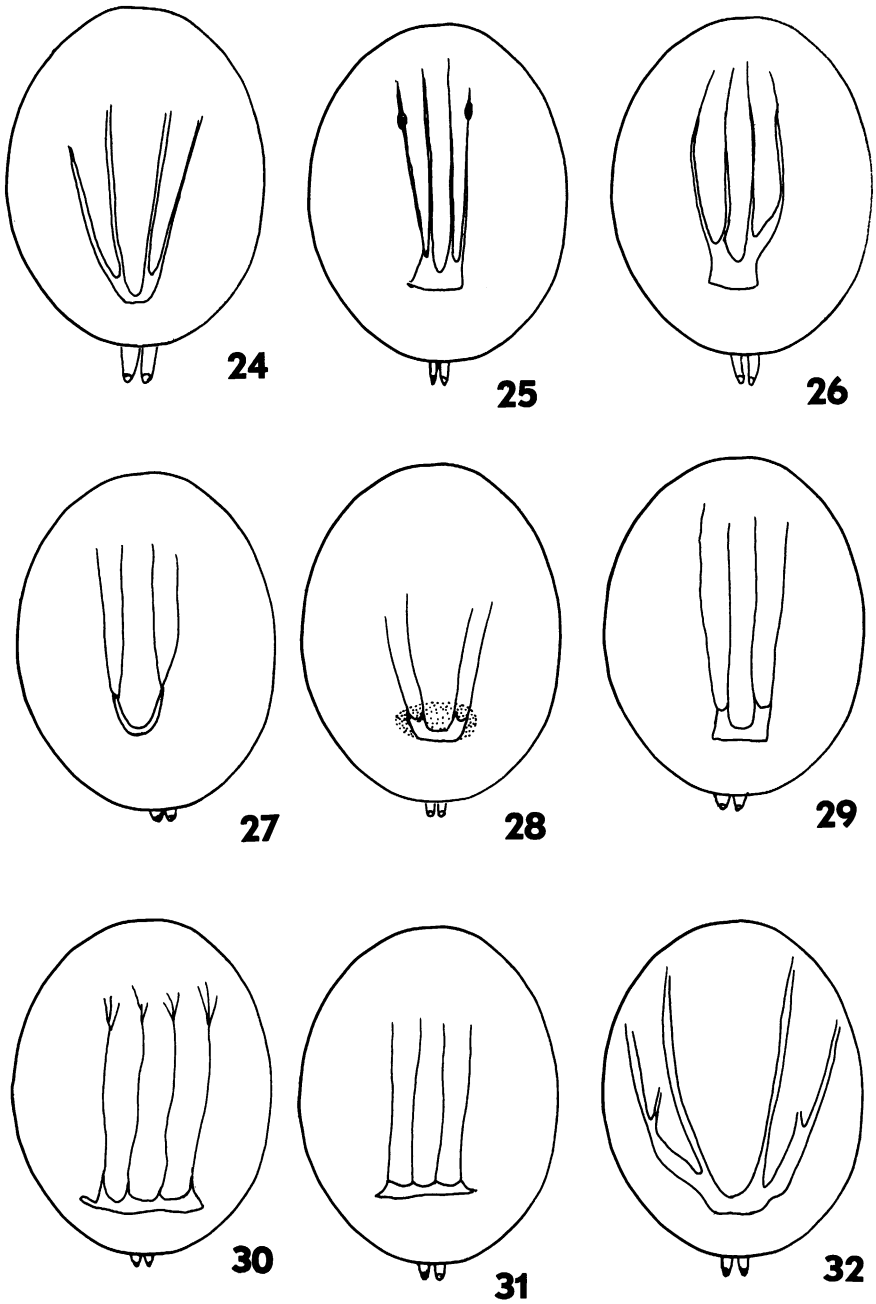


Figs. 19–23. **19.** *Storenomorpha comottoi,* leg IV, tarsal tip, left claw lost. **20.** *Madrela madrela,* leg IV, tarsal organ. **21.** *Mallinus* sp., femoral organ. 22–23. *Storena formosa.* **22.** Pitted shield. **23.** As previous, detail.

Lachesana rufiventris (Simon), in which there are only two main ducts, finely divided in the middle of the abdomen (fig. 33). A six-tubed form is also found in *Platnickia* (fig. 37). In the Cydrelinae there is a further reduction of the tracheal system, which ends with only two fine stems (*Psammoduon*) (fig. 34). In that genus, the loss of a complex tracheal system is apparently counterbalanced by strongly developed booklungs that fill the anterior half of the abdomen.

The second main type of tracheal system is found in the Zodariinae. In this subfamily the system is composed of two undivided stems which run directly from the short atrium into the prosoma where they are finely divided (see Lamy, 1902: fig. 31). According to this author there are short stems with a finely divided extremity, but I have not been able to detect these (figs. 35, 36).

An aberrant form has been found in *Diores poweri* Tucker. There are two wide stems ap-

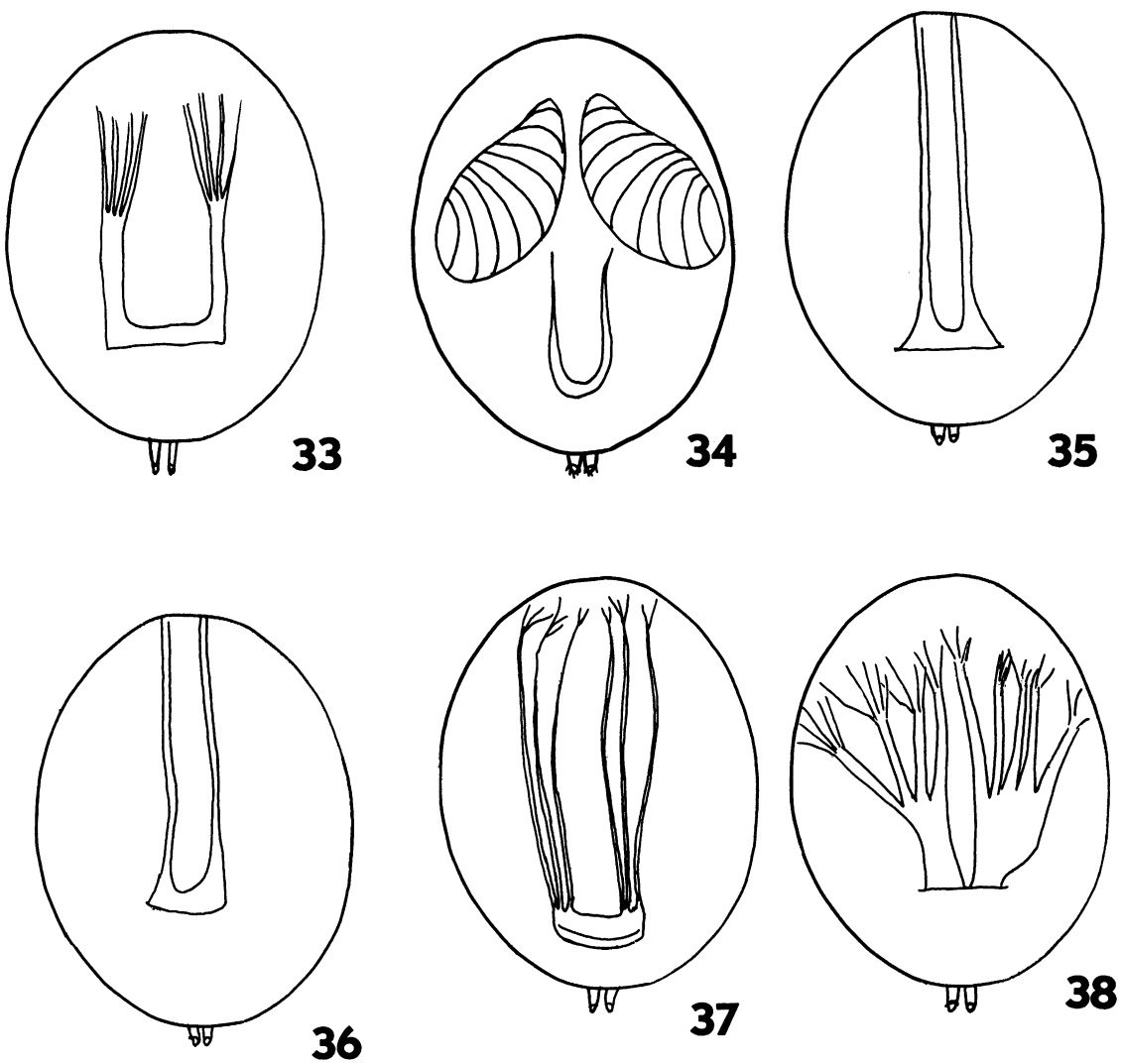


Figs. 24–32. Tracheal systems. **24.** *Tenedos barronus,* female. **25.** *Cybaeodamus* sp. juv. **26.** *Habronestes* sp. juv. **27.** *Capheris* sp. juv. **28.** *Asteron reticulatum,* male. **29.** *Neostorena minor,* sa female. **30.** *Mallinella vittiventris,* male. **31.** *Selamia reticulata,* female. **32.** *Lutica maculata,* male.

parently originating separately from the spiracle, each stem divided into four narrow ones, all divided into fine tracheae in the middle of the abdomen (fig. 38).

Stridulating Organ

A possible stridulating organ is found in *Akyttara homunculus.* In that species the anterior part of the abdomen is provided with



Figs. 33–38. Tracheal systems. **33.** *Lachesana rufiventris,* female. **34.** *Psammoduon deserticola,* female. **35.** *Zodarion nigriceps,* female. **36.** *Dusmadiores robanja,* male. **37.** *Platnickia elegans,* female. **38.** *Diores poweri,* female.

some coarse setae which, combined with the granulations on the posterior part of the carapace (fig. 324), might serve as a stridulating organ.

Spinnerets

A family character of the Zodariidae is the reduction of the median and posterior spinnerets. AS and PS are all two-segmented. The last segment is very short and as a result often very difficult to discern in the PS, which may be very small. There is a tendency for the PS and MS to become smaller or to be absent. They tend to be smaller in males than in females, which has given rise to some remarkable synonyms (Jocqué, 1986b: 7). The anterior spinnerets are conical, whereas the MS and the PS are cylindrical.

In most genera of the Zodariinae (except in *Heradida* and *Trygetus*) the AS stand on a common base. This has been used as a family character but as it does not occur outside the mentioned subfamily, this is certainly not

appropriate. In some genera (*Hermippus*) the PS of the female are very short and thick and provided with some large spigots (Jocqué, 1986b: fig. 1f).

In a few genera the AS are very long and retractile. Although the spinnerets can always be held closely against the abdomen, in this case there appears to be a shaft to lodge the long spinnerets inside the abdomen. In *Lachesana* and *Lutica* a pair of strong longitudinal muscles, running from the back to the front, have been found in the abdomen. They may serve to retract the spinnerets. In some taxa these spinnerets are surrounded by dense, fine, more or less curved hairs. This is presumed to be an adaption to burrowing in loose sand.

Colulus

The colulus is usually represented by a group of hairs, sometimes divided in two. In a few taxa this group may be restricted to only a few hairs.

Epiandrum

I call **epiandrum** the sclerotized area in front of the epigastric fold of males. It is present in most non-Zodariinae and may be complex. The internal structure was not studied.

Epigyne

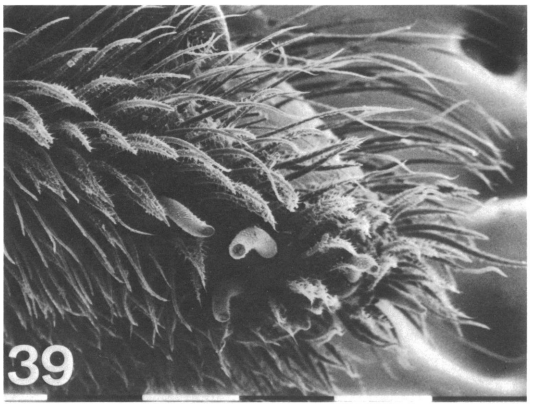
The epigyne often has a central plate. The copulatory ducts originate in the middle of the grooves delimiting this plate. They lead to widely separated, spherical spermathecae. The fertilization ducts are short and end just in front of the epigastric furrow. This is the basic, plesiomorphic conformation of the epigyne but a wide range of variations does occur. The shape of the spermathecae is very variable. In several genera (*Hermippus, Forsterella*) the spermathecae are very large and the ducts are invisible even after intense clearing. In many cases the copulatory ducts or the spermathecae (the limit between them is often difficult to determine) are long and coiled (*Mallinella, Neostorena, Antillorena*). In some other genera the spermathecae lie close together (*Microdiores*). In some Cydrelinae (*Psammoduon, Caesetius*) the fertilization ducts do not lead to the epigastric furrow and probably end somewhat further to the front although this is not stated with certainty as the fertilization ducts are hidden by the strongly sclerotized copulation ducts and spermathecae.

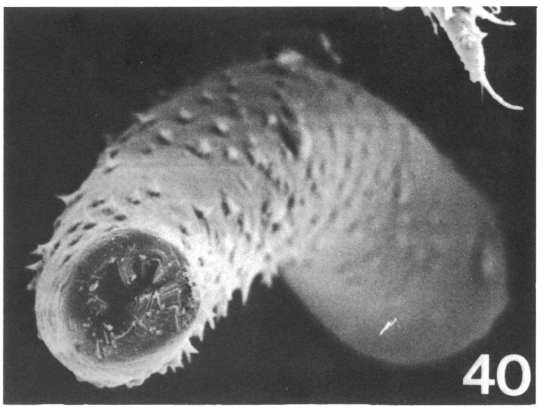
Ledoux (in litt.) mentioned the "birth" of the entelegyne state in the Zodariidae. He compared the epigynes of *Mallinella bandamaensis* (Jézéquel) with those of *Zodarion* spp. He concluded that the openings of the "cd" and the "fd" of *Mallinella* are in fact both ends of a slit that is narrowed in the middle, whereas in the *Zodarion* species the ducts are separated. Considering the place of *Mallinella* in the cladogram it is likely that the situation in *Mallinella* is secondary and in fact a simplification of the real entelegyne state which has already been reached in more plesiomorphic genera. Yet, the observation of Ledoux is puzzling and it might be worthwhile to devote a detailed study to the epigynes in Zodariidae.

Male Palp

The palpal tibia has a dorsolateral apophysis in the plesiomorphic state. In more derived genera there are several apophyses, mostly lateral or dorsolateral which, in some cases, may delimit a dorsal concavity (*Asteron, Storosa*). These apophyses tend to point forward and outward, and very rarely backward as in *Hermippus* which has a supplementary back-pointing lateral apophysis.

The cymbium is usually oval; in most cases its axis is straight but in a few genera (e.g., *Habronestes*) it is strongly curved. Very often the cymbium is provided with a few spines at the extremity. These may be very large in some Cydrelinae (*Capheris*). A most peculiar character is that of some Storenomorphinae (*Storenomorpha, Cicynethus*) where there are **canaliculated hairs** along the distal extremity of the cymbium (figs. 39, 40). These are supposed to serve as the outlet of a gland that produces a rubbery substance used to plug the epigyne after copulation. In the few females of this genus available, the epigynes were indeed overlaid with a rubbery cover that gives a negative print when removed. Taking into account the extensiveness of this cover, and the amount of substances needed to produce such a plug, I assume that a special gland is necessary to produce the rubbery





Figs. 39, 40. *Storenomorpha reinholdae.* **39.** Cymbium with canaliculate hairs. **40.** As previous, detail.

substance. A cymbial gland is supposed to be the answer. Epigyneal plugs are found in several other genera (e.g., *Mallinella, Capheris*) but these are restricted to the copulatory openings.

Many taxa have a terminal, dorsolateral field of chemoreceptors. In those taxa which have a femoral gland, there is a series of unilaterally pectinated setae (Jocqué, 1988a: figs. 12–15).

In many genera (e.g., *Mallinella, Neostorena, Habronestes*) there is a **lateral fold** which obviously holds the long embolus during expansion. In *Neostorena* this fold is provided with a so-called outlet. In *Asceua* this fold is so large that the cymbium is strongly narrowed as seen from above. In other genera (*Nostera, Storena*) there is a basolateral **flange,** which may be developed as a down-pointing horn (*Storamia*).

The bulbus is composed of a subtegulum which is well developed in *Cyrioctea* and the Cydrelinae. The most complex and variable part of the male palp is the tegulum. It may have a single or up to four appendages. It is very simple in *Hermippus* in which the tegular apophysis is a single, oval slightly sclerotized appendage, inserted on a membranous, prolateral part of the tegulum. In *Diores,* the TA is superficially divided into two parts: the main part and a lateral part, called the **pointer,** sticking out laterally and variable in shape. In *Zodarion* the TA has been called the "retinaculum." Its main feature is that it is very loosely attached to the tegulum and its position easily changed, even in the unexpanded palp. In addition to this TA, there often is a "conductor" which is a terminal appendage of the tegulum. This may be accompanied with a supplementary membranous appendage. In *Leprolochus* there is a so-called **intertegular apophysis** which originates on the membranous stalk connecting the tegulum and subtegulum. This feature was mentioned to occur in other South American genera (Jocqué, 1988b) but closer examination of the palp of *Cybaeodamus* proved that the large appendage of its bulbus is a real TA. Quite spectacular is the development of the TA in some Australian representatives (*Asteron*), in which it is so large that it hides the entire bulbus in ventral view. In some genera one of the appendages may be an essential part of the tegulum and determine its shape, as in *Habronestes,* in which it is Y-shaped.

The embolus is most often slender and originates at the back of the tegulum. However, the plesiomorphic state is apparently a short embolus that originates on the anterior part of the tegulum. This is the case in some Cydrelinae: some of the males belonging to this subfamily have a corkscrew-shaped embolus situated at the distal extremity of the tegulum. The embolus normally merges smoothly with the tegulum and one cannot speak of an "embolic division" as in some other spider families. An exception is found in *Forsterella* where there is a clearly delimited embolic base. Probably the most aberrant palp of the family is found in *Antillorena*

(figs. 48, 49). The tibial apophysis is strictly dorsal. The cymbium is very narrow, laterally flattened in its proximal part, with a large lateral flange, and cylindrical in its distal part. The very long and thin embolus originates on the lateral side of the tegulum, which has a distal swollen membranous apophysis and a long sharp proximal extension, pointing backward.

NATURAL HISTORY

Zodariids have been regarded as relatively rare spiders. This is probably due to the fact that the ground fauna of tropical and subtropical regions has been studied very superficially. Lycosidae are supposed to be the most common soil-dwelling spiders in these areas. However, recent studies with pitfall traps (Russell Smith et al., 1987; my own unpublished data from Malawi, Ivory Coast, Rwanda) have revealed the Zodariidae to be often much more common than Lycosidae and in fact sometimes the richest in species (or second after the Salticidae). Most Lycosidae are indeed dependent on a certain humidity whereas many Zodariidae are extremely drought-resistant. Many of the species that live in savannas, semideserts, or other semiarid areas are able to survive weeks, sometimes even months, without water or food (observations on *Psammoduon, Selamia, Zodarion*). On the other hand, representatives of forest-inhabiting species of *Mallinella* or *Dusmadiores* are very susceptible to drought and do not survive a couple of hours in a dry environment! Yet in these habitats, also, the Zodariidae are very common and among the families with the greatest number of species and specimens at ground level.

Relatively little is known about the habits of the Zodariidae. Where data exist on their behavior and biology, they are mentioned in the generic descriptions. Worth mentioning here is the fact that the Zodariidae are typically ground-living spiders that burrow. For this fact they deserve the name "burrowing spiders," at least the non-Zodariinae. These would better be called "ant-eating spiders" as they are compulsory ant-eaters (Jocqué and Billen, 1987; Jocqué, 1988a). Moreover, they do not burrow in the strict sense of the word, but construct an igloo-shaped retreat (fig. 3), a behavior that is most likely derived from simple burrowing behavior combined with the construction of an underground silk-lined retreat. However, some of the more plesiomorphic representatives of the family (*Cyrioctea, Lachesana, Lutica, Psammoduon*) live in loose sand without a retreat (there is some doubt about *Lachesana* which has been mentioned from a silk-lined burrow; Roth, in litt.). However, this probably is a secondary behavior that apparently only occurs in spiders which live in habitats with dry, loose sand. I have observed that even *Psammoduon,* which is extremely well adapted to living in sand, constructs a silk-lined retreat for molting.

Much of the morphological variation within the family can be understood in the light of their burrowing habit. The strong spination of legs III and IV, and the rows of cephalic spines in *Cyrioctea* and *Leprolochus,* must all be seen as adaptations to digging. The hardness of the substratum apparently plays a role and it is assumed that *Capheris,* which has enormous palpal claws, digs in very hard soil.

Exceptions to the ground-living behavior occur in the subfamily Storenomorphinae which are supposed to live in the shrub or tree layer. In these spiders the spination of the third and fourth leg is reduced and that of the anterior legs more strongly developed.

CLADISTIC ANALYSIS

The genus *Cyrioctea* was used as an outgroup to determine the polarity of the characters. The genus was revised by Platnick (1986) and Platnick and Griffin (1988). The authors pointed out why the genus can be regarded the sister group of all other Zodariidae. It is the only genus which lacks the lateral teeth on the tarsal claws but it has the

TABLE 1
Characters Used in Cladistic Analysis

Apomorphic (1 – n)	Plesiomorphic (0)
1. a row of spines between AER and PER	absent
2. a row of spines in front of eyes	absent
3. tarsal claws with lateral teeth	teeth ventral
4. male palp with intertegular apophysis	absent
5. AS long, retractile	AS short, not retractile
6. cheliceral fang of male recurved	not
7. PER	
1. strongly procurved, PLE at level or in front of AME	PER straight or slightly procurved
2. strongly procurved but PLE behind AER	
3. strongly recurved	densely covered in front
8. chelicerae almost devoid of hair	with teeth on both margins
9. cheliceral margin	
1. with teeth on anterior margin	
2. without teeth	
10. sternum triangular	sternum oval
11. all eyes, including AME, pale	AME dark
12. tarsal claws short, strongly curved, in concavity	different
13. endites with basolateral extension	without
14. eyes 2,2,4	eyes in 2 rows or 2,4,2
15. fangs short (thin part < thick part)	fangs normal
16. tuft on Mt with chisel-shaped hairs	hairs different
17. femoral organ (5 states, see morphology)	absent
18. hinged hairs absent or few	numerous
1. few, only dorsal	
2. absent	
19. chilum	chilum present, poorly delimited, haired
1. well delimited, double, few hairs	
2. well delimited, single, few hairs	
3. absent	
20. PS short	PS long, at least half the AS
21. sternum with triangular extensions	without
22. precoxal sclerites present	absent
1. 2	
2. 6	
3. 8 small	
4. 8 large	
23. carapace domed or flat	carapace with raised cephalic area
1. domed	
2. flat	
3. cephalic area overhanging thoracic one	
24. legs with flattened indented hairs (f.i.h.)	without
1. f.i.h. not dense or absent on femora	
2. f.i.h. dense on femora	
25. with short spinules, mainly on P	without
26. tarsi with two claws	with 3 claws
1. with 2 and 3 claws mixed	
2. with 2 claws	
27. 6 eyes	8 eyes
28. chelicerae with teeth on anterior surface	without
29. male with finely perforated carapace	different
30. chelicerae fused	not
27. 6 eyes	8 eyes
28. chelicerae with teeth on anterior surface	without

TABLE 1—(*Continued*)

Apomorphic (1 − n)	Plesiomorphic (0)
29. male with finely perforated carapace	different
30. chelicerae fused	not
31. intercheliceral triangle large	small or absent
32. abdomen posteriorly widened	abdomen oval
33. sternum rebordered	not so
34. with ventral abdominal scutum	absent
35. fovea absent	present
36. with row(s) of modified hairs in front of tracheal spiracle	without
37. spination	more developed on III and IV
1. reduced	
2. absent	
3. stronger on legs I and II	
38. sternum wider than long	longer than wide
39. leg formula	4123 or 4132
1. 4321 or 4312	
2. 1423 or 1432	
3. 1243	
40. abdomen with circumferential folds	without
41. sternum with wide excavations	without
42. palpal tarsus with large claw and spines	without
43. female palp triangular, dorsoventrally flat	different
44. male leg IV modified	not so
45. chelicerae with mesal field of spinules	without
46. trichobothria plumiform	not so
47. tarsi with accessory digging "claws"	without
48. legs with fans of supple spines	without
49. fang with proximal knoblike extension	no so
50. legs, mainly patellae, with double spine rows	without
51. habitus elongate (carapace L = 2× W)	carapace more oval
52. eyes in close group	not so
53. with claw tufts	without
54. cymbium with canaliculate hairs	without
55. abdomen posteriorly pointed	not so
56. abdomen with 2 frontal muscle points	without
57. carapace with longitudinal hair rows	without
58. group of long hairs in front of fovea	not so
59. abdomen with dorsal pitted shield	without
60. clypeus more than 4 times ALE diameter	less high
61. clypeus with a cluster of setae	without
62. male palpal tibia with more than 1 apophysis	with only one lateral apophysis
1. with a dorsal apophsysis	
2. with 2 lateral apophysis	
3. with a lateral and a dorsal apophysis	
4. with dorsal concavity	
5. with forward and backpointing apophyses	
63. embolus long and whiplike	not so
64. embolus originating at posterior end of tegulum	not so
65. tracheal spiracle advanced	not so
66. AS on common base	not so
67. abdominal pattern simple	not so
68. TA big, free of tegulum	not so
69. 2 big tegular apophyses	not so
70. embolic base separated from tegulum	not so

TABLE 1—(*Continued*)

Apomorphic (1 – n)	Plesiomorphic (0)
71. fertilization ducts tightly coiled	not so
72. cymbium flattened, with exit	not so
73. tegulum Y-shaped	not so
74. tegulum with basal swelling	without
75. cymbium with lateral flange only	without
76. lateral cymbial fold with dorsal and ventral concavity and basal flange	different
77. male tibia with backpointing ventral knob	without
78. subtegular apophysis present, convergent with tegular apophysis	absent
79. spermathecae touching	not so

long AS and lacks a serrula on the endites. According to Platnick and Griffin (1988) the wide distribution of the genus may be another argument to consider *Cyrioctea* the sister group of the other zodariids. In the paragraph "morphology" the variation of the characters and their states is explained.

Seventy-nine characters (table 1) were used for the cladistic analysis. To calculate the cladogram we used Farris' Hennig86 (1.5). In that program the ie- command would not give a result within 132 hours (using an IBM PS2 model 30 with an 80286 processor). Therefore an approximate cladogram was calculated with "m*.bb*". This yielded 140 equally parsimonious trees. The Nelson consensus tree was then calculated with the "nelsen" command.

The initial tree produced by Hennig86 program yielded quite a number of polychotomies in the subfamilies of the Storeninae and Zodariinae. This shows that these subfamilies are rather homogeneous. Indeed there are many autapomorphies for the different genera but few synapomorphies which sustain the branches carrying the remaining genera. Running the Storeninae and Zodariinae separately gave a more acceptable tree with many fewer polychotomies. These three trees, the one for all the genera and those for the Storeninae and the Zodariinae alone, were combined in MacClade 2.1 in order to define the apomorphies on the branches.

Several characters proved to be too variable and added tremendous noise to the matrix. They were therefore given weight 0. (characters 23, 60–63, 67). Sixteen characters were given a weight more than 1: *weight 2:* 7, 10, 11, 13, 16, 18, 21, 22, 37, 39, 45, 50, 56; *weight 5:* 14, 54; *weight 10:* 17.

The femoral organ (character 17) is a rather complex structure that implies the development of a gland on an unusual location for a spider. It is very unlikely that this character developed twice. Taxa with this feature are therefore considered to belong to a monophyletic group. The character is given weight 10.

The eye formula 2-2-4 (character 14) with the ALE far in front of the AME is unique in spiders and therefore considered of high taxonomic value, hence given weight 5. The same applies to the presence of canaliculate hairs on the male palpal cymbium (character 54). This character, too, is unique in spiders and therefore attributed weight 5. Weight 2 is attributed to characters with a clear polarity and for which the supposed derived state is not scattered throughout the family. Excluded from this category are autapomorphies of single genera.

The following multistate characters were considered unordered: 7, 9, 19, 22, 23, 24, 26, 37, 39, 62. The only multistate character retained as additive is the presence and abundance of hinged hairs (24). This apparently is a conservative character that is very unlikely to be reversible. It is clear that the number of hairs decreases in more apomorphic taxa.

The results of these analyses are shown in table 2 and figure 41. Tree length was found to be 277 and the consistency index 0.51. On the basis of this cladogram the family was divided into six subfamilies.

According to the cladogram the Storeninae

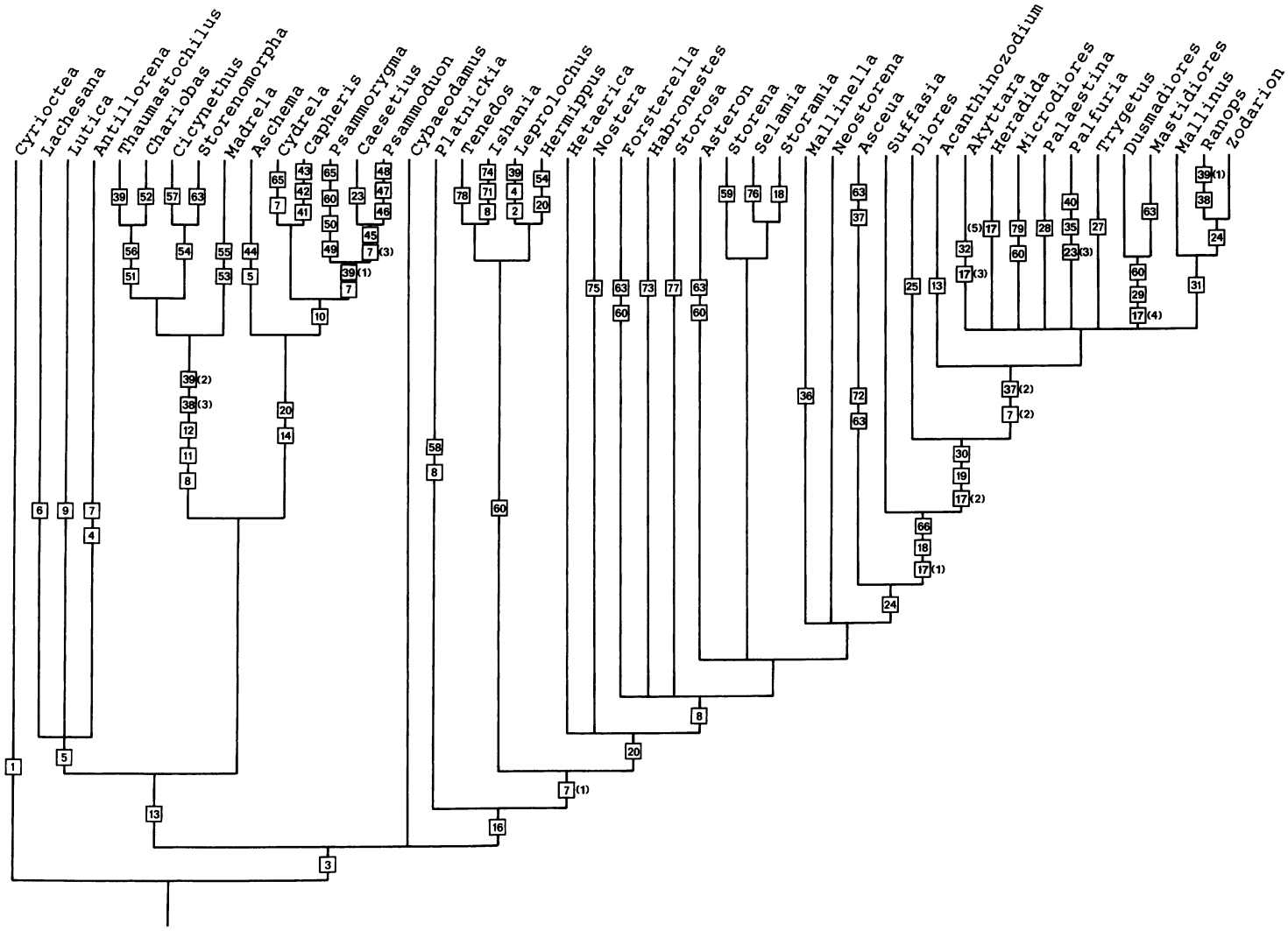


Fig. 41. Cladogram of zodariid genera. Numbers refer to characters in table 1.

are paraphyletic and *Asceua* is the sister group of the Zodariinae. It is therefore quite possible that the Storeninae are not a natural group. A possible solution may be to consider the absence of chisel-shaped hairs as a loss in the Zodariinae and to combine them with the Storeninae into one subfamily. However, the autapomorphy of the Storeninae, ventral metatarsal hair tufts with hollow chisel-shaped hairs, is distributed in such a way that it supports the monophyly of the subfamily. It is found in all the genera except in *Cybaeodamus,* but that genus is plesiomorphic within the Storeninae and thus of no relevance to the present problem. No trace of metatarsal hair tufts has been found in any of the Zodariinae, not even in juvenile *Suffasia* in which it could be expected if these subfamilies had to be united. For the time being, I therefore consider Zodariinae and Storeninae as separate subfamilies.

KEY TO GENERA

1. Carapace with a transverse row of spines in ocular area 2
– Carapace without a row of spines in ocular area 3
2. Transverse row of spines between AER and PER; tarsal claws with teeth in the axis; leg formula 4123 ..... *Cyrioctea*
– Transverse row of spines under the AME; teeth of tarsal claws implanted on the side of the claw; leg formula 4321 or 4312 ..... *Leprolochus*
3. Six eyes ..... *Trygetus*
– Eight eyes 4
4. Eyes in two rows or in three rows (2-4-2) 5
– Eyes in three rows (2-2-4) (transverse tangents to the AME do not intersect the ALE); often with precoxal sclerites (Cydrelinae) ... 18
5. Medium-size to small spiders (<8.5), with flattened incised hairs on legs (figs. 11, 12), spination reduced to a few dorsal spines on femora or some spinules on other segments; femoral organ present; without chilum (exc. *Suffasia*); make an igloo-shaped refugium (Zodariinae) 6
– Without flattened incised hairs on legs; spination much more elaborate (exc. *Asceua, Asteron*); chilum mostly well developed 23
6. Femoral organ weak, with tiny smooth hairs; chilum present; epigyne (fig. 377) with intricately wound ducts, spermathecae in front, thick-walled; carapace domed (males unknown) ..... *Suffasia*
– Femoral organ with barbed or grooved hairs; chilum absent (a few exceptions in *Diores*); epigyne with less intricately wound ducts 7
7. Abdomen large and spherical, largely overhanging thorax (fig. 334) ..... *Mallinus*
– Abdomen oval, of normal shape and size 8
8. Legs, including femora, densely covered with flattened incised hairs (figs. 11, 12); intercheliceral triangle large (figs. 366, 397) 9
– Femora with very few or without flattened incised hairs, intercheliceral triangle small (fig. 317) 10
9. Leg formula 4321; sternum wider than long (fig. 367) ..... *Ranops*
– Leg formula 4123 or 4132, sternum longer than wide (fig. 398) ..... *Zodarion*
10. Small spiders with elongate scutate abdomen; sternum rebordered along margin 11
– Abdomen globular or oval; scutum if present, small and ill-defined; sternum not rebordered 12
11. Femoral organ conspicuous, with one club-shaped hair in alveolus; abdomen elongate, oval ..... *Heradida*
– Femoral organ weak, with a few barbed hairs in shallow alveolus; abdomen higher at the back than in front ..... *Akyttara*
12. Legs with "spinules," mainly on patellae (figs. 9, 10); male palp with lateral tegular apophysis with pointer (figs. 331, 332) .. *Diores*
– Legs without spinules; tegular apophysis in one piece 13
13. AME very large; male carapace with many small perforations; epigyne with globular widely separated spermathecae; femoral organ with grooved hairs 14
– AME usually of normal size; male carapace without pits; femoral organ with barbed hairs; epigyne variable 15
14. Male palp elongate, with whiplike embolus ..... *Mastidiores*
– Male palp broad, with massive embolus ..... *Dusmadiores*
15. Chelicerae with two to five coarse teeth on anterior surface (figs. 338, 345) ..... *Palaestina*
– Chelicerae without such teeth 16
16. Carapace with strongly raised cephalic lobe, overhanging thoracic area (figs. 354, 360); abdomen with circumferential dorsal folds (fig. 354) ..... *Palfuria*
– Carapace and abdomen otherwise 17
17. Tiny spiders (<2.5); no leg spines; sperma-

thecae oval, close together or touching ... . *Microdiores*
– Larger spiders (>3.5), with at least a few dorsal spines on femora; spermathecae widely separated ..... *Acanthinozodium*
18. Anterior margin of sternum with three concavities accommodating the posterior parts of the endites and labium (fig. 280); female palp with triangular, flattened tarsus which bears numerous strong spines just as on the male cymbium (figs. 281–283) .. *Capheris*
– Sternum without frontal concavities, or at the most with small indentations 19
19. Posterior legs of male distorted or modified (fig. 266); embolus long and slender; tegulum very broad up to the distal tip; epigyne with narrow median longitudinal cleft (fig. 267) ..... *Aschema*
– Posterior legs not modified or if so then tegulum narrowed in front and with apophysis; epigynum otherwise 20
20. Chelicerae with a median field of spinules and sometimes with pairs of precoxal sclerites (fig. 272); embolus broad and massive (exc. *Caesetius inflatus* and *C. bevisi* for both the latter characters) 21
– Chelicerae without a median field of spinules; one pair of precoxal sclerites or none; embolus very short or slender 22
21. Without precoxal sclerites; profile of carapace dipped (fig. 296); legs with fans of long supple spines; a pair of digging claws (strong, modified curved spines) underneath tarsal claws; trichobothria plumiform .... *Psammoduon*
– With one to three pairs of precoxal (fig. 280) sclerites; profile domed (fig. 270); legs without fans of spines, no digging claws, trichobothria normal ..... *Caesetius*
22. Cheliceral fangs with a small knoblike proximal extension (fig. 305); P III and P IV with a double row of dorsal spines; precoxal sclerites in front of coxae present (fig. 306) ..... *Psammorygma*
– Cheliceral fangs without proximal knob; legs III and IV with a single row of dorsal spines; without precoxal sclerites ..... *Cydrela*
23. Endites with enlarged base, the plane of palpal insertion perpendicular to body axis (figs. 47, 224, 263); sternum oval, widest near the middle (fig. 47) 24
– Endites with normal base (figs. 120, 172), the plane of palpal insertion making an obtuse angle with the body axis; sternum triangular (figs. 120, 172), widest near anterior margin 31
24. All eyes pale; often elongate species; claws relatively small and strongly curved, in distal concavity (figs. 18, 19); cheliceral fangs short; AS not particularly long .... Storenomorphinae 25
– AME dark (may appear pale in old museum specimens); claws of normal size and implantation (fig. 17); cheliceral fangs long; AS long and retractile ..... Lachesaninae 29
25. Habitus markedly elongate (figs. 220, 253) with carapace at least twice as long as wide .. 26
– Habitus less elongate, carapace not more than 1.8 times longer than wide 27
26. Eyes in a close group (fig. 223); leg formula 1423 ..... *Chariobas*
– Eyes in two strongly procurved rows (fig. 255); leg formula 1243 ..... *Thaumastochilus*
27. Tarsi with claw tufts; carapace hairless; abdomen sparsely haired; cymbium without canaliculate hairs ..... *Madrela*
– Tarsi without claw tufts but often with dense scopulae; carapace haired; abdomen sparsely or densely haired, cymbium with canaliculate hairs (figs. 39, 40) 28
28. Abdomen densely haired with white longitudinal stripes which may be broken; embolus, originating on posterior end of tegulum, partly covered by membranous subtegulum ..... *Storenomorpha*
– Abdomen sparsely haired; embolus, originating in anterior part of tegulum, not hidden by subtegulum (fig. 240) ..... *Cicynethus*
29. Cheliceral margin toothless ..... *Lutica*
– Anterior cheliceral margin toothed 30
30. PER straight or slightly procurved as seen from above; male chelicerae with recurved fang; tegulum without posterior prong; embolus short, mostly hidden (figs. 57, 59) .... *Lachesana*
– PER strongly procurved; male cheliceral fang normal; tegulum with sharp posterior prong; embolus very long, whiplike (fig. 48) .... *Antillorena*
31. Sternum with small triangular extensions fitting in coxal concavities (fig. 120), chilum sample 32
– Sternum otherwise (fig. 147), usually with smooth sides, if triangular extensions present then fitting between coxae; chilum variable 38
32. Tarsi with two claws and claw tufts; male palpal tibia with complex apophysis with a forward and a backward directed part; carapace entirely covered with short hairs ... . *Hermippus*
– Tarsi with three claws, no claw tufts; carapace hairless 33
33. Large spiders (8.0–20.0) with dark reddish to black carapace and dark gray abdomen, dorsum with three or five white blotches

with a pale brown pitted shield between them (fig. 181) ..... *Storena* (part)
– Coloration different and without light brown pitted shield between white spots on dorsum of abdomen 34
34. Cymbium without lateral fold, TA particularly large, standing off from bulbus (figs. 75, 76, 78, 79) ..... *Asteron* (part)
– Cymbium with lateral fold, TA not particularly large 35
35. Hinged hairs absent; cymbial lateral fold very large (fig. 68), copulatory ducts in epigyne superficial (figs. 70, 96) 36
– Hinged hairs present; cymbial lateral fold less large, copulatory ducts invisible in uncleared epigyne 37
36. Small spiders (<5.00); male palpal cymbium striplike as seen from above, due to the enormous lateral fold; epigynum with superficial wound ducts; spines reduced to a few on femora ..... *Asceua*
– Medium-size spiders (4.00–6.00); cymbium not markedly narrow as seen from above; spines numerous on legs III and IV ..... *Storamia*
37. A row of short spines between tracheal spiracle and spinnerets; cymbium with lateral fold, sometimes restricted to basal half, but without "pointed exit"; epigynum simple; internal structure without long ducts, usually shaped like two tight corkscrews ..... *Mallinella*
– No short spines in front of spinnerets; cymbium with large lateral fold characterized by the "pointed exit" (figs. 133, 137); epigyne with long copulatory ducts and well delimited spermathecae ..... *Neostorena* (part)
38. Carapace strongly domed, with sparse but remarkably long hairs in front of fovea (fig. 152); tegular apophysis elongate (figs. 155, 156) ..... *Platnickia*
– Carapace less obviously domed and without a group of long hairs in front of fovea; tegular apophysis of another shape 39
39. Clypeus height more than 5 times the diameter of an ALE 40
– Clypeus height less than 4 times the diameter of an ALE 42
40. Cymbial fold, which opens ventrally, converges into a pointed "exit" (figs. 133, 137); tegulum with double apophysis: one sclerotized more or less straight, lying ventrad of a membranous one which is similar in form but less slender .. *Neostorena* (part)
– Cymbial fold without a pointed lateral "exit," tegular apophyses differently shaped .. 41
41. Lateral cymbial fold large; tegulum Y-shaped due to a curved sclerotized mesal excrescence (fig. 110) ..... *Habronestes*
– Lateral cymbial fold less large, opening ventrally; tegulum not Y-shaped .... *Ishania*
42. Large spiders with dark gray abdomen with 3 or 5 dorsal white dots and a central, pale brown dot which is a finely pitted shield (fig. 181) ..... *Storena* (part)
– Abdomen without finely pitted shield .. 43
43. Chilum simple or poorly defined 44
– Chilum clearly defined and double 49
44. Chelicerae densely haired in front (fig. 163) 45
– Chelicerae with a few or without hairs in front 46
45. Trichobothria on T in two rows; cymbial fold which opens ventrally converges into a pointed "exit" (figs. 133, 137); tegulum with double apophysis: one sclerotized more or less straight, lying ventrad of a membranous one which is similar in form but less slender; epigyneal opening near posterior margin ..... *Neostorena* (part)
– Trichobothria on T in 4 rows; palp otherwise; epigyneal opening in anterior part (fig. 167) ..... *Selamia*
46. Tegular apophysis massive, in fact not easily distinguished from the rest of the tegulum 47
– Tegular apophysis small, clearly recognizable as such (fig. 197); tibial apophyses delimiting a dorsal concavity; embolus massive ..... *Storosa*
47. Eyes in two procurved rows; tegular apophysis and suprategular apophysis converging, almost touching (figs. 205, 212, 217) ..... *Tenedos* (part)
– Eyes in three rows (2-4-2); palp otherwise 48
48. Embolic base clearly separated from the rest of the tegulum and almost touching the tegular apophysis which has a membranous tip (figs. 102, 103); epigyne a featureless chitinized plate; internally with two large spermathecae with very short copulatory ducts (fig. 104); abdominal dorsal pattern with spots and chevrons ..... *Forsterella*
– Embolic base smoothly fused to tegulum; tegular apophysis massive standing more or less free from tegulum (figs. 76, 79); epigyne with strongly sclerotized posterior margin; copulatory ducts thick, long, and wound; abdomen on dorsum usually with 5 white circular spots (fig. 71) ..... *Asteron* (part)
49. Cheliceral margin completely toothless .... *Tenedos* (part)

- Chelicerae with at least one marginal tooth, sometimes hidden by dense hair cover 50

50. PER recurved or straight; male palp with two tegular apophyses: a distal and a lateral one (figs. 86, 92); epigyne with copulatory openings in anterior half, followed by a shining sclerotized boss (fig. 87) ... *Cybaeodamus*
- PER strongly procurved; male palp with broad embolus (fig. 149); epigyne with central membranous area (fig. 150) .....*Nostera*

SYSTEMATICS

FAMILY ZODARIIDAE

DIAGNOSIS: Representatives of the Zodariidae differ from all other Araneomorpha by the absence of a gnathocoxal serrula, the presence of long AS which are always stronger than the PS and MS, and the lateral implantation of the teeth on the tarsal claws. The latter character is absent in *Cyrioctea* which is considered to be the sister group of all other Zodariidae (cf. Platnick and Griffin, 1988).

DESCRIPTION: A general description of the morphology of the Zodariidae and its variations is given under the heading Morphology. However, a few typical characters should be stressed here. Apart from the diagnostic characters, most zodariids are characterized by the very short cheliceral fangs, which determine to some extent the typical habitus of members of this family. A remarkable character is that the female palpal tarsal claw is turned inward over an angle of up to 90°.

The family is divided into six subfamilies:
Cyriocteinae, new subfamily
Lachesaninae, new subfamily
Storeninae Simon (1893)
Storenomorphinae Simon (1890)
Cydrelinae Simon (1893)
Zodariinae Simon (1890)

CYRIOCTEINAE, NEW SUBFAMILY

TYPE GENUS: *Cyrioctea* Simon.

Cyriocteinae, consisting of only one genus, *Cyrioctea,* is characterized by only one autapomorphy: a row of spines between the AER and the PER. Besides this character there are a number of plesiomorphic characters that make it easy to discern them from other zodariids: the presence of cheliceral teeth on both margins and the implantation of the teeth on the tarsal claw in the axis of the claw. The cheliceral fang is particularly long.

CYRIOCTEA SIMON

For a complete review of literature, descriptions, and natural history see Platnick (1986) and Platnick and Griffin (1988).

Note: The familial placement of this genus has been questioned for some time (Jocqué, 1988b). It lacks a serrula and has long anterior spinnerets, both synapomorphies of the Zodariidae. On the other hand, it lacks the typical character of lateral teeth on the tarsal claws. For these reasons, the taxon is here considered to be the sister group of all other members of the family.

DIAGNOSIS: The genus is easily recognized by the row of stiffened setae between AER and PER.

DESCRIPTION: The generic description by Platnick (1986) is almost complete. It should be mentioned that the sternum is oval (fig. 42). The legs are provided with numerous hinged hairs. Trichobothria are in three rows on T, in two on Mt and in one on t.

TYPE SPECIES: *Drassus spinifera* Nicolet (figs. 42, 43).

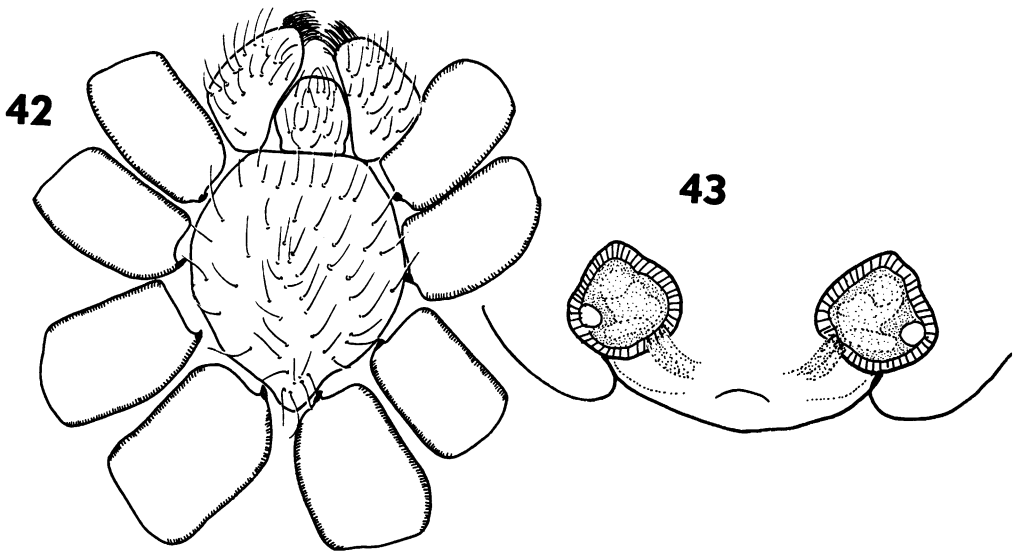
OTHER SPECIES INCLUDED: Four species from Chile, three from Namibia, and one from Australia (see Platnick, 1986; Platnick and Griffin, 1988).

DISTRIBUTION: Southwestern South America, southwestern Africa, and eastern Australia.

LACHESANINAE, NEW SUBFAMILY

TYPE GENUS: *Lachesana* Strand.

Lachesaninae contains three genera, which are united by the following synapomorphy: long, retractile AS. They also have a basolateral extension of the endites, a character shared with the Cydrelinae and the Storenomorphinae. They are further recognized by the unmodified eye position, although the PER is strongly procurved in *Antillorena.*



Figs. 42, 43. *Cyrioctea spinifera.* **42.** Sternum. **43.** Epigyne, cleared dorsal view.

ANTILLORENA, NEW GENUS

Storena (part): Hasselt, 1887: 227; Simon 1893b: 408, 423. Merian, 1910: 29 (part), not Merian, 1910: 23. Comstock, 1913: 323. Gertsch, 1949: 231.

Habronestes (part): Marx, 1891: 30.

TYPE SPECIES: *Storena pollii* Simon.

ETYMOLOGY: *Antillorena* is a contraction of *Storena* and Antilles. The gender is feminine.

DIAGNOSIS: Representatives of this genus are recognized by the combination of long retractile spinnerets together with a strongly procurved PER. The peculiar conformation of the palp in males and the long coiled copulatory duct in females provide additional diagnostic characters.

DESCRIPTION: Medium-size to large spiders (7.0–12.0) with oval carapace, widest between coxae II and III, narrowed in front to about 0.6 times maximum width in males, 0.7 times maximum width in females.

Color: Carapace yellowish orange with dark margin. Sternum yellowish brown, darker toward sides. Legs yellow except Mt and t dark brown. Abdomen pale gray with slightly darker pattern.

Eyes closely grouped; in three rows (2-4-2); AME dark, circular; less than their radius apart. Other eyes pale, circular. ALE about 1.5 times their diameter apart; PME about their radius apart, 1.5 times their diameter from PLE. MOQ slightly longer than wide. Clypeus straight; three times as high as ALE diameter. Chilum a large, longly oval sclerite, about 6 times wider than high. Chelicerae strong, with obvious condyle; anterior margin with one tooth, fang short. Endites rather slender, with anteromesal scopula. Labium 1.25 times longer than wide. Sternum roughly oval, with straight frontal margin, sinuous sides ending in sharp point; 1.3 times longer than wide.

Legs: Formula 4123. Spination: few spines on anterior pairs, numerous and longer spines on posterior pairs of legs. T, Mt, and t of leg I may have numerous ventral spinules; small specimens tend to have fewer or no spinules. Hinged hair present on T and Mt. Mt III and IV with poorly developed distal ventral hair tufts. Scopulae poorly developed. Three claws: superior ones slightly curved, in sort of alveolus, with 4 teeth on anterior legs up to 12 teeth on posterior pairs; dental row oblique: distal teeth implanted laterally, proximal ones in axis of claw. Unpaired claw on protruding ventral part (onychium) of tarsus; claws flanked by row of hairs on retrolateral side. Trichobothria: few; in two rows on T, in single row on Mt and t.

Abdomen oval. Epiandrum poorly developed. 6 spinnerets, surrounded by some long curved hairs. AS long, cylindrical, clearly biarticulate, with spigots; base protected by common membranous sheet. Posterior spinnerets slightly longer than half length of anterior ones, conical, faintly biarticulate. Median pair conical, small in females, very small in males. Colulus represented by two groups of setae. Tracheal spiracle very faint, without sclerotized rim.

Male palp with large dorsal tibial apophysis. Cymbium in distal part of unusual cylindrical shape. Tegulum with large, chitinized posterior excrescence and membranous conductorlike apophysis in front. Embolus very long, whiplike, originating on lateral part of tegulum.

Female palpal tarsus with numerous ventral and mesal spines; claw with three teeth, turned inward over about 30°.

Epigyne with central concavity divided by longitudinal median ridge. Copulatory duct very long and coiled (figs. 51, 94).

OTHER SPECIES INCLUDED: None.

DISTRIBUTION: Lesser Antilles, Bahamas. Gertsch (1961) explained why Marx' (1891) record of the species in the U.S.A. is unlikely to be correct.

NATURAL HISTORY: According to Gertsch (1961: 366) these spiders are supposed to dig in sand well away from the beach; they are reported to construct formal burrows lined with silk and closed with a wafer-type trap door.

Antillorena pollii (Simon), new combination
Figures 44–51, 94

Storena (Habronestes) spirafer(a) L. Koch (sic!): Van Hasselt, 1887: 227 (descr. ♂, misidentification).

Storena (Habronestes) pollii Simon, in Van Hasselt, 1887: 229 (descr. ♀, new species).

Habronestes americanus Marx, 1891: 31 (descr. ♀). NEW SYNONYMY.

Note: Van Hasselt (1887) identified the male as *S. spirafera* L. Koch and published in the same paper Simon's description of the female which was supposed to represent a new species. Later, Simon (1893c) wrongly assumed that Hasselt's description of the male was creating a new species, which should have been *S. spirafera* Hasselt. He therefore described what he assumed to be the same species, under the name *hasselti* nomen novum, replacing *spirafera* because of the supposed homonymy. Apparently, there was no homonymy because Hasselt did not describe *spirafera* as new, but simply misidentified the male as *S. spirafera* L. Koch. Furthermore, the specimen subsequently described by Simon (1892a) obviously belongs to another species, most probably in the genus *Tenedos*. It is fairly small and falls outside the range of *A. pollii*, its eyes are in two rows, and the MOQ is narrower in front than in the back, which is typical for *Tenedos*.

TYPE MATERIAL: Lectotype female (here designated): Bonaire, Fontein, under stones, Neervoort van de Poll (RMNH 5114) (examined).

Paralectotype: One imm.: together with Lt.

DESCRIPTION: *Female:* Total length 9.24 (6.74–10.82); carapace 4.24 (3.75–5.16) long, 2.66 (2.41–4.08) wide.

Color: See genus description.

Eyes: a: 1.00 (0.15); b: 1.20; c: 0.97; d: 1.20; e: 0.85; f: 0.63; g: 0.57; h: 1.37. MOQ: AW = 0.91 PW; AW = 0.87 L.

Legs: Spination: femora I pl1d1 II pl1d2* III pl1d2* IV d23*rl1; patellae I-II-III pl2d1rl1 IV pl1d1rl1; tibiae I v6spul II v1 III pl3*d1rl3*v1-2-2 IV pl3*d2*rl2*v2-2-2; metatarsi I-II v1-2-3 III w4-5-6 IV w4-5-6; tarsi I-II-III v4 IV v5. Measurements:

	I	II	III	IV
F	2.58	1.75	1.87	2.50
P	1.33	1.08	0.92	1.29
T	1.92	1.50	1.04	1.63
Mt	1.67	1.58	1.79	2.63
t	0.83	0.92	0.92	1.21
Tot	8.34	6.84	6.55	9.25

Epigyne: Figures 50, 51, 94.

Male: Total length 9.58; carapace 5.58 long, 4.00 wide.

Color: See genus description.

Eyes: Position as in the female; a: 1.00 (0.18).

Legs: Spination: Femora I pl1d2* II pl1d2 III d1-1-2-2 IV d1-1-2; patellae I-II pl1v10 III pl2*d1rl1 IV pl2*d1rl1; tibiae I v10spul II pl3*v1-2-2 III pl3*d1rl2*v2-2-2 IV pl3*d2*rl2*v2-2-2; metatarsi v26disp II

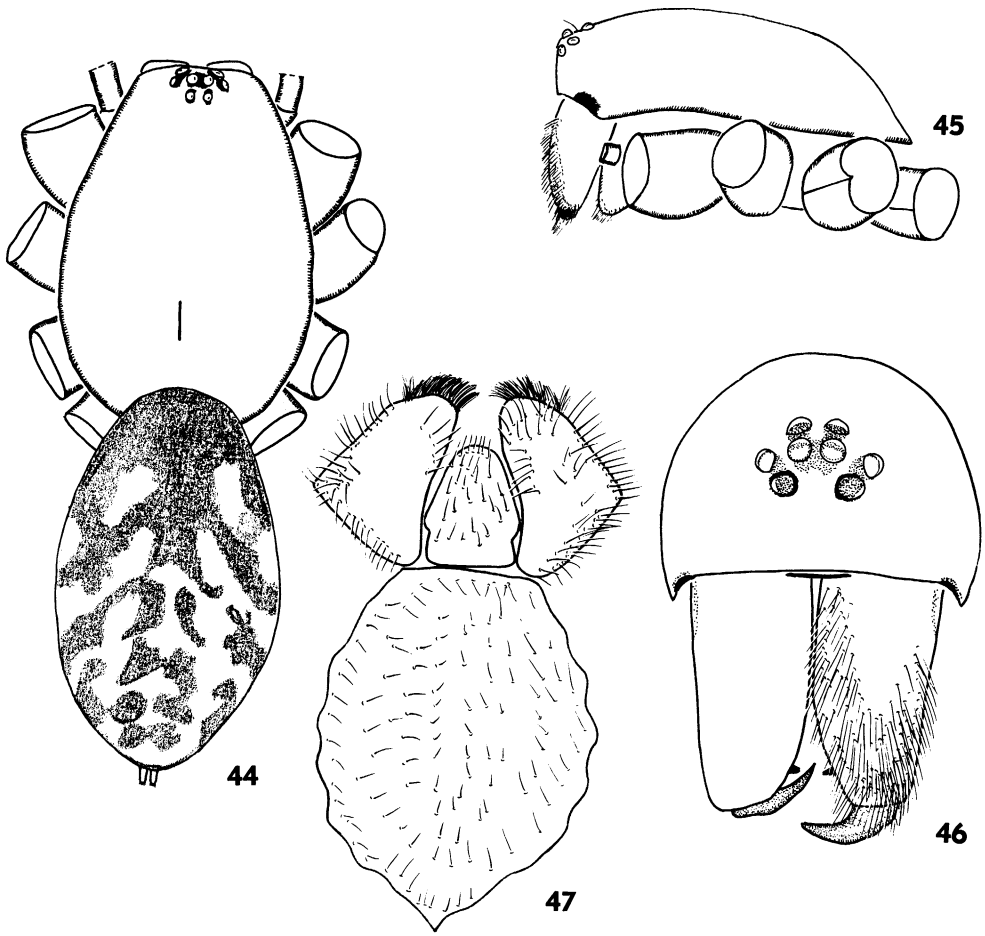


Fig. 44–47. *Antillorena pollii.* **44.** Female habitus, dorsal view. **45.** Female carapace, lateral view. **46.** Female carapace, frontal view. **47.** Sternum, labium, and endites.

pl1rl1-1v2-2-1-2 III w4-4-6 IV w4-5-1-6; tarsi I v21 spul II v1-1 III v4 IV v5. Measurements:

	I	II	III	IV
F	4.66	3.75	3.50	4.16
P	1.91	1.67	1.50	1.75
T	3.50	2.67	2.00	2.67
Mt	3.00	2.92	3.25	4.33
t	1.75	1.58	1.92	2.16
Tot	14.82	12.58	12.16	15.08

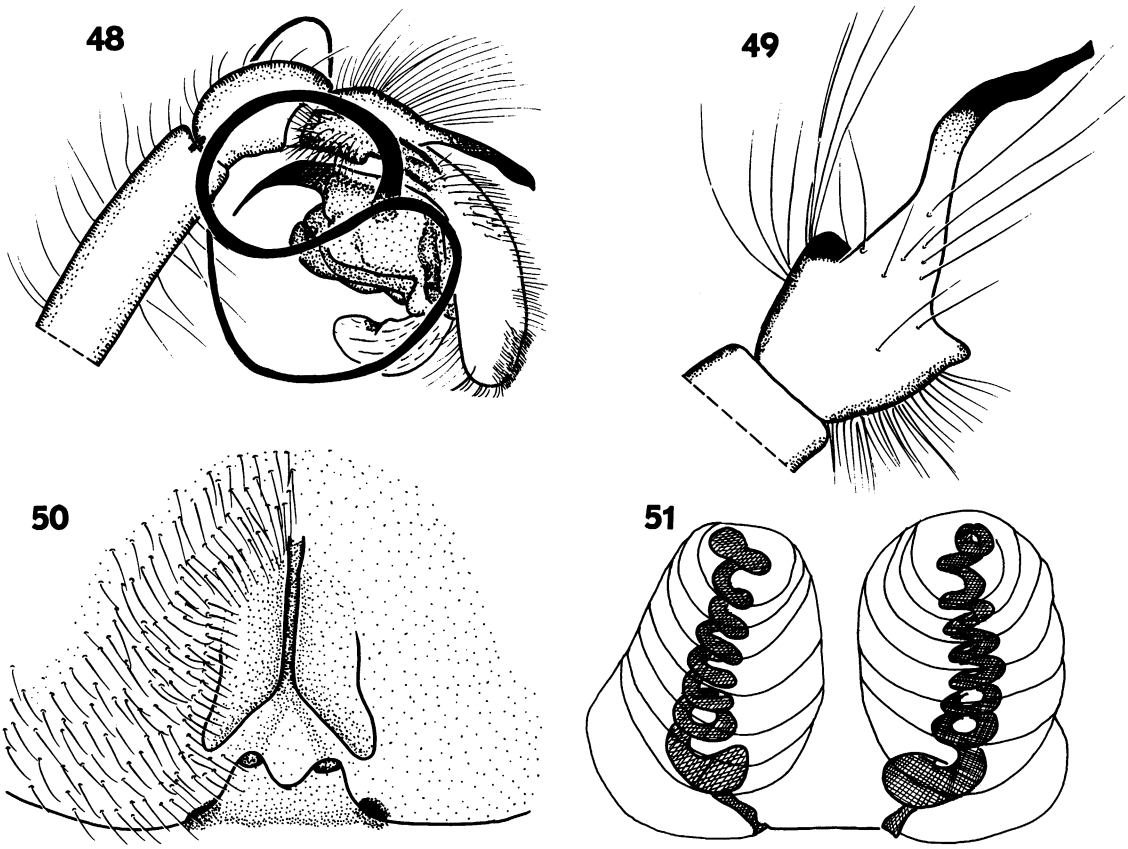
Male palp (figs. 48, 49): tibial apophysis strictly dorsal. Cymbium very narrow, laterally flattened, with large lateral flange in proximal part, cylindrical in distal part; very long and thin embolus originates on lateral side of tegulum, which has distal swollen membranous apophysis and long, sharp, proximal extension, pointing backward.

OTHER MATERIAL EXAMINED: 1♂: Aruba, Eagle Petr. Comp., V. 1955, at light (RMNH 9925); 1♂: Curaçao: Groot Kwartier in Peter Stuyvesant College, 10.III.1981, De Jong (RMNH 9919); 1♀: Bonaire, Kalendijk, in house, 6.VI.1975, L. Gerharts; 1♂: Curaçao: Hate, 25–30.XII.1967, B. Malkin (AMNH); 1♂: Bonaire, E. Reimoser (MCZ); 1♀, Ht of *Habronestes americana* Marx (USNM) (for locality see remark under genus distribution).

DISTRIBUTION: Aruba, Bonaire, Curaçao, Bahamas.

LACHESANA STRAND

Lachesis Savigny and Audouin, 1825: 110 (descr. new genus) (preoccupied). Simon, 1864: 218; 1870: 51.



Figs. 48–51. *Antillorena pollii.* **48.** Male palp, lateral view. **49.** Male palpal tibia, dorsal view. **50.** Epigyne, ventral view (hairs omitted on left side). **51.** Epigyne, cleared dorsal view.

Lestes Gistel, 1848: IX (nomen novum for *Lachesis,* preoccupied).
Laches Thorell, 1869: 37 (nomen novum for *Lachesis,* preoccupied).
Simon, 1893b: 408, 410, 423–429. Gerhardt and Kästner, 1938: 601.
Lachese (*Lachesis*): Simon, 1873: 66 (lapsus?).
Lachese: Simon, 1874: 237 (lapsus?).
Lachesana Strand, 1932: 140 (nomen novum for *Laches* Thorell); Lehtinen, 1967: 242.

TYPE SPECIES: *Lachesis perversa* Savigny and Audouin (whereabouts of type(s) unknown, probably not designated; material lost as most, or all, of the Audouin material).

DIAGNOSIS: Males of this genus are recognized by the recurved cheliceral fangs; females by the combination of characters of the Lachesaninae and a flat epigyne without median plate.

DESCRIPTION: Medium-size to large spiders (7.0–15.0) with oval carapace, widest between coxae II and III and narrowed in front to 0.5–0.6 times maximum width in males and 0.6–0.7 times maximum width in females. Carapace smooth with clear cervical grooves and deep fovea; rather broad (L/W ± 1.3 in males, ±1.5 in females), clothed with fine hairs, some stronger ones around fovea and in eye region.

Color: Prosoma, including legs, yellow to orange; thoracic area usually paler than cephalic area and chelicerae. Abdomen with dorsal pattern of black spots on pale background or entirely pale.

Eyes in two rows, anterior one strongly procurved as seen from in front, posterior one straight or very slightly procurved as seen from above. AME dark and circular, remainder pale and circular. All eyes of similar size. About one radius apart, at 0.65 times their diameter from ALE. PME slightly less than their diameter apart, twice that distance from PLE. MOQ longer than wide (1.1 to 1.3 times). Clypeus retreating: about 1.5 times as

high as diameter of ALE. Chilum one wide, densely haired sclerite, about 5 times wider than high. Chelicerae massive, slightly tapering toward extremity; densely haired in front; with strong lateral condyle; anterior margin with one or two teeth, resp. in male and female. Fangs rather long: length about three times width at base in female; strongly recurved in male. Endites roughly rectangular, slightly tapering toward extremity, slightly converging, with dense anteromesal scopula. (In *L. rufiventris* (Simon), the endites are modified in the male: the tip is drawn out and curved downward; no females are available for study.) Labium roughly quadrangular, narrowed at base. Sternum oval, without lateral extensions.

Legs: Formula 4123 or 4321. Spination: number of spines very variable, always fewer on legs I and II than on posterior pairs. Spines obviously dispersed. Hinged hair present on T. Tarsi with spiniform scopulae. No claw tufts. Three claws; paired claws with oblique row of teeth, varying between 9 and 20 (no differences were found in number of teeth on internal and external claws as mentioned by Simon, 1873: 67): the most proximal teeth are implanted in axis of claw, the most distal ones clearly laterally, facing the other claw. Trichobothria in two dorsal rows on tibia, in one dorsal and one retrolateral row on Mt, in one dorsal row on tarsi.

Abdomen oval. Epiandrum poorly developed. Six spinnerets, surrounded by long, curved hairs; anterior pair long, retractable, cylindrical, clearly biarticulate, with spigots. Posterior spinnerets only slightly more than half length of AS, cylindrical, faintly biarticulate. Median pair conical, small in females, very small in males. Colulus represented by two groups of short setae. Tracheal spiracle very narrow, with slightly sclerotized rim.

Male palp with broad tibial apophysis with transverse groove along distal margin. Cymbium dorsally densely clothed with fine hairs, absent in *L. insensibilis,* new species; with several strong spines distally and lateral groove holding the tibial apophysis. Tegulum and tegular apophysis membranous; divided by transversal cleft. Embolus originating on prolateral margin of posterior part of tegulum, very thin, reaching anterior tip of membranous tegular apophysis, here serving as conductor.

Female palp with toothed claw.

Epigyne a chitinized plate, in center with two holes. Spermathecae near anterior margin and far apart.

OTHER SPECIES INCLUDED: *Lachesana blackwalli* (O. P.-Cambridge) (new combination), *Lachesana insensibilis,* new species, *Lachesana rufiventris* (Simon) (new combination), *Lachesana vittata* (Strand) (new combination).

Notes: 1. *Laches scutiventris* Simon 1893b is a lapsus for *L. rufiventris* Simon 1873.

2. Reimoser (1927) mentioned the species *Laches sundaica* from the Sunda islands. I have seen the male holotype of the species (NHMW) and I have not been able to find the slightest difference with specimens of *L. blackwalli.* I therefore consider the specimen as mislabeled and *Laches sundaica* as a new synonym of *L. blackwalli* (NEW SYNONYMY). It is probably not a coincidence that the NHMW register number of the specimen (417) follows two numbers (415, 416) referring to *Lachesana* caught in Jerusalem.

DISTRIBUTION: Middle East, North Africa as far east as Tunisia (other records further west are unsubstantiated); Crete (a juvenile specimen caught by J. Murphy).

NATURAL HISTORY: The biology of members of this genus is confused: they apparently live in semiarid and arid regions; these spiders have been mentioned living under stones in tubular webs (O. P.-Cambridge, 1872), simply under stones without web (Simon, 1873), or in the sand in tubes which may be lined with silk (Roth, 1988). Roth (in litt.) mentioned a juvenile *Lachesana* ". . . taken from a hole, 43 cm deep in inland dunes, closed in the day time—covered with sausage shaped lumps of sand up to 7 mm in diameter and up to 25 mm long. The burrow is open at night." It is rather unlikely that a spider of 9.8 mm total length (actual size of the specimen mentioned) would be able to construct lumps the size mentioned above. I therefore think that the spider uses the burrow of another animal.

Lachesana blackwalli (O. P.-Cambridge)
Figures 52–58

Lachesis blackwalli O. P.-Cambridge, 1872: 266 (descr. ♂♀).

Lachese blackwalli: Simon, 1873: 67; 1874: 253.

Laches blackwalli: Simon, 1893b: 426, 427, fig. 399.
Laches blackwallii: Kulczynski, 1908: 56, figs. 11, 12.

TYPE MATERIAL: Lectotype male (here designated): Palestina, Jerusalem (MO 485).
Paralectotype: 1♀: together with Lt.

DIAGNOSIS: The male of this species is recognized by the shape of the male palpal tibial apophysis; the female is characterized by its epigyne.

DESCRIPTION: *Male:* Total length 13.7; carapace 8.33 long, 6.25 wide.

Color: Carapace orange, darker on striae and in ocular area; chelicerae yellow at base, orange near fang; sternum yellow; legs with coxae, tibiae and ventral side of tibiae paler than other parts of legs which are orange. Abdomen with typical dorsal pattern of dark patches on pale background. Venter with orange epiandrum and slightly paler orange area surrounding it; remainder of abdomen pale yellow, except oblique black ventral stripe on either side of spinnerets.

Eyes: a: 1.00 (0.17); b: 1.11; c: 0.88; d: 0.94; e: 0.41; f: 0.65; g: 0.76; h: 1.82. MOQ: AW = 0.93 PW; AW = 0.85 L.

Legs: Spination: femora I pl4*d1-1-2rl4* II d1-1-2rl4* III d3-1-2-1-1-2rl5* IV d3-1-2-1-2rl1; patellae I pl1 II pl1 III pl3*d1rl1 IV pl2*d1rl1; tibiae I 14disp. II 11disp. III 15disp. IV 15disp.; metatarsi I pl1v16disp. II pl2*v13disp. III 23disp. IV 23disp. Measurements:

	I	II	III	IV
F	4.41	4.16	3.83	4.83
P	1.83	1.67	1.58	1.83
T	3.50	3.25	2.50	3.16
Mt	3.50	3.66	4.50	6.00
t	2.58	2.58	2.83	3.25
Tot	15.83	15.32	15.24	19.07

Palp: Figs. 56, 57.

Female: Total length 14.90; carapace 6.50 long, 4.00 wide. Color as in male.

Eyes: Position as in male.

Chelicerae with lateral condyle much stronger than in male. Fangs not recurved.

Epigyne: Figure 58.

OTHER MATERIAL EXAMINED: 2♂, 1 sa: Turkey, 30 km from Gaziantep on Urfa Road, 12.IX.1956, attracted to light (AMNH); 3♂: Israel, Dead Sea (ZMH).

DISTRIBUTION: Middle East: from Turkey in the north to Israel in the south.

Lachesana insensibilis, new species
Figure 59

TYPE MATERIAL: Holotype male: Saudi Arabia, Khulais Valley, N of Jeddah, 1987, pitfall, A. Faragalla (MRAC 169818).
Paratype: 1♂: together with Ht (DBUJ).

DIAGNOSIS: The species is closely related to *L. blackwalli* but differs by the entirely pale abdominal dorsum, the high number of spines on the legs, the high number (±20 instead of ±13) of teeth on the paired tarsal claws, the leg formula 4321 and in the male by the absence of a mesodorsal patch of chemoreceptors on the palpal cymbium.

ETYMOLOGY: The name refers to the absence of chemoreceptors on the male palpal cymbium and means "insensitive."

DESCRIPTION: *Male* (data for Pt between brackets): total length 11.91 (10.41), carapace 5.91 (5.58) long, 4.08 (3.91) wide.

Color: Prosoma including legs entirely pale yellow. Abdomen uniform pale in front with pale yellow T-shaped scutum.

Carapace strongly narrowed in front to 0.5 times maximum width.

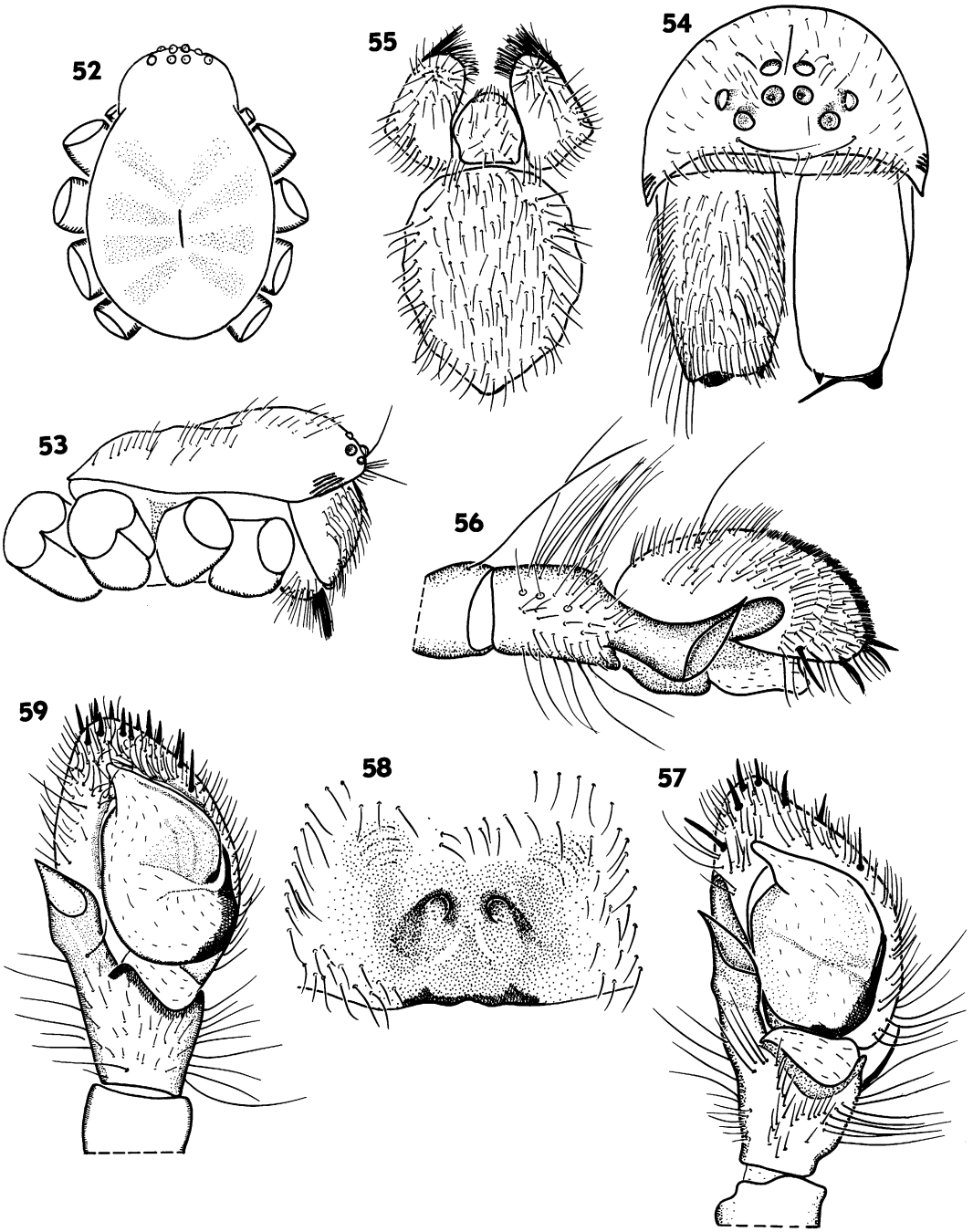
Eyes: a: 1.00 (0.16); b: 0.81; c: 0.87; d: 1.06; e: 0.62; f: 0.43; g: 1.12; h: 1.68. MOQ: AW = 1.00 PW; AW = 0.91 L.

Legs: Spination: femora I pl10d4rl11v1 II pl10d4rl8v2 III pl11d7rl2v2 IV pl7d8rl1v4; patellae I pl2rl21 II pl2rl2 III pl5d1rl1 IV pl3d1rl1; tibiae I pl11v4 II pl6rl3v7 III 19 disp. IV 21 disp.; metatarsi I pl10v4*rl1 II pl7rl6v2disp. III 23disp. IV 25 disp. Measurements:

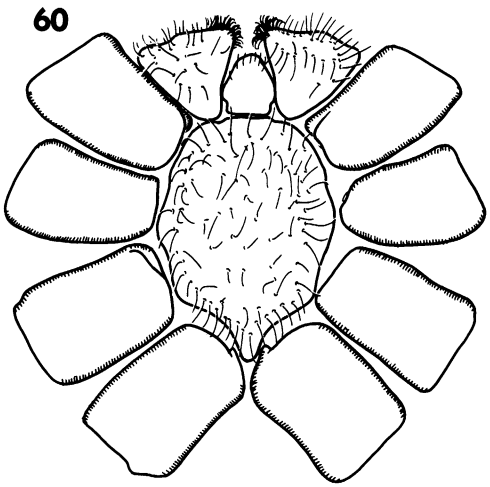
	I	II	III	IV
F	5.58	5.08	5.16	6.00
P	1.92	1.75	1.83	1.83
T	4.25	3.75	3.41	4.25
Mt	4.33	5.24	6.83	8.00
t	2.08	2.75	3.33	3.58
Tot	18.16	8.57	20.57	23.66

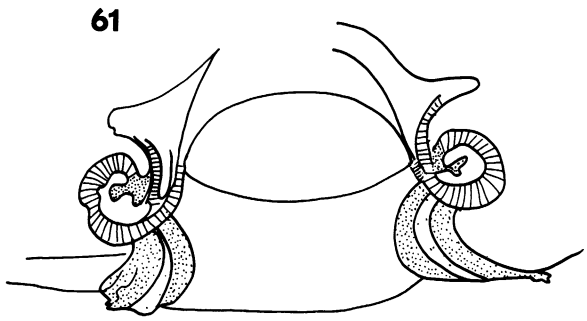
Tarsi widened toward extremity. Unpaired tarsal claw small. Paired claws long, with 18–23 teeth.

Palp (fig. 59): very similar to that of *L. blackwalli* (fig. 57) but lacking area with dense chemoreceptors on cymbium and transversal division of tegulum is oblique in *L. blackwalli,* perpendicular to axis in *L. insensibilis.*



Figs. 52–59. 52–58. *Lachesana blackwalli.* **52.** Female carapace, dorsal view. **53.** Female carapace, lateral view. **54.** Female carapace, frontal view (hairs omitted on left chelicera). **55.** Sternum, labium, and endites. **56.** Male palp, lateral view. **57.** Male palp, ventral view. **58.** Epigyne, ventral view. **59.** *Lachesana insensibilis,* male palp, ventral view.





Figs. 60, 61. *Lutica maculata.* **60.** Sternum, labium, and endites. **61.** Epigyne, cleared dorsal view.

Female: Unknown.

Note: The leg formula 4321 is remarkable and seems to occur mainly in Zodariidae from arid regions.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

LUTICA MARX

TYPE SPECIES: *Lutica maculata,* Marx 1891 (Ht imm. in USNM, examined).

For a complete review of literature, descriptions, natural history, etc. see Gertsch (1961). Further literature: Brignoli, 1976: 211; Roth, 1985: B-47-1.

Note: Lutica bengalensis Tikader and Patel, 1975 and *Lutica deccanensis* Tikader and Malhotra, 1976 certainly do not belong in *Lutica* as already mentioned by Brignoli, 1976. Unfortunately, the type specimens are not available for study. The real generic identity of these species could throw new light on the distribution of some Zodariinae (*Zodarion*? *Acanthinozodium*? *Diores*?).

DIAGNOSIS: Representatives of *Lutica* are typical Lachesaninae with slightly recurved PER, and a toothless cheliceral margin.

DESCRIPTION: Gertsch's (1961) description is almost complete. I can add a few more data.

Chilum well developed, roughly oval, about three times wider than high, provided with many setae. Endites (fig. 60) with enlarged base, plane of insertion of palpus perpendicular to body axis. Hinged hairs present on tibiae and metatarsi.

Epigyne (fig. 61): Copulatory ducts very short, leading directly into widely separated spermathecae.

Tracheae: With four main trunks, lateral ones stronger than median ones, bifurcating toward middle not far from tracheal spiracle.

OTHER SPECIES INCLUDED: *L. nicolasia* Gertsch, *L. abalonea* Gertsch, *L. clementea* Gertsch.

DISTRIBUTION: Insular and coastal California.

NATURAL HISTORY: Roth (1985) mentioned that members of *Lutica* make a silken retreat just under the surface of sandy dunes and ambush prey from within it. This is corroborated by laboratory observations (Griswold, in litt.) but in strong contrast with Gertsch (1961), who stated that they do not make any formal retreat and come to the surface by night to hunt. This is of some importance as the construction of a subterra-

nean retreat appears to be apomorphic in the Zodariidae.

STORENINAE SIMON 1893

TYPE GENUS: *Storena* Walckenaer.

Although this is a very homogeneous subfamily, some doubt remains about its position (see cladistic analysis). The synapomorphies are: metatarsal ventral hair tufts with hollow chisel-shaped hairs. Hinged hairs are few, and restricted to the dorsal side of the leg segments, except in *Cybaeodamus* where they are numerous. They are lacking in *Storamia* and *Asceua.*

Several genera are on the limit of this subfamily: *Cybaeodamus* which lacks several apomorphies present in other members of this group (triangular sternum, few hinged hairs, PER procurved, well delimited chilum). Considering these facts as well as the poorly developed metatarsal tuft and the absence of chisel-shaped hairs, *Cybaeodamus* might in fact belong in the Lachesaninae. Its AS are indeed long but there is no indication that they are retractile; they were therefore coded as 0 in table 2. There are long curved hairs around these AS, another indication that they might belong in the Lachesaninae. However, the complexity of the male palp points more in the direction of a more apomorphic subfamily, Storeninae being the only one that would match.

Another problematic taxon is *Platnickia,* tentatively placed in this subfamily. Although it lacks metatarsal tufts, there are a number of chisel-shaped hairs at the distal ventral extremity of the posterior Mt. It has a quite simple palp which resembles that of some Lachesaninae (*Lachesana* and *Lutica*) but it lacks the long, retractile AS.

Leprolochus is another member of the subfamily that has some remarkable autapomorphies (leg formula 4321, row of spines in eye region) as well as some puzzling plesiomorphies (long PS).

Asceua and *Storamia* are at the other end of the subfamily's range. They both share apomorphies with the Zodariinae: *Storamia* lacks hinged hairs whereas *Asceua* has flattened indented hairs but almost no spines on the legs.

ASCEUA THORELL

Asceua Thorell, 1887: 75 (new genus).
Storena (part): Simon, 1893b: 429 (synonymized).
Ascena: (sic) Merian, 1911: 173 (lapsus).
Doosia Kishida, 1940: 140 (new genus), type species: *Hermippus japonicus* Bösenberg and Strand, 1906, Ht in SMF (examined) (NEW SYNONYMY).
Suffucia Simon, 1893d: 78 (new genus) type species: *Suffucia heliophila* Simon, 1983d: 78 (whereabouts Ht unknown) (NEW SYNONYMY).
Asceua: Bosmans and Van Hove, 1986a: 19 (gen. rev.). Jocqué, 1986a: 307.

Remarks: Suffucia clearly is a junior synonym of *Asceua.* Simon's (1893d) description of the type species, *S. heliophila,* leaves no doubt as to the identity of the genus. It is a small (2.7–3.0) species with a dark, rufous carapace. The male palp is compressed, with a large groove on either side, a diagnostic character of *Asceua.*

TYPE SPECIES: *Asceua elegans* Thorell.

DIAGNOSIS: Representatives of the genus *Asceua* are recognized by the narrow cymbium (male) and the superficially intricately wound ducts in the epigyne (female). Their small size and the absence of spines (except one or two dorsal ones on the femora), are additional characters.

DESCRIPTION: Small spiders (2.5–4.5), with relatively high, oval carapace, without cervical grooves, widest at level of coxae II; narrowed in front to 0.65 maximum width in males and to about 0.75 times maximum carapace width in females. Highest point in profile between PME and fovea. Teguments smooth or finely granulated.

Color: Carapace, chelicerae, and sternum orange to dark brown; legs basically yellow to brown with dark stripes, femora usually with pale base. Abdomen dark gray with pale dorsal patches; venter pale or gray.

Eyes in two procurved rows; ALE dark, circular; remainder pale, circular; all eyes subequal. AME less than their diameter apart and at same distance from ALE. PME about their diameter apart and slightly further from PLE, which are close to ALE. MOQ wider in back than in front and slightly longer than posterior width. Clypeus about three times

as high as width of ALE, convex and protruding.

Chilum single triangular sclerite, approximately as high as wide. Chelicerae without teeth. Endites and labium typical for subfamily. Sternum bulging; roughly triangular with slight lateral triangles, corresponding with coxal concavities.

Legs: Formula 4123 or 4132. Spination very poor; at most 1 or 2 dorsal spines on femora. Distoventral tuft of hairs poorly developed on Mt III and IV, but with clearly chisel-shaped hairs. Hinged hairs absent. Three claws: paired ones with about 10 teeth on legs I and II, with 4 or 5 teeth on legs III and IV. Inferior claw very small or vestigial, on protruding support. Tarsi I and II fusiform, III and IV laterally compressed. Legs beset with indented hairs, which may be flat. Trichobothria in two rows on T, in one row on Mt and t; distal trichobothrium on Mt long.

Abdomen oval, with dorsal scutum and epiandrum in male. Spinnerets 4 in male (not 2 as erroneously mentioned in Jocqué, 1986a), 6 in female. Colulus represented by transversal row of few setae. Tracheal spiracle narrow, slightly procurved, anterior rim slightly sclerotized.

Male palp with short tibia, provided with one or more short lateral and/or dorsal apophyses; cymbium very narrow as seen from above, due to wide lateral fold. Embolus threadlike, originating on mesoproximal side of tegulum. The latter with small lateral apophysis.

Female palp with finely pectinate claw, turned inward over 90°. Tarsus slightly fusiform.

Epigyne with long, wound ducts leading to aboral spherical spermathecae. In front often with short central lip.

Other species included: *Asceua lejeunei,* new species, *Hermippus japonicus* Bösenberg and Strand (type in SMF, examined), *Asceua amabilis* Thorell (type in MCSG) (examined), *Storena zodarionina* Simon (Ht in MCSG) (examined); *Asceua radiosa* Jocqué (Ht in MRAC); several described and many undescribed species.

DISTRIBUTION: Tropical and subtropical regions of Africa and Asia; also occurring on oceanic islands (Jocqué, 1986a).

Asceua elegans Thorell
Figures 62, 63, 95

Asceua elegans Thorell, 1887: 76 (descr. ♀).

TYPE MATERIAL: Holotype female: Birma, Bhamo, 1885, L. Fea (MCSG) (examined).

DIAGNOSIS: The female of this species is recognized by the details of the epigyneal duct system.

DESCRIPTION: *Female:* Total length 3.83; carapace 1.54 long, 1.04 wide.

Color: Carapace and chelicerae uniform dark reddish brown; sternum yellow with medium brown margin; legs and palp yellow with medium brown tarsi. Abdomen (fig. 62): dorsum sepia with two white spots in front, two in middle followed by interrupted chevron and complete one in front of spinnerets. Sides pale in frontal part, sepia with large circular spot in posterior part. Venter pale with small diamond-shaped sepia spot in front of spinnerets, surrounded by narrow dark ring.

Carapace: Typical for genus.

Eyes: a: 1.00 (0.09); b: 1.00; c: 0.89; d: 1.11; e: 0.44; f: 0.33; g: 0.77; h: 2.33. MOQ: AW = 0.95 PW; AW = 0.70 L. Clypeus 0.26 high.

Legs: Spination: all femora with one dorsal spine. Measurements:

	I	II	III	IV
F	1.03	0.97	0.95	1.09
P	0.34	0.34	0.40	0.59
T	0.81	0.65	0.65	0.95
Mt	0.85	0.81	0.89	1.15
t	0.50	0.48	0.40	0.50
Tot	3.53	3.25	3.29	4.28

Epigyne: Figures 63, 95.

Male: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

Asceua lejeunei, new species
Figures 64–70

TYPE MATERIAL: Holotype male: Zaire, Kivu, vallée de la Ruindi, 10.VII.1972,

TABLE 2

Cyrioctea	1000000000	0000000000	0000000000	0000000000	0000000000	0000000000	0000000000	000000000
Lachesana	0010110010	0010000000	0000000000	0000000010	0000000000	0000000000	0011000000	000000000
Lutica	0010100020	0010000000	0000000000	0000000000	0000000000	0000000000	0000000000	000000000
Antillorena	0010101010	0010000000	0010000000	0000000000	0000000000	0000000000	0011100000	000000000
Leprolochus	0111001021	0000110100	0020020000	0000000010	0000000000	0000000001	0211000000	000000000
Asceua	0010001121	0000110211	1011000000	0000002000	0000000000	0000000000	1311001000	000000000
Asteron	0010001121	0000110110	1110000000	0000000000	0000000000	0000000001	1311001100	000000001
Cybaeodamus	0010000011	0000000000	0000000000	0000000000	0000000000	0000000001	0011000001	000000000
Forsterella	0010001121	0000110121	0010000000	0000000000	0000000000	0000000001	1011001001	000000001
Habronestes	0010001121	0000110101	0010000000	0000000000	0000000000	0000000001	1311001000	001000001
Hermippus	0010001021	0000110121	0010020000	0000010000	0000000000	0010000001	1501001000	000000001
Hetaerica	0010001011	0000110101	0010000000	0000000000	0000000000	0000000000	1???001000	00000000?
Ishania	0010001121	0000010100	0000000000	0000000000	0000000000	0000000001	1011001000	100100001
Mallinella	0010001121	0000110121	1010000000	0000010000	0000000000	0000000001	1001001000	000000000
Neostorena	0010001121	0000110121	1010000000	0010000000	0000000000	0000000001	1011001000	010000000
Nostera	0010001011	0000110101	0010000000	0000000000	0000000000	0000000000	1000001000	000010001
Platnickia	0010000111	0000110100	0010000000	0000000020	0000000000	0000000100	?000001000	000000001
Selamia	0010001010	0000010111	0010000000	0000000000	0000000000	0000000000	1001000010	000001000
Storamia	0010001011	0000110221	1010000000	0000000000	0000000000	0000000001	1301001000	000000001
Storena	0010001011	0000110111	1000000000	0000000000	0000000000	0000000011	1301001000	000000001
Storosa	0010001111	0000110111	0010000000	0000000000	0000000000	0000000000	1301001000	000000101
Tenedos	0010001021	0000010100	0010000000	0000000000	0000000000	0000000001	1301001000	000000010
Chariobas	0010000120	1110100100	0020010000	0000003020	0000000000	1100010000	1000001000	000000000
Cicynethus	0010001020	1110100100	0020000000	0000003020	0000000000	0001001000	1000001000	000000000
Madrela	0010001120	1110100100	0000010000	0000001020	0000000000	0010100000	1001000000	000000000
Storenomorpha	0010001120	1110100100	0010000000	0000003020	0000000000	0001000000	0311001000	000000000
Thaumastochilus	0010001120	1110100100	0020000000	0000003030	0000000000	1000010000	1???001000	000000000
Aschema	0010100020	0011100101	0000000000	0000000000	0001000000	0000000001	1201001000	000000000

TABLE 2—(*Continued*)

Caesetius							
0010003021	0011100101	0210020000	0000000010	0000100000	0000000000	1000000000	000000001
Capheris							
0010000021	0011100111	0410000000	0000000000	1111000000	0000000001	0300001000	000000000
Cydrela							
0010003021	0011100101	0000000000	0000000000	0000000000	0000000000	1000101000	000000000
Psammoduon							
0010003021	0011100101	0000020000	0000000010	0000111100	0000000001	1300000000	000000001
Psammorygma							
0010000021	0011100111	0300000000	0000000010	0000000011	0000000001	0001101000	000000001
Acanthinozodium							
0010002121	0000102231	1021000001	0000011000	0000000000	0000000000	1211011000	000000000
Akyttara							
0010002121	0000103231	1000000001	0111002000	0000000000	0000000001	1001011000	000000000
Diores							
0100001121	0000102231	1001120001	0000001000	0000000000	0000000000	1211111000	000000000
Dusmadiores							
0010002121	0000104231	1001000011	0000002000	0000000000	0000000001	1201011000	000000000
Heradida							
0010002121	0000105231	1000000001	0010102000	0000000000	0000000000	1301001000	000000000
Mallinus							
0010002121	0000102231	1001020001	1000012000	0000000000	0000000001	1???011000	00000000?
Mastidiores							
0010002121	0000104231	1001010011	0000002000	0000000000	0000000001	1211011000	000000000
Microdiores							
0010002121	0000102131	1001000001	0000002000	0000000000	0000000001	1201011000	000000001
Palaestina							
0010000121	0000102231	1001000101	0001102000	0000000000	0000000000	1300011000	000000000
Palfuria							
0010002121	0000102231	1031000001	0000002001	0000000000	0000000000	1001011000	000000000
Ranops							
0010002121	0000102231	1022000001	1000002110	0000000000	0000000000	1000011000	000000000
Suffasia							
0010001111	0000101221	1011000000	0000000000	0000000000	0000000001	1???010000	000000000
Trygetus							
0010002121	0010102231	1001001001	0001102000	0000000000	0000000001	1011001000	000000000
Zodarion							
0010002121	0000102231	1022000001	1000012000	0000000000	0000000000	1001011000	000000000

sweeping, R. P. M. Lejeune (MRAC 144 436).

Paratypes: 4♀, 2 juv. together with Ht.

DIAGNOSIS: Specimens of *A. lejeunei* are recognized by the abdominal pattern (fig. 64) and the details of the male palp and the female epigyne.

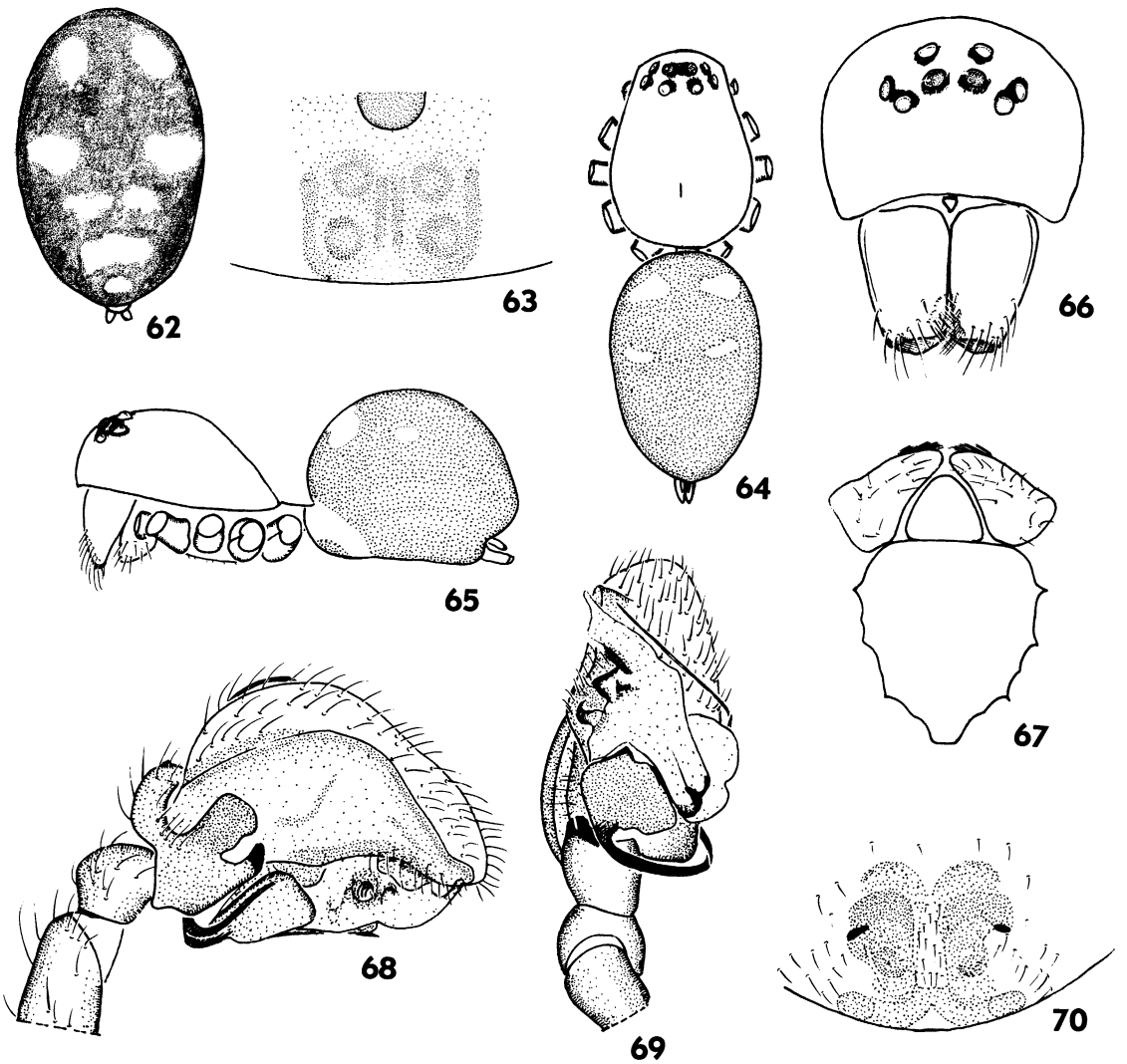
ETYMOLOGY: The species name is a patronym in honor of Rev. P. M. Lejeune who made some very interesting collections of spiders in Kivu (Zaire).

DESCRIPTION: *Male:* Total length 2.98; carapace 1.37 long, 1.00 wide.

Color: Carapace yellowish orange with darker margin; chelicerae and sternum yellowish, the latter suffused with black; legs yellowish with basal third of femora white; remainder of legs with dark ventral streak. Abdomen entirely dark gray except for four pale dots on dorsum: two large ones in front, two smaller ones in middle, and one pale circular mark around epiandrum. Spinnerets yellow.

Carapace smooth.

Eyes: a: 1.00 (0.08); b: 1.00; c: 1.00; d: 1.12; e: 0.62; f: 0.62; g: 1.12; h: 1.50. MOQ: AW = 0.84 PW; AW = 0.75 L.



Figs. 62–70. 62–63. *Asceua elegans.* **62.** Abdomen, dorsal view. **63.** Epigyne, ventral view. 64–70. *Asceua lejeunei.* **64.** Female habitus, dorsal view. **65.** Female carapace, lateral view. **66.** Female carapace, frontal view. **67.** Sternum, labium, and endites. **68.** Male palp, lateral view. **69.** Male palp, ventral view. **70.** Epigyne, ventral view.

Legs: Spination: all femora with one dorsal spine in proximal half. Remainder spineless. Measurements:

	I	II	III	IV
F	0.85	0.79	0.65	0.85
P	0.30	0.30	0.48	0.28
T	0.67	0.63	0.61	0.71
Mt	0.83	0.73	0.79	1.01
t	0.55	0.51	0.48	0.55
Tot	3.21	2.95	3.01	3.39

Male palp (figs. 68, 69): Tibia with three apophyses: one dorsal, one dorsolateral, one ventrolateral. Tegulum with distal membranous extension and short, sclerified ventral tooth. Tegular apophysis short and hook shaped.

Female: Total length 2.92–3.63; carapace 1.33–1.38 long, 0.92–0.96 wide. Color as in the male, but orange instead of yellowish orange. Further as male. Legs: measurements:

	I	II	III	IV
F	0.81	0.73	0.73	0.85
P	0.28	0.28	0.34	0.30
T	0.65	0.59	0.57	0.71
Mt	0.81	0.75	0.79	1.01
t	0.51	0.46	0.44	0.50
Tot	3.05	2.83	2.87	3.37

Epigyne: Figure 70.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

ASTERON, NEW GENUS

TYPE SPECIES: *Asteron reticulatum*, new species.

DIAGNOSIS: Representatives of this genus are recognized by the remarkable tegulum in the male palp. It is very large and stands free from the rest of the bulbus. Females have an epigyne with poorly defined spermathecae, and relatively long, superficial, copulatory ducts. The dorsal abdominal pattern with three or five white spots, sometimes with a few extra chevrons, on a dark background is also characteristic.

ETYMOLOGY: *Asteron* is an anagram of *Storena*. The gender is neuter.

DESCRIPTION: Small to medium-size spiders (2.50–6.50) with smooth or reticulated teguments. Carapace widest at level of coxae II, narrowed to 0.65 maximum width in females, to about 0.55 maximum width in males. Profile domed with highest point between fovea and PME.

Color: Carapace, chelicerae, and sternum reddish to dark chestnut brown; legs orange to brown, sometimes with contrasting white rings; abdomen dark sepia with three or five well delimited pale spots, posterior median sometimes broken into several small chevrons.

Eyes in three rows (2-4-2). Second one strongly recurved as seen from above, so that it may seem that there are 4 rows of 2 eyes. All eyes subequal, circular, pale, only AME dark. AME close together, about one radius from PME, these slightly larger. ALE twice their diameter apart. PLE close together. MOQ longer than wide and slightly narrower in front than in back. Clypeus slightly convex and retreating, straight or slightly concave; about 4 times diameter of ALE; with few hairs.

Chilum single, oval, or double with 2 rather broad, short sclerites, slightly wider than long, without hairs. Chelicerae with few hairs in front and dense row on distal promargin; no teeth. Labium narrowed at base; sparsely haired. Endites rather elongate; sparsely haired; with anteromesal scopula. Sternum bulging, more strongly so in males than in females; triangular with straight or slightly procurved anterior margin and slight triangular extensions between coxae. No inter- or precoxal sclerites.

Legs: formula 4123. Spination: few spines on pairs I and II, more numerous on III and IV. Tarsal claws with approximately 14 teeth on those of first leg pairs, with only about 8 teeth on those of legs III and IV. Unpaired claw on well-developed onychium. Trichobothria in 2 or 3 rows on T and in single row on Mt and t. Hinged hairs present. Metatarsal tufts poorly developed.

Abdomen oval; with two muscle points; in male with narrow dorsal scutum in anterior half and with epiandrum. Tracheal spiracle almost straight, narrow; sclerified area in front of it sometimes bulging, then covered with short, modified setae. Tracheae from beginning divided into 4 fine tubuli. Spinnerets: posterior pairs smaller in males than in females. Colulus represented by few hairs.

Male palp: Tibia with short lateral and dorsal apophyses, together delimiting frontal concavity. Embolus broad at base, originating on promesal or posterior part of tegulum, which has large, sometimes huge, sclerified, broad, apophysis.

Epigyne: Simple; posterior margin strongly sclerotized; copulatory ducts starting at posterior margin, wound, ending in poorly defined spermathecae, sometimes corkscrew-shaped.

Female palp with slender, conical tarsus provided with spines on mesal and ventral sides. Finely dentate tarsal claw in normal axis or slightly turned inward over $\pm 30°$.

OTHER SPECIES INCLUDED: *Asteron mas*, new species, many undescribed.

DISTRIBUTION: Queensland, New South Wales (probably entire Australia).

Asteron reticulatum, new species
Figures 71–77, 96

TYPE MATERIAL: Male holotype: Australia, New South Wales, Bondi State Forest, S Bambala, woodlot 1, 37°08'S, 149°09'E, 15.X.1980, G. Gowing et al. (AM, KS 11310).

Paratypes: *New South Wales*: 1♀: Nadgee Nature reserve, 37°27'S 149°56'E, J. Settle (AM: KS1295); 10♂: Bondi State Forest, S of Bambala, woodlot 1, 37°08'S, 149°09'E, 25.X.1980, G. Gowing et al. (AM: KS11004, 11048, 11051, 11059, 11070, 11131, 11188); 7♂, 2♀, 2 juv.: 15.X.1980 (AM: KS11198, 11213, 11245, 11246, 11276, 11281, 11303, 11427); 1♀: 1.VII.1981 (AM: KS11482); 4♂, 1♀: 14.XI.1980 (AM: KS11581, 11625, 11630, 11764, 11863); 1♂: 26.I.1981 (AM: KS12138); 1♀: 6.V.1980 (AM: KS12162); 1♂: 27.IX.1980 (AM: KS15199); 1♂: 31.III.1981 (AM KS11390); 1♀: Smith Lake near Myall Lakes, 32°23'S, 152°29'E, IX.1972, Maquarie University leg. (AM KS15601). *Queensland*: 1♀, 1 juv.: Eurimbula, SE of Gladstone, 24°11'S, 151°50'E, III.1975, C. Horseman (AM: KS6712).

DIAGNOSIS: The male of this species is recognized by the shape of the tibial and tegular apophyses and by the presence of a tooth on the basis of the embolus. The female can be recognized by the details of the epigyne.

ETYMOLOGY: *Reticulatum* refers to the reticulated carapace of this species.

DESCRIPTION: *Male:* Total length 2.72 (2.54–3.08); carapace 1.54 (1.42–1.58) long, 1.01 (0.94–1.02) wide.

Color: Carapace dark chestnut brown; chelicerae medium brown; sternum reddish brown; legs medium brown with femora distinctly darker than remainder of legs. Abdomen: dorsum dark sepia with five white spots: one pair in front, one pair in middle and single spot in front of spinnerets; sides dark; venter with longitudinal pale patch behind epigastric furrow, large white spot on either side, halfway between spinnerets and epigastric furrow.

Eyes: a: 1.00 (0.07); b: 1.14; c: 1.07; d: 1.28; e: 0.14; f: 0.57; g: 0.57; h: 1.43. MOQ: AW = 0.78 PW; AW = 0.60 L. Clypeus 0.32 high, slightly convex.

Legs: spination: femora I d1 II d1 III d1 IV d2*; patellae I-II-III p1l IV p1lrl1; tibiae I-II-III pl2*d2*v1 IV pl2*d2*rl2*v3*; metatarsi I-II v1 III 9 IV disp. 11 disp. Measurements:

	I	II	III	IV
F	0.87	0.81	0.65	0.85
P	0.36	0.36	0.32	0.40
T	0.77	0.57	0.46	0.69
Mt	0.67	0.59	0.61	0.91
t	0.53	0.44	0.36	0.50
Tot	3.19	2.77	2.40	3.35

Distal metatarsal trichobothrium very long (more than 5 times diameter of segment), with clear nod in middle, from there bent backward.

Male palp (figs. 75, 76): Tibia with sharp lateral and blunt dorsal apophysis delimiting dorsal concavity; embolus with broad base with large mesal tooth, remainder whiplike; tegulum with large distal apophysis with rounded extremity, standing free of main part of bulbus.

Female: Total length 2.84 (2.84–3.42), carapace 1.66 (1.54–1.66) long, 1.05 (1.00–1.06) wide.

Color: Very much as in male, but with more reddish tinge all over; abdomen without scutum.

Eyes as in male.

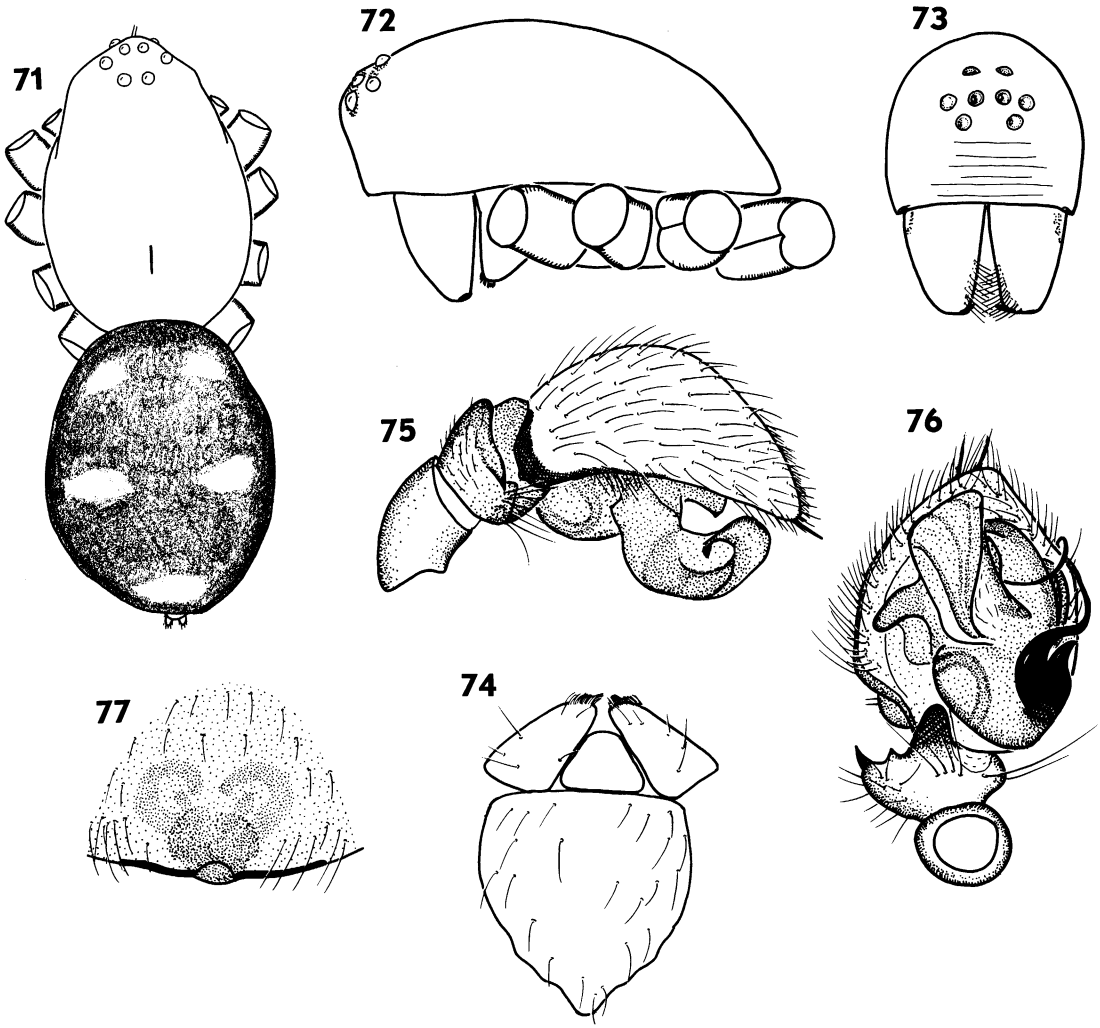
Legs: Spination: femora I d1 II d1 III d1 IV d2*; patellae I-II-III p1l IV p1lrl1; tibiae I-II-III pl2*d2*v1 IV pl2*d2*rl2*v2*; metatarsi I-II-III 9 IV disp. 11 disp. Measurements:

	I	II	III	IV
F	0.91	0.81	0.67	0.93
P	0.40	0.36	0.36	0.42
T	0.67	0.57	0.51	0.77
Mt	0.63	0.57	0.65	1.01
t	0.48	0.44	0.38	0.53
Tot	3.09	2.75	2.56	3.65

Epigyne (figs. 77, 96): Rather simple: sclerotized rectangular plate, strongly sclerotized along posterior margin, with small central lip behind tiny opening; ducts shining through.

OTHER MATERIAL EXAMINED: 1♀: Bondi State Forest, S of Bombala, woodlot 1, 37°08'S, 149°09'E, 14.XI.1980, G. Gowing et al. (AM: KS12026).

DISTRIBUTION: New South Wales, Queensland.



Figs. 71–77. *Asteron reticulatum*. **71.** Male habitus, dorsal view. **72.** Male carapace, lateral view. **73.** Male carapace, frontal view. **74.** Sternum, labium, and endites. **75.** Male palp, lateral view. **76.** Male palp, ventral view. **77.** Epigyne, ventral view.

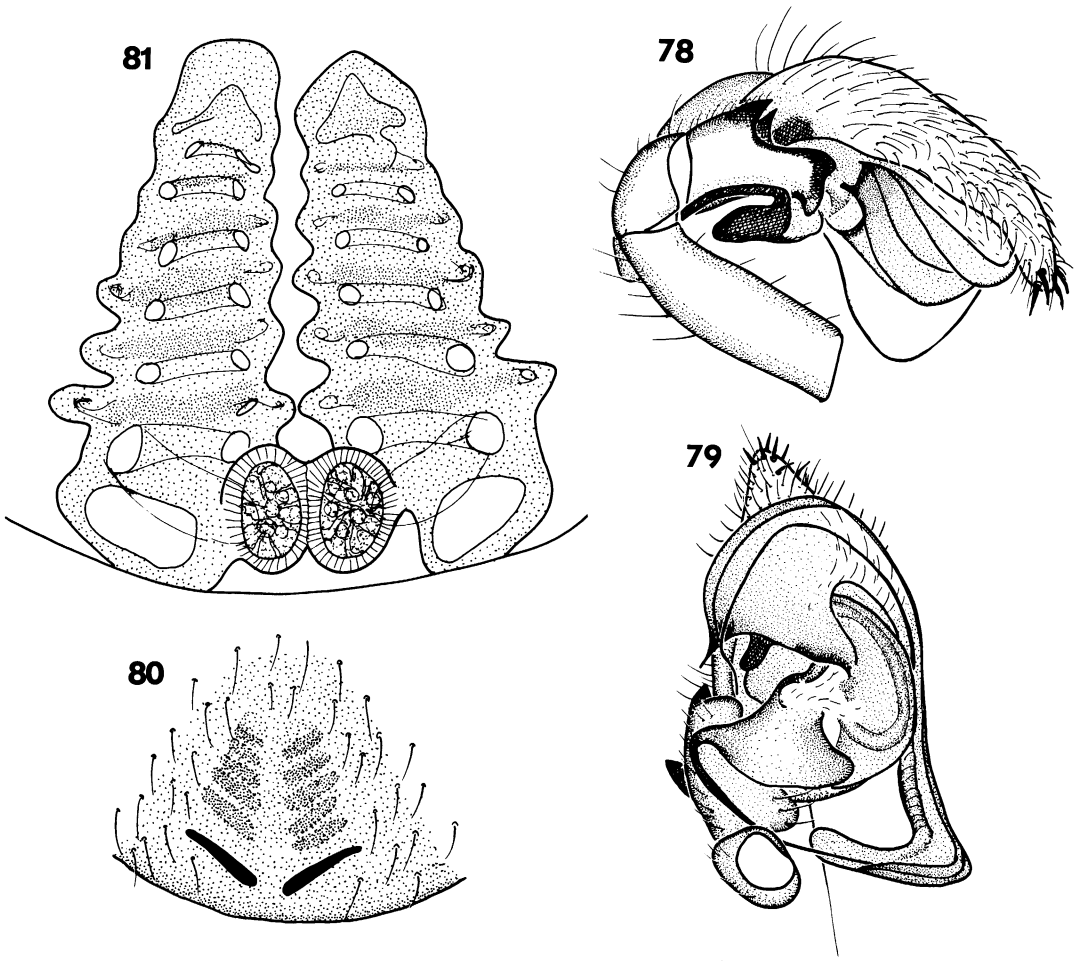
Asteron mas, new species
Figures 78–81, 97

TYPE MATERIAL: Male holotype: Australia, New South Wales, Bondi State Forest, S of Bombala, woodlot 1, 37°08'S, 149°09'E, 14.XI.1980, G. Gowing et al. (AM, KS 11632).

Paratypes: New South Wales: 1♂ 1 sa ♀: Bondi State Forest, S of Bombala, woodlot 1, 37°08'S, 149°09'E, 25.X.1980, G. Gowing et al. (AM: KS11008); 1♂ 1 sa ♀: 15.X.1980 (AM: KS11197); 1♀: 1.VII.1981 (AM: KS11513); 5♂ 1 sa ♀: 14.XI.1980 (AM: KS11522, KS11589, KS11728, KS11755, KS11774, 1♂ and 1 sa ♀ now in KBIN).

ETYMOLOGY: *mas* is a noun in apposition which means male and refers to the pronounced male characters in this species, more precisely the enormous tegular apophysis on the palp.

DIAGNOSIS: The male of this species is rec-



Figs. 78–81. *Asteron mas.* **78.** Male palp, lateral view. **79.** Male palp, ventral view. **80.** Epigyne, ventral view. **81.** Epigyne, cleared dorsal view.

ognized by the shape of the tibial and tegular apophyses; the female can be recognized by the details of the epigyne which has a coiled copulatory duct.

DESCRIPTION: *Male:* Total length 4.17 (3.75–4.29); carapace 2.17 (2.04–2.17) long, 1.58 (1.50–1.62) wide.

Color: Carapace dark chestnut brown; sternum and chelicerae medium brown; legs: coxae white, trochanters dark brown; femora white in proximal half, dark brown in distal half; remainder of legs medium brown. Abdomen: dorsum dark sepia, with slightly darker narrow scutum; 2 pairs of dorsal white spots, 1 pair in front, 1 pair in middle, followed by series of 2 to 4 narrow chevrons in front of spinnerets; sides dark with 3 oblique pale streaks in posterior half; venter with transverse row of 3 pale spots just behind middle. Some males have entirely dark abdomen without pale pattern.

Carapace finely reticulated.

Chilum single about 5 times wider than high.

Eyes: a: 1.00 (0.08); b: 1.12; c: 1.25; d: 1.37; e: 0.50; f: 0.50; g: 0.87; h: 1.50. MOQ: AW = 0.91 PW; AW = 0.70 L. Clypeus 0.45 high, straight.

Legs: Spination: femora I pl1d2* II pl1d2* III pl2d3*rl1 IV d3*; patellae I-II-III pl1d1rl1

IV pl1d1rl1; tibiae I pl1v2* II v2* III pl2*d2*rl2*v2-2-2 IV pl2*d2*rl2*v2-2-2; metatarsi I v6 II v6 III 13 IV disp. 15 disp. Measurements:

	I	II	III	IV
F	1.57	1.41	1.27	1.62
P	0.58	0.56	0.61	0.65
T	1.27	1.09	0.91	1.21
Mt	1.43	1.25	1.27	1.88
t	0.94	0.77	0.69	0.83
Tot	5.79	5.09	4.74	6.18

Distal metatarsal trichobothrium ± three times as long as diameter of segment, with clear nod in middle.

Male palp (figs. 78, 79): tibia with two sharp dorsal apophyses and one broad prong in front, together delimiting dorsal concavity; embolus with broad base on posteromesal side strongly narrowed to long whiplike thread; tegulum with enormous apophysis originating in middle of tegulum; mesal extremity with sharp, rounded tip, lateral part sickle-shaped spanning entire mesal side of bulbus and tibia.

Female: Total length 5.42, carapace 2.08 long, 1.50 wide.

Color: very much as in male, but with more reddish tinge all over; abdomen paler, without scutum, but pattern similar.

Eyes as in male.

Legs: Spination: femora I pl1d2* II pl1d2* III pl2d3*rl1 IV pl1d4*rl1; patellae I-II-III pl1d1rl1 IV pl1d1rl1; tibiae I pl1v2* II v1-1-2 III pl2*d2*rl2*v1-1-2 IV pl2*d2*rl2*v1-1-2; metatarsi I v6 II v6 III 13 IV disp. 15 disp. Measurements:

	I	II	III	IV
F	1.41	1.21	1.15	1.37
P	0.54	0.61	0.55	0.61
T	1.05	0.85	0.73	1.09
Mt	1.07	0.95	1.01	1.60
t	0.75	0.63	0.61	0.71
Tot	4.82	4.24	4.04	5.37

Epigyne (figs. 80, 81, 97): Very simple: poorly sclerotized oval plate, slightly more sclerotized along posterior margin, with two oblique dark brown streaks behind corkscrew-shaped ducts which shine through.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

CYBAEODAMUS MELLO-LEITÃO

Cybaeodamus Mello-Leitão, 1938: 93 (descr. new genus in Agelenidae); 1941: 107. Roth, 1965: 290 (transferred to Zodariidae). Lehtinen, 1967: 226.

Hyltoniella Mello-Leitão, 1940: 29 (descr. new genus). (NEW SYNONYMY).

Valcheta Mello-Leitão, 1940: 20 (descr. new genus in Agelenidae). Roth, 1965: 291 (transferred to Zodariidae). Lehtinen, 1967: 274. (NEW SYNONYMY).

TYPE SPECIES: *Cybaeodamus ornatus* Mello-Leitão.

DIAGNOSIS: Males of this genus are recognized by the palps with two tegular apophyses of which the distal one is large and complex; females have a large epigyne with a strongly sclerotized area on either side; the chelicerae are densely haired.

DESCRIPTION: Large spiders (7.0–14.0). Carapace longly oval, widest between coxae II and III, narrowed in front to about 0.55 times maximum width in males, to about 0.62 times maximum width in females. Carapace rather flat with highest point between fovea and PME. Fovea quite deep. Teguments smooth. Color usually orange brown with yellowish brown or orange legs; abdomen with dark sepia mottling on pale background.

Eyes in 2 rows; anterior row procurved as seen from in front; posterior row recurved or straight as seen from above, clearly wider than anterior one. AME dark, remainder pale; all eyes circular, subequal. MOQ slightly longer than wide: anterior and posterior width similar. Clypeus slightly convex, retreating; provided with cluster of setae; height 3 to 4.5 times diameter of ALE.

Chilum single; a wide sclerite about 3 times wider than high provided with a few setae. Chelicerae densely covered with hairs, sometimes short, on anterior surface; 1 or 2 teeth on promargin; fangs short with thick base. Endites swollen, rather broad at base; with anteromesal scopula. Labium with short straight anterior margin. Sternum longly oval; longer in females than in males; sides sinuous but without lateral extensions.

Legs: Formula 4123 or 4132. Spination: relatively few, long, slender spines on legs I and II, more short and strong spines on legs III and IV. Hinged hairs present on T and

Mt. Trichobothria in 3 rows on T and Mt, in one row on t. P and T with unhaired longitudinal stripes. Poorly developed scopulae present, spiniform on III and IV; no claw tufts; metatarsal groups of hairs poorly developed, chisel-shaped hairs absent. Paired tarsal claws with about five teeth on legs I and II, with some eight teeth on legs III and IV. Coxae slightly overhanging sternum. Coxae IV touching in males, close together in females; tarsi widened toward tip.

Abdomen oval; with four muscle points. Densely haired with simple short hairs. Tracheal spiracle narrow, just in front of spinnerets. Tracheae split from beginning in 2 short branches which immediately divided into 4 thin ducts. Colulus represented by small group of setae.

Male palp: Tibia with short but strong lateral apophysis; cymbium without field of chemoreceptors. Tegulum with two strong apophyses: median one relatively simple, distal one larger and complex. (The statement of Jocqué, 1988b: 78, in reference to an "intertegular apophysis" as in *Leprolochus* is not quite correct. Close examination reveals that there is no apophysis originating from the stalk connecting subtegulum and tegulum as in *Leprolochus* but only true tegular apophyses.) Embolus originating on posterior part of tegulum, relatively long, slender, describing half a loop.

Epiandrum present.

Female palp with cylindrical tarsus provided with ventral and mesal spines; with finely toothed claw, turned inward over approximately 45°, with short onychium underneath it. Epigyne with quadrangular sclerotized area, on either side with slightly bulging, strongly chitinous knob. Copulatory ducts in shape of large S, starting at central openings and ending in spherical spermathecae at posterior margin.

OTHER SPECIES INCLUDED: *Drassus lycosoides* Nicolet (holotype sa ♀, MNHN, examined); *Storena lentiginosa* Simon (holotype sa ♀, MNHN, examined), *Hyltoniella birabeni* Mello-Leitão (holotype ♂, MLP, examined) which is a junior synonym of *Rubrius enigmaticus* Mello-Leitão (holotype ♂, MHNB, examined) (NEW SYNONYMY) (figs. 88–93); *Valcheta rastellifera* Mello-Leitão (holotype sa ♀, MLP, examined).

It should be borne in mind that some of these are probably synonyms of *C. ornatus.*

DISTRIBUTION: Chile, Argentina, Uruguay, Peru, Brazil.

Cybaeodamus ornatus Mello-Leitão
Figures 82–87

Cybaeodamus ornatus Mello-Leitão, 1938: 94 (descr. ♂♀ in Agelenidae). Roth, 1965: 290 (transferred to Zodariidae).

TYPE MATERIAL: Lectotype male (here designated): Argentina, Prov. Buenos Aires, Rio Santiago, La Plata (MLP 14033 and 14044) (examined).

Paralectotype female: together with Lt.

DIAGNOSIS: Males of this species are easily recognized by the shape of the tibial and the distal tegular apophyses (the shape of these apophyses changes greatly with changing observation angle) which are both shorter than in *Cybaeodamus enigmaticus* (new combination); the cusps on coxae IV and the ventral patch of spines on the abdomen provide additional characters since they are absent in *C. enigmaticus*; the females are recognized by the shape of the epigyne: the area delimited by the copulatory openings and lateral cusps is rectangular and not butterfly-shaped as in *C. enigmaticus.*

DESCRIPTION: *Male:* Total length 10.2 (7.74–12.66); carapace 4.9 (4.00–6.08) long, 3.04 (2.58–4.00) wide.

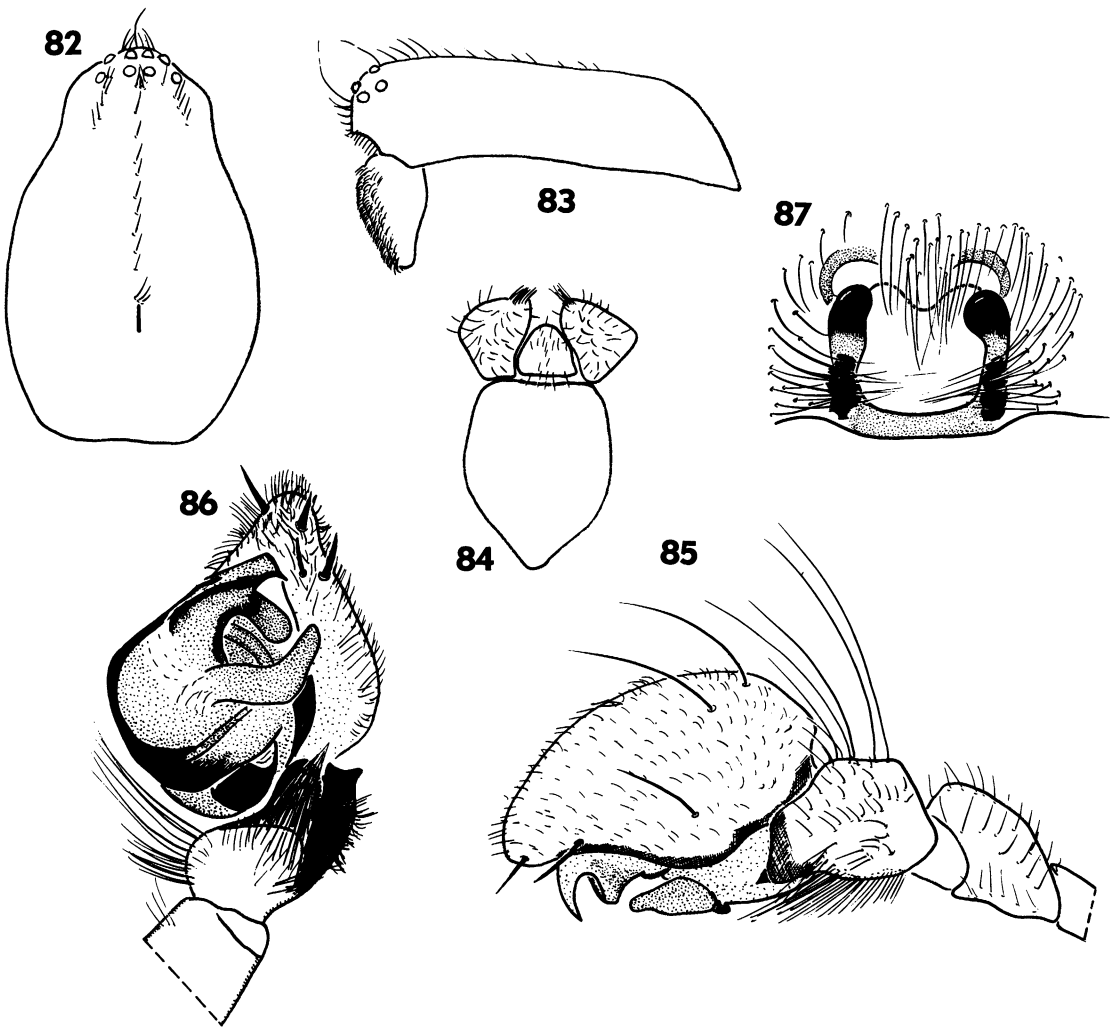
Color: Carapace orange; sternum and chelicerae reddish orange; legs yellow but coxae orange and femora pale yellow. Abdomen pale gray with dark sepia mottling; spinnerets pale brown.

Carapace smooth with dark hairs on median line between fovea and PME.

Eyes: a: 1.00 (0.12); b: 1.25; c: 1.08; d: 1.25; e: 0.50; f: 0.42; g: 0.58; h: 1.66. MOQ: AW = 0.91 PW; AW = 0.79 L. Clypeus 0.52 high or 4.3 times diameter of ALE.

Chilum oval: 0.58 wide, 0.19 high. Chelicerae rather long (1.42); promargin with two teeth, retromargin without. Sternum: oval, densely covered with fine long hairs; 2.47 long, 1.77 wide.

Legs: Coxae III and IV with densely haired basal cusp. Spination: femora I d1-1 II d1-1 III d8 IV d8; patellae I-II-III pl3d1 IV pl3d1; tibiae I v1-1 II pl1-1v8 III 18 disp. IV 15



Figs. 82–87. *Cybaeodamus ornatus*. **82.** Female carapace, dorsal view. **83.** Female carapace, lateral view. **84.** Sternum, labium, and endites. **85.** Male palp, lateral view. **86.** Male palp, ventral view. **87.** Epigyne, ventral view.

disp.; metatarsi I v2-1-2-2 II v2-2-1-2 III 22 disp. IV 25 disp. Measurements:

	I	II	III	IV
F	3.07	2.76	2.65	3.29
P	1.32	1.17	1.22	1.59
T	2.23	1.91	1.70	2.23
Mt	2.33	1.96	2.01	3.23
t	1.75	1.43	1.48	1.64
Tot	10.70	9.22	9.06	11.98

Male palp (figs. 85, 86): Tibia with broad lateral apophysis, extremity large and convex as seen directly from side (fig. 85), more narrow and concave as seen from below (fig. 86). Tegulum with 2 apophyses: 1 S-shaped, median, 1 large, terminal, with 1 rounded and 1 sharp tip. Embolus rather broad, originating on posterior end of tegulum.

Epiandrum well developed, with 2 bare patches on densely haired area. Abdomen on venter with patch of dense short spiniform setae.

Female: Total length 11.13 (7.16–13.36); carapace 6.30 (3.16–6.66) long, 3.88 (2.24–4.08) wide. Further as male except in following respects:

Legs: coxae III and IV without basal boss. Spination: femora I pl1d3* II pl1d3* III

pl2*d3*rl3* IV pl2*d3*rl3*; patellae I-II-III pl2*d1rl1 IV pl2*d1rl1; tibiae I-II v2* III pl3*d3*rl2*v7 IV pl4*d2*rl3*v2-3-2; metatarsi I v2-1-2-2 II v2-2-1-3 III 18 disp. IV 24 disp. Measurements:

	I	II	III	IV
F	3.00	2.71	2.59	3.50
P	1.33	1.38	1.33	1.50
T	2.33	1.88	1.54	2.33
Mt	2.17	1.96	2.21	3.46
t	1.54	1.45	1.29	1.72
Tot	10.38	9.38	8.97	12.51

Epigyne: Figure 87.

Abdominal venter with normal hairs.

OTHER MATERIAL EXAMINED: ARGENTINA.—1♂, 1 sa ♂: Ascha, Aimogasta, La Rioja, 1941, C. Freyre (MACN); 2♂, 1♀, 1 sa ♂, 2 juv: Ascha, La Rioja, 1947, C. Freyre (MACN); 1♂: X.1957; 1♂: La Rioja, X.1968, Galiano (MACN); 1♂, 1♀: Purmamarca, Jujuy, 20.V.1983, Goloboff (MACN); 1♀: Andalgala, 21.II.1973 (MACN); 1♂, 1♀: Lago Argentino, Pto. Bandera, II.1963 (MACN); 1♂: C. de Patagones, XI.1971, Aguilera (MACN); 2♂, 1♀: San Juan, Valle Fertil, XI. 1970, Viana (MACN); 1♀: Sierra La China, 25 km E Olavarria, 20.III.1983, E. Maury (MACN); 1♂: Tandil V.1967, E. Maury (MACN); 1♂: Bahia Blanca, II.1942, F. Marros (MACN); 1♀: C. de Patagones, II.1975, E. Maury (MACN); 1♀: Lihuel Calel, La Pampa, 2.I.1985, E. Maury and Toth (MACN); 1♀: Lihuel Calel, La Pampa, 10.XI.1969, E. Maury (MACN); 1♂, 1♀: San Luis Carolina, IX.1971, Williner (MACN, now in KBIN); 1♂, 2 juv: Cerro Alto, Rio Negro, I.1975, E. Maury; 1♀: La Petrona, C. de Patagones, I.1975, E. Maury (MACN); 1♂, 2♀: Patagonia, Camarones, 1909, Riedtmann (MHNB); 1♂: Misiones, Tobuna, 7.VI.19??, Partridge (MACN). PERU.—1♂, 1♀: between Puno and Pancarcolla, 16.X.1983, E. Maury (MACN); 1♂, 1♀. Camacani, Lac Titicaca, 3700 m, 19–21.XI.1955, L. Pena (KBIN). URUGUAY.—1♂, 2 juv.: Canelones, Marindia, 8.IV.1976, F. Costa and Capocasale (CAS). Locality unreadable: 1♂, 1♀: L. Pena (KBIN).

DISTRIBUTION: Argentina, Peru, Uruguay.

FORSTERELLA, NEW GENUS

DIAGNOSIS: The genus *Forsterella* is characterized by the male palp, in which the embolic base is clearly separated from the tegulum and almost touching the tegular apophysis; the subtegulum is swollen.

TYPE SPECIES: *Forsterella faceta*, new species.

ETYMOLOGY: The name is a patronym in honor of Dr. R. Forster in recognition of his monumental work on New Zealand spiders. The gender is feminine.

DESCRIPTION: Medium size spiders (4.0–6.0) with finely reticulated teguments. Carapace longly oval, widest between coxae II and III; narrowed in front to 0.7 times maximum width in females, to 0.55 times maximum width in males; profile domed with highest point between fovea and PME. Color of prosoma reddish brown; abdomen dark sepia with white dorsal pattern.

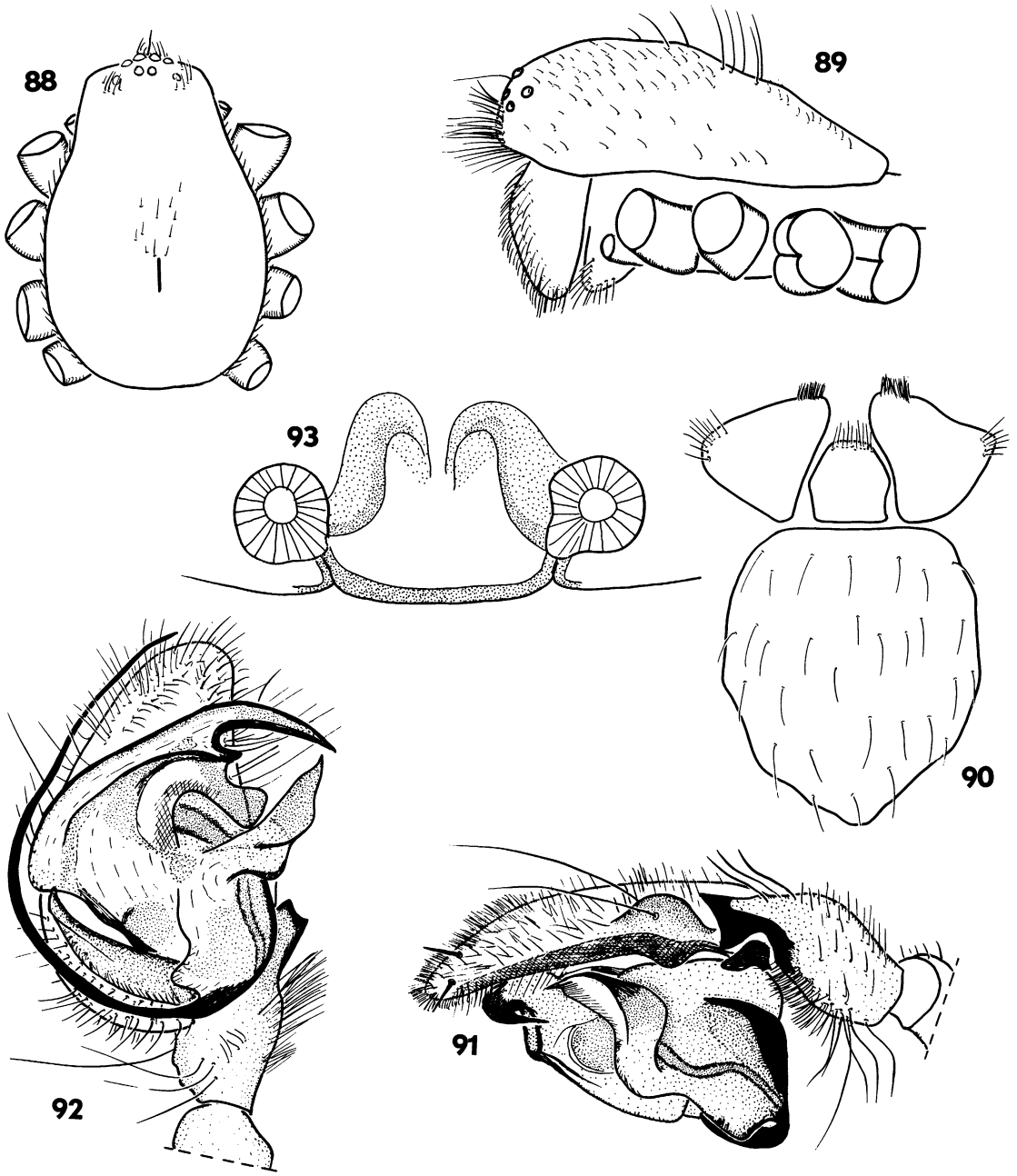
Eyes in three rows (2-4-2); second row recurved as seen from above; AME dark, circular, less than their radius apart; other eyes pale, circular; ALE (first row) more than twice their diameter apart; PLE (second row) slightly larger than AME, at one diameter from these; PME slightly more than their radius apart; MOQ slightly wider in back than in front, clearly longer than wide. Clypeus slightly convex, retreating, 4 times as high as diameter of ALE.

Chilum composed of 2, roughly triangular, hairless sclerites. Chelicerae with anteromesal group of hairs, very sparsely haired elsewhere; no teeth; fangs short and thick. Sternum as long as wide, triangular, with straight anterior margin, without lateral excrescences or precoxal sclerites. Coxae approximately 0.75 times sternal width.

Legs: formula 4123; anterior legs with few spines, posterior pairs with numerous spines. Tarsi I and II widened toward apex; III and IV almost cylindrical. Paired tarsal claws with numerous teeth (10–14); unpaired claw on slight onychium. All Mt with ventrodistal tuft of hairs. Hinged hairs present on T and Mt. Trichobothria in two rows on T and Mt, in one row on t.

Abdomen oval, with two muscle points. Tracheal spiracle narrow, procurved. Colulus represented by small group of hairs. Spinnerets: AS large, conical, 2-segmented; PS and MS much smaller, cylindrical.

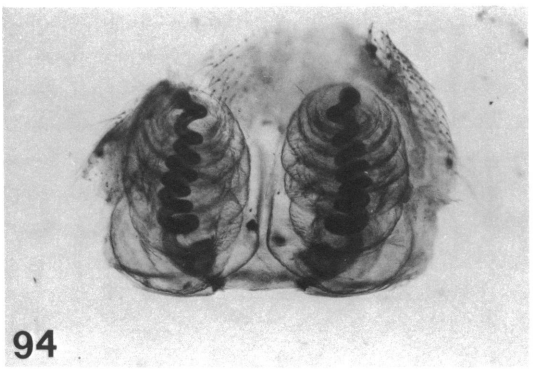
Male palpus with short lateral tibial apophysis. Cymbium with short proximal lateral

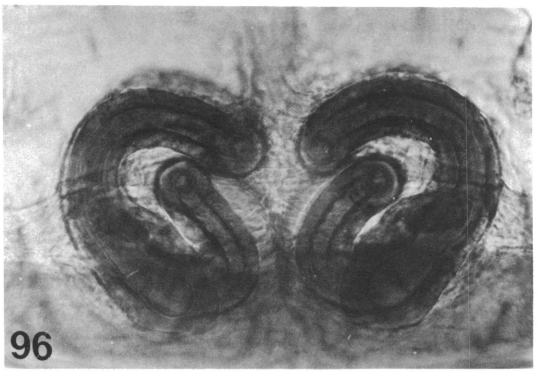


Figs. 88–93. *Cybaeodamus enigmaticus* (Mello-Leitão) new combination. **88.** Female carapace, dorsal view. **89.** Female carapace, lateral view. **90.** Sternum, labium, and endites. **91.** Male palp, lateral view. **92.** Male palp, ventral view. **93.** Epigyne, cleared dorsal view.

ridge; subtegulum swollen; ventral side of tegulum completely covered by tegular apophysis and embolic base, the latter clearly separated from tegulum.

Female palp with conical tarsus, provided with finely dentate claw, turned over angle of about 30°. Epigyne simply covered with featureless chitinous plate; internally with two large spermathecae with very short copulatory ducts.





Figs. 94–97. Cleared epigynes, dorsal view. **94.** *Antillorena pollii.* **95.** *Asceua elegans.* **96.** *Asteron reticulatum.* **97.** *Asteron mas.*

OTHER SPECIES INCLUDED: None; some of the species known from New Caledonia might belong to this genus.

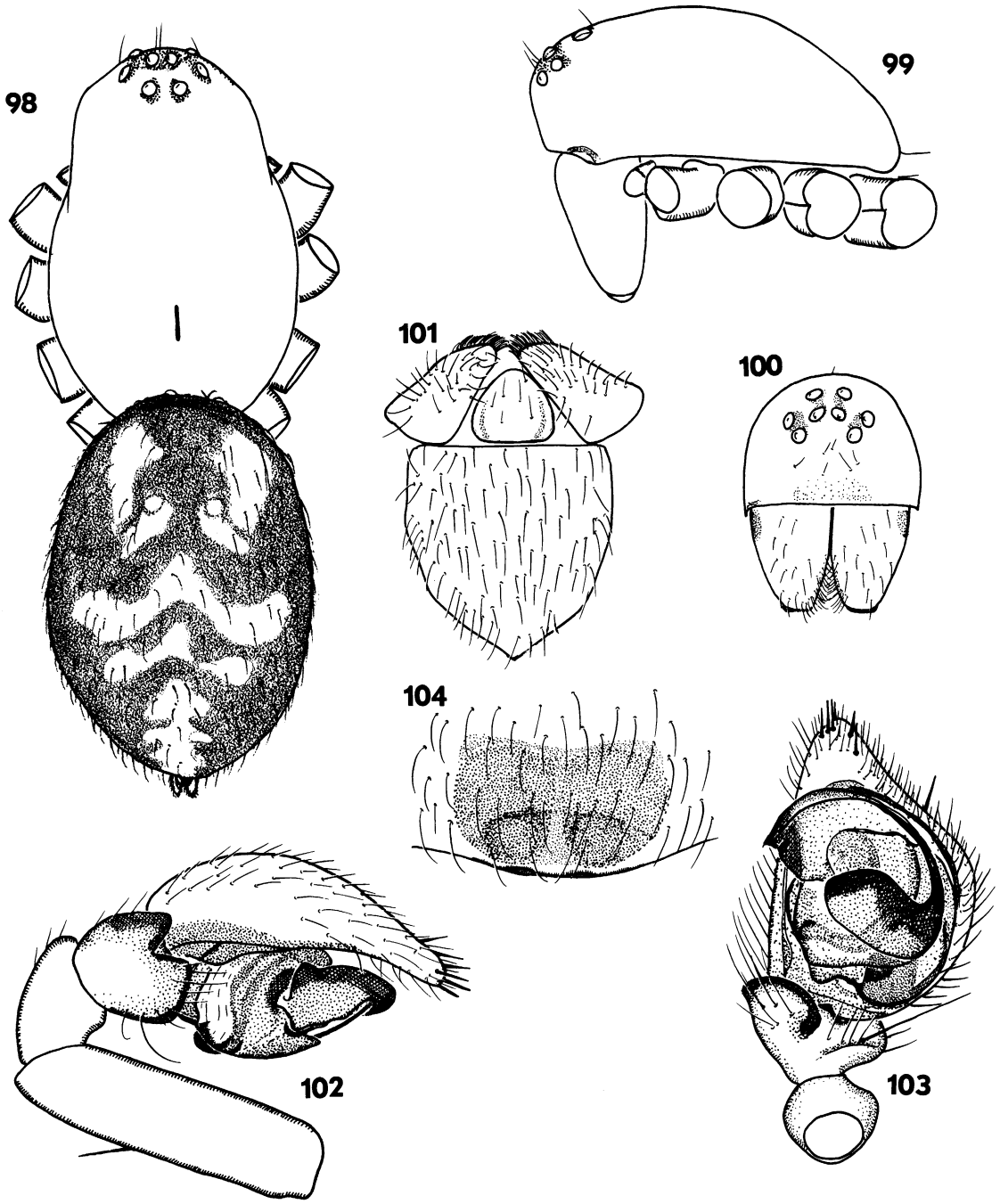
DISTRIBUTION: Only known from North Island, New Zealand.

Forsterella faceta, new species
Figures 98–104, 139

TYPE MATERIAL: Holotype female: New Zealand, Red Island, Mercury Islands, 24.II.1972, litter 72/232 G. W. Ramsay (EDA).

Paratypes (all localities North Island): 2♂: 3 mi S of Paihia, 15.XII.1966, K. Wise (AMA); 1♀, 2 juv.: NI, Waipoua, Toronui, 150 m, 13.IV.1980, A. Newton, M. Thayer (AMNH); 1♀: Waipoua Forest, G. Kuschel (EDA); 2♀: Mangamuka Reserve, summit, 609 m, 21.I.1972, G. Ramsay (EDA); 1♀: Noises I., Motuhoropapa I., Snail Flat, 13.IV.1978, M. May (EDA); 1♂: Mimiwhangata, 10–17.XII.1970, pitfall, J. Darby (KBIN); 2♂, 5 juv.: Whangaiterenga R., Kanaerenga Val., Thames, 7.XII–18.I.1971, pitfall, H. Oliver (OMD); 1♀: Kohukohunui, Hunua Ra., 600 m, 30.III.1974, G. Kuschel (OMD); 2♀: Kohukohunui, Hunua Ra., 550 m, 30.III.1974, G. Kuschel (KBIN); 1♀: N. I., Whangaroa County, Butterfly Creek, Tauranga Bay, 25.IX.1966, K. Wise (AMA); 1♀, 1 juv.: Mayor Island, N.W. Bay, 8.XII.1966, K. Wise (AMA); 1♀: as previous; 1♀: Otepe Res., E of Taupo, 4.I.1972, G. Ramsay (EDA); 1♂, 1 juv.: Maruiana Arm, Lake Waikaremoana, 11.XII.1946, R. Forster (NMW); 1♀: L. Waikaremoana, Hawkes Bay, 17.I.1972, G. Ramsay (EDA); 1♂: Waiuku, Kaviatahi, V.1910, M. Wiklund (OMD); 1♂: Lake Okataina, rimu/tawa litter, 20.X.1984, D. Court (OMD); 1♀: Little Barrier I., summit of track, 22.II.1947, E. Turbott (AMA); 1♀: Mangareia, Wairarapa, X.1946 (OMD); 1♀: Totara Res., Pohangina Valley, Manawatu, 4.I.1975, J. Watt (EDA).

DIAGNOSIS: Males of this species are rec-



Figs. 98–104. *Forsterella facieta.* **98.** Female habitus, dorsal view. **99.** Female carapace, lateral view. **100.** Female carapace, frontal view. **101.** Sternum, labium, and endites. **102.** Male palp, lateral view. **103.** Male palp, ventral view. **104.** Epigyne, ventral view.

ognized by the shape of the palpal tibia and of the tegular apophysis; females are characterized by the featureless epigynal plate.

ETYMOLOGY: *facetus* (Latin: handsome) refers to the abdominal pattern of the species.

DESCRIPTION: *Female:* Total length 5.83 (4.33–7.75); carapace 2.79 (2.00–3.41) long, 1.87 (1.33–2.16) wide.

Color: Carapace dark reddish brown; chelicerae dark reddish brown with pale patch

mediodorsally; sternum orange; legs yellowish to orange, more reddish on Mt and t; tibiae and femora with dark band in middle; abdomen: dorsum dark sepia with pale pattern of dots and chevrons (fig. 98); sides pale with two oblique dark lines in posterior half; venter pale with two darker areas on each side behind epigyne and with dark lines, converging from sides, ending in dark ring around spinnerets.

Eyes: a: 1.00 (0.10); b: 1.00; c: 1.00; d: 1.10; e: 0.20; f: 0.80; g: 0.60; h: 1.90; ALE-ALE: 2.50; AME-PLE: 1.20. MOQ: AW = 0.84 PW; AW = 67 PW.

Legs: Spination (Ht): femora I d1 II d1 III pl1d1 IV d1rl1; patellae I-II-III pl1d1rl1 IV pl1d1rl1; tibiae I v2-2 II v1-1 III pl2*d2*rl2*v2-2-2 IV pl2*d2*rl2*v2-2-2; metatarsi I v1-1 II v2-2 III 12 IV disp. 16 disp. Spination (specimen from Toronui, AMNH): femora I d2*pl1 II d2* III d3* IV d3*; patellae I-II-III pl1d1rl1 IV pl1d1rl1; tibiae I v2-1 II v1-1 III pl2*d2*rl2*v2-2-2 IV pl2*d2*rl2*v2-2-2; metatarsi I v1-1 II v2-2 III 10 disp. IV 12 disp. Measurements:

	I	II	III	IV
F	1.47	1.29	1.15	1.53
P	0.62	0.64	0.61	0.67
T	1.17	0.91	0.81	1.17
Mt	1.15	1.01	1.03	1.66
t	0.81	0.63	0.61	0.65
Tot	5.23	4.48	4.20	5.67

Epigyne (figs. 104, 139): A simple chitinized plate covering two large, globular spermathecae with very short copulatory ducts.

Male: Total length 3.91–5.41; carapace 2.00–2.91 long, 1.50–2.08 wide.

Color basically as in female but usually slightly paler with legs yellowish instead of orange.

Relative eye size and position as in female.

Legs: Spination very much as in female from Toronui, but quite variable. Measurements:

	I	II	III	IV
F	1.61	1.25	1.21	1.41
P	0.61	0.54	0.58	0.64
T	1.33	0.99	0.83	1.27
Mt	1.31	1.15	1.17	1.82
t	0.91	0.71	0.63	0.77
Tot	5.77	4.64	4.42	5.91

Male palp (figs. 102, 103): Tibia with prolateral ridge and short, blunt dorsolateral apophysis; tegular apophysis large, with short, sharp, lateral point.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: North Island of New Zealand.

HABRONESTES L. KOCH

Habronestes L. Koch, 1872: 299 (descr. new genus). Simon, 1874: 37 (key); not Simon, 1873: 72; not Simon, 1876: LVXXXIII. Urquhart, 1891: 132, 135; 1893: 111. not Goyen, 1890: 269. not Keyserling, 1891: 158. not Marx, 1891: 30. Bosmans and Van Hove, 1986a: 17.

Habronectes (lapsus): Thorell, 1881: 187 (syn. *Storena*).

Storena (part): Simon, 1893b: 429 (synonymized). Hogg, 1900: 97.

TYPE SPECIES: In his original description of the genus, L. Koch (1872) did not designate a type species for it. For an unknown reason, Simon (1893b) mentioned that *Habronestes braccatus* L. Koch is the type species of the genus. Luckily, there is no reason to accept this statement, as the type specimen of that species is a juvenile female, which would have created another identity problem. Bonnet (1957) mentioned *H. striatipes* L. Koch as the type species although in L. Koch's publication many other species have page priority over *H. striatipes.* However, the first four of these preceding species are taxa described by O. P.-Cambridge in the genus *Storena.* Koch had apparently not seen these specimens and simply took over the German translation of Cambridge's descriptions and put them all in *Habronestes,* just as Cambridge had put all Australian Zodariidae in *Storena.* It is obvious that some of Cambridge's species preceding *H. striatipes* in Koch's paper do not belong in what Koch considered as *Habronestes* (e.g., *Storena variegata* belongs in *Nostera* and *S. scintillans* probably in *Storosa*). The next three are species that had been described by L. Koch himself in an earlier paper (1865). *H. striatipes* is thus the first new species described in Koch's 1872 paper. For these reasons I underscore Bonnet's choice of *H. striatipes* as type species of this genus.

DIAGNOSIS: The only sure diagnostic character of this genus is the Y-shaped tegulum of the male palp, always combined with a

large, lateral, cymbial fold; the high clypeus (five to seven times the diameter of an ALE) is typical, but shared with a few other genera.

DESCRIPTION: Medium-size spiders (3.5–8.5) with oval carapace, widest at level of coxae II; strongly narrowed in front to about 0.5–0.6 times maximum width in males, to 0.65–0.75 times maximum width in females. In profile rather even, with highest point between fovea and eyes but only very slightly raised.

Color: Carapace usually chestnut brown but orange and yellow species occur; chelicerae and sternum of same color; legs with contrasting colors; femora usually with basal and dark distal part or entirely dark and then contrasting with pale coxae; remainder of legs mostly paler than femora. Abdomen dark sepia with white pattern of well-defined white spots and stripes.

Eyes in close group; in three rows; most often similar in size although some variation exists. AME circular, dark; remainder circular, pale. ALE more than twice their diameter apart. AME about their radius apart, more than their diameter from the PLE. PME slightly less than their diameter apart. MOQ: anterior width less than posterior width; length almost twice anterior width. Clypeus high, up to 7 times diameter of ALE; straight; slightly concave or convex. With few hairs along inferior margin.

Chilum single elongate sclerite; width about 3 times height; superior margin convex, sides slanting inward, inferior margin concave; in some species double and then relatively high. Chelicerae tapering, less strongly so in females; no teeth. Hairs on anterior surface increasing in length distomesad. Condyle well developed, with row of hairs, bordering mesal margin. Fangs short. Endites broad at base, strongly tapering; with anteromesal scopula. Labium roughly triangular, with narrowed base. Sternum with straight anterior margin, slightly sinuous sides ending in sharp tip; haired; without lateral extensions.

Legs slender; slightly less so in females. Formula 4123. Spination: all femora with at least two dorsal spines. Anterior legs with few ventral spines on T and Mt. Posterior legs with numerous spines on P, T, and Mt. Scopulae spiniform on legs III and IV. No claw tufts, but ventral groups of hairs on slightly swollen distal extremities of Mt II-IV. Paired claws long with about a dozen teeth. Hinged hairs present on T. Trichobothria in two rows on T, in one row on Mt and t.

Abdomen oval. Six spinnerets. Tracheal spiracle narrow; tracheae bifurcated at base into 4 thin tubes, not reaching petiolus. Colulus represented by group of setae. Epiandrum well developed.

Male palp: Tibia with dorso- and ventrolateral apophysis of very variable shape. Cymbium strongly curved downward toward extremity; with large lateral fold often almost extending to distal tip. Tegulum of typical shape: Y-shaped, due to mesal, sickle-shaped extension with free tip; a well-developed tegular apophysis in between legs of Y. Embolus whiplike, originating on posterior end of tegulum.

Female palp: Tarsus cylindrical with dentate claw, curved inward over 45°.

Epigyne variable; usually with long copulatory ducts originating in anterior part, ending in aboral, poorly delimited spermathecae.

OTHER SPECIES INCLUDED: Several described, many undescribed species.

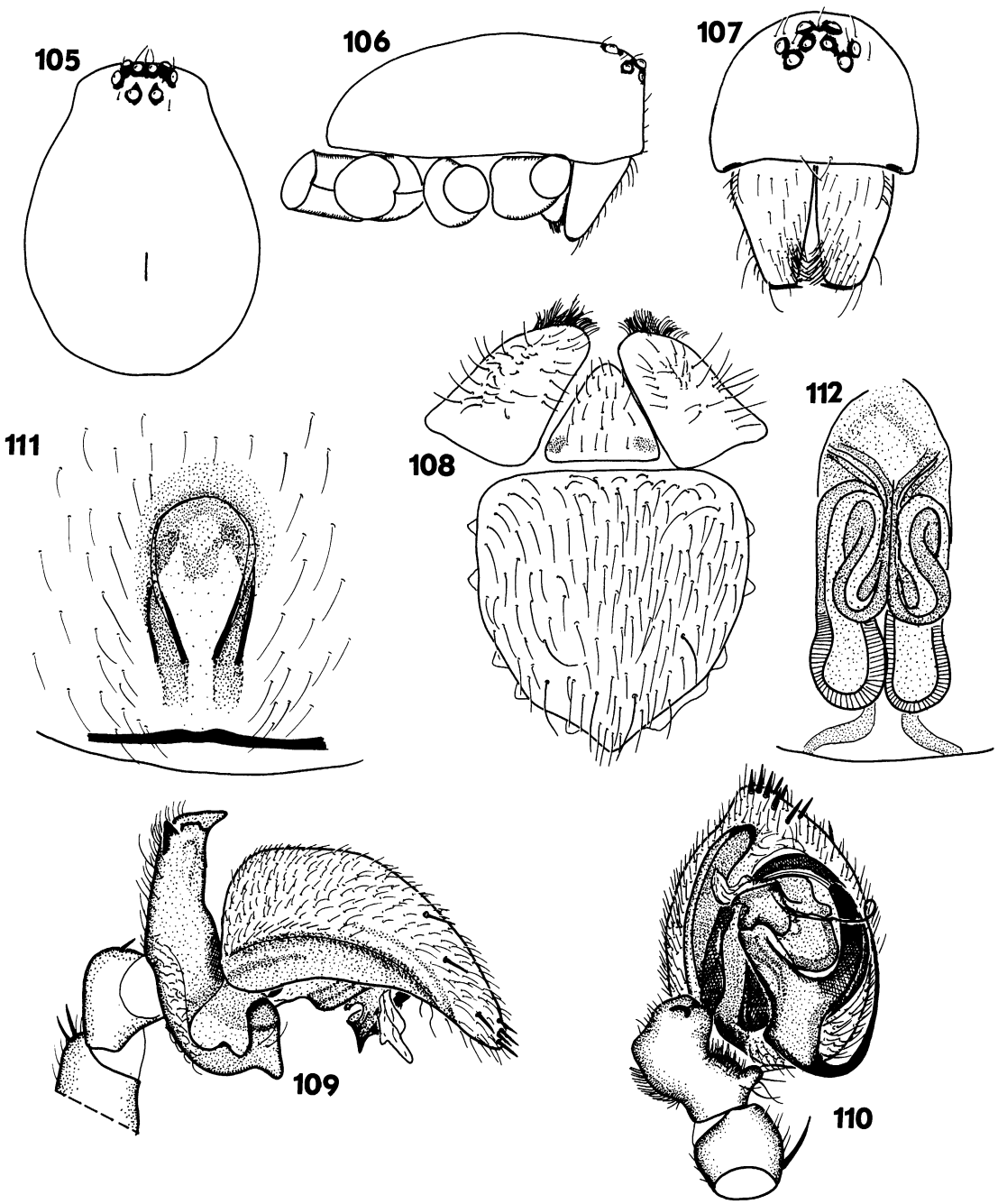
DISTRIBUTION: Probably entire Australia.

Habronestes striatipes L. Koch
Figures 105–112

Habronestes striatipes L. Koch, 1872: 313, pl. XXV, fig. 4 (descr. ♀). Butler, 1876: 353.
Storena striatipes: Simon, 1893b: 427. Hogg, 1900: 72. Rainbow, 1911: 151; 1912: 191.

TYPE MATERIAL: Female lectotype (here designated): Australia, Rockhampton (ZMH) (examined).

Note: The type series obviously consisted of several female specimens. The original description mentions Rockhampton and Bowen as the "type localities." According to Bosmans (in litt.) the BMNH has a female of the type series from Bowen (not examined). I therefore assume that the specimen from ZMH (the label of ZMH reads "*Storena striatipes* (L. Koch) ♂ (sic) syntype") is from Rockhampton, and I consider this as the type locality of the species. The BMNH collections further contain a conspecific male and female from Rockhampton but these were collected later and are most likely the specimens studied by Butler (1876).



Figs. 105–112. *Habronestes striatipes.* **105.** Male carapace, dorsal view. **106.** Male carapace, lateral view. **107.** Male carapace, frontal view. **108.** Sternum, labium, and endites. **109.** Male palp, lateral view. **110.** Male palp, ventral view. **111.** Epigyne, ventral view. **112.** Epigyne, cleared dorsal view.

DIAGNOSIS: Males are easily recognized by the very high palpal tibia with a single large tooth on top preceded by a slightly serrated ridge; the female is recognized by the external pattern of the epigyne. There are two more very similar species in the region where *H. striatipes* occurs.

DESCRIPTION: *Female:* Total length 8.17; carapace 3.54 long, 2.34 wide.

Color: Carapace, chelicerae medium brown;

sternum pale yellowish brown. Legs: coxae pale, trochanters dark; FI medium brown with large yellow stripes covering entire mesal and lateral sides of segment; FII–FIV dark brown, but FII and FIII with proximal pale ring, FIV with distal half pale. P I and II, T I and II yellow with brown lateral stripes; other segments yellow to pale brown. Abdomen dark sepia; dorsum with central lyriform pattern, in front of it two white spots followed by few white spots on central line in front of spinnerets; sides with two oblique pale stripes; venter with median longitudinal stripe on each side with one pale spot, just in front of spinnerets.

Eyes: a: 1.00 (0.11); b: 1.42; c: 1.38; d: 1.62; e: 0.48; f: 0.76; g: 1.14; h: 1.81; i: 0.48; MOQ: AW = 0.67 PW; AW = 0.58 L.

Legs: Spination: femora I pl1d3* II pl1d3* III pl3*d3*rl1 IV pl3*d3*rl1; patellae I-II-III pl1d1rl1 IV pl1d3*rl1; tibiae I pl1v2-2-2-1-2 II pl212-2-2 III pl3*d4*rl3*v2-2-2 IV pl3*d4*rl3*v2-2-2; metatarsi I v12 II v2-2-2-1-2 III 20 disp. IV 20 disp. Measurements:

	I	II	III	IV
F	2.33	2.08	1.92	2.50
P	0.92	0.92	0.92	1.08
T	1.88	1.46	1.38	2.13
Mt	2.08	1.83	2.00	3.29
t	1.50	1.42	1.21	1.42
Tot	8.71	7.71	7.42	10.42

Epigyne: Figures 111, 112.

Male: Total length 7.09; carapace 3.75 long, 2.75 wide. Color as in female, but femora without pale rings; all dark brown with pale lateral and mesal stripes. Dorsal abdominal pattern as in female but lyriform pattern broken: each stripe divided in two.

Eye pattern as in male.

Legs: Virtually all spines of this specimen are lost.

	I	II	III	IV
F	3.21	2.84	2.46	3.42
P	1.21	1.25	1.17	1.21
T	2.92	2.25	2.13	2.92
Mt	2.75	2.67	3.04	4.67
t	lost	1.71	lost	lost
Tot		10.72		

Male palp: Figs. 109, 110. Palpal tibia very high, dorsal tip with single large tooth preceded by slightly serrated ridge.

OTHER MATERIAL EXAMINED: 1♂, 1♀: Australia, Queensland, Rockhampton (BMNH 1874.55).

DISTRIBUTION: Western coastal region of Queensland.

HERMIPPUS SIMON

For a review of literature, descriptions, etc., see Jocqué (1986b, 1987b, 1988c).

DIAGNOSIS: Representatives of *Hermippus* are the sole members of the Storeninae with only two claws and strongly developed scopulae. The male palpal tibia with a retrolateral and two prolateral apophyses provides a further diagnostic character.

TYPE SPECIES: *Hermippus loricatus* Simon (type in MNHN, examined).

Remarks: The genus description (Jocqué, 1986b) mentions the presence of teeth on the retromargin. This is obviously mistaken as can be seen in the descriptions of the species; only the promargin is provided with teeth.

OTHER SPECIES INCLUDED: *H. affinis* Strand, *H. arcus* Jocqué, *H. arjuna* (Gravely), *H. cruciatus* Simon, *H. minutus* Jocqué, *H. septemguttatus* Lawrence, *H. tenebrosus* Jocqué.

DISTRIBUTION: Eastern and southern Africa, India, Sri Lanka.

HETAERICA RAINBOW

Hetaerica Rainbow, 1916: 47, figs. 21–23 (descr. new genus).

DIAGNOSIS: Because the type specimen of the type species is a juvenile, no unequivocal diagnosis can be given. The taxon is considered incertae sedis.

Remarks: Rainbow (1916) based this new genus on the presence of only four spinnerets. This is not uncommon in Zodariidae and is not enough a reason to create a new genus. Furthermore the specimen does have six spinnerets; the small MS were obviously overlooked by Rainbow. He also mentioned the presence of "a tooth on lower margin of each falx." The single tooth on the promargin of the chelicerae is probably meant.

DESCRIPTION: Probably medium-size spiders with elongate carapace, reaching maximum width at level of second coxae; narrowed in front to 0.70 times maximum width.

Color of prosoma medium brown; abdomen with pale pattern on sepia background.

Eyes in three rows (2-4-2). All eyes circular, light (in old specimens this is often the case and it is not sure whether the AME are really light). Eyes of AER separated by slightly more

than their diameter. Second row strongly recurved as seen from above; median one small, 0.65 times their diameter apart and almost half as large as lateral ones from which they are separated by 0.65 times their diameter. Posterior row with two closely set eyes, one-third their diameter apart, almost as large as the ALE. MOQ wider behind than in front and longer than wide. Clypeus convex and retreating; as high as 2.5 times the diameter of ALE.

Chilum composed of 2 elongate sclerites, with some hairs. Chelicerae short, wide, with well-developed lateral condyle. Promargin with single small tooth. Fangs relatively long, curved. Endites strongly tapering, curved inward. With small anteromesal scopula. Labium broadly triangular. Sternum with smoothly curved sides, slightly narrowed in front, pointed behind.

Legs: Formula 4123. Spines few and restricted to ventral side on legs I and II; numerous on legs III and IV. Three claws; paired ones with ±12 teeth. Tarsi all fusiform (this is a juvenile character of most Zodariidae), with spiniform scopulae. Mt III and IV with distoventral groups of hairs. Trichobothria: in 2 (3?) rows on T; in 1 row on Mt and t.

Abdomen elongate oval; with 2 small muscle points; 6 spinnerets; colulus represented by 2 setae.

Palpus: Tarsus twice as long as tibia, conical, with finely toothed claw.

TYPE SPECIES: *Hetaerica aresca* Rainbow.

OTHER SPECIES INCLUDED: None.

DISTRIBUTION: Australia.

Hetaerica aresca Rainbow
Figures 113–116

Hetaerica aresca Rainbow, 1916: 48, figs. 21–23 (descr. juv.).

TYPE MATERIAL: Holotype juvenile: Australia, Queensland, Pentland, 9.I.1913, sweeping foliage in forest (AM, KS6744) (examined).

DIAGNOSIS: See diagnosis of genus.

DESCRIPTION: *Juvenile:* Total length 4.67; carapace 2.12 long, 1.37 wide.

Color: Prosoma entirely medium brown; pattern possibly bleached. Abdomen with faint dorsal pattern composed of 2 longitudinal pale bars, united behind, followed by 3 pale blotches, posterior one reaching spinnerets.

Eyes: a: 1.00 (0.06); b: 1.67; c: 1.67; d: 1.83; e: 0.66; f: 0.33; g: 0.50; h: 2.61. MOQ: AW = 0.70 PW; AW = 0.57 L.

Legs: Measurements:

	I	II	III	IV
F	1.21	1.11	0.85	1.27
P	0.54	0.46	0.46	0.61
T	0.97	0.75	0.61	0.99
Mt	0.83	0.77	0.87	1.47
t	0.63	0.66	0.63	0.83
Tot	4.18	3.76	3.41	5.17

Male and female unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

ISHANIA CHAMBERLIN

The genus is in revision by Jocqué and Ubick (in press).

TYPE SPECIES: *Ishania tentativa* Chamberlin (MCZ, examined).

DIAGNOSIS: The genus is closely related to *Tenedos* but the male has a very long embolus; the female has a long, wound fertilization duct.

DESCRIPTION: Jocqué and Ubick (in press).

OTHER SPECIES INCLUDED: A few undescribed.

DISTRIBUTION: Central and South America.

LEPROLOCHUS SIMON

The genus was revised by Jocqué (1988b).

TYPE SPECIES: *Leprolochus spinifrons* Simon (Lt in MNHN, examined).

DIAGNOSIS: Easily recognized by the row of spiniform setae in front of the eyes.

DESCRIPTION: See Jocqué, 1988b.

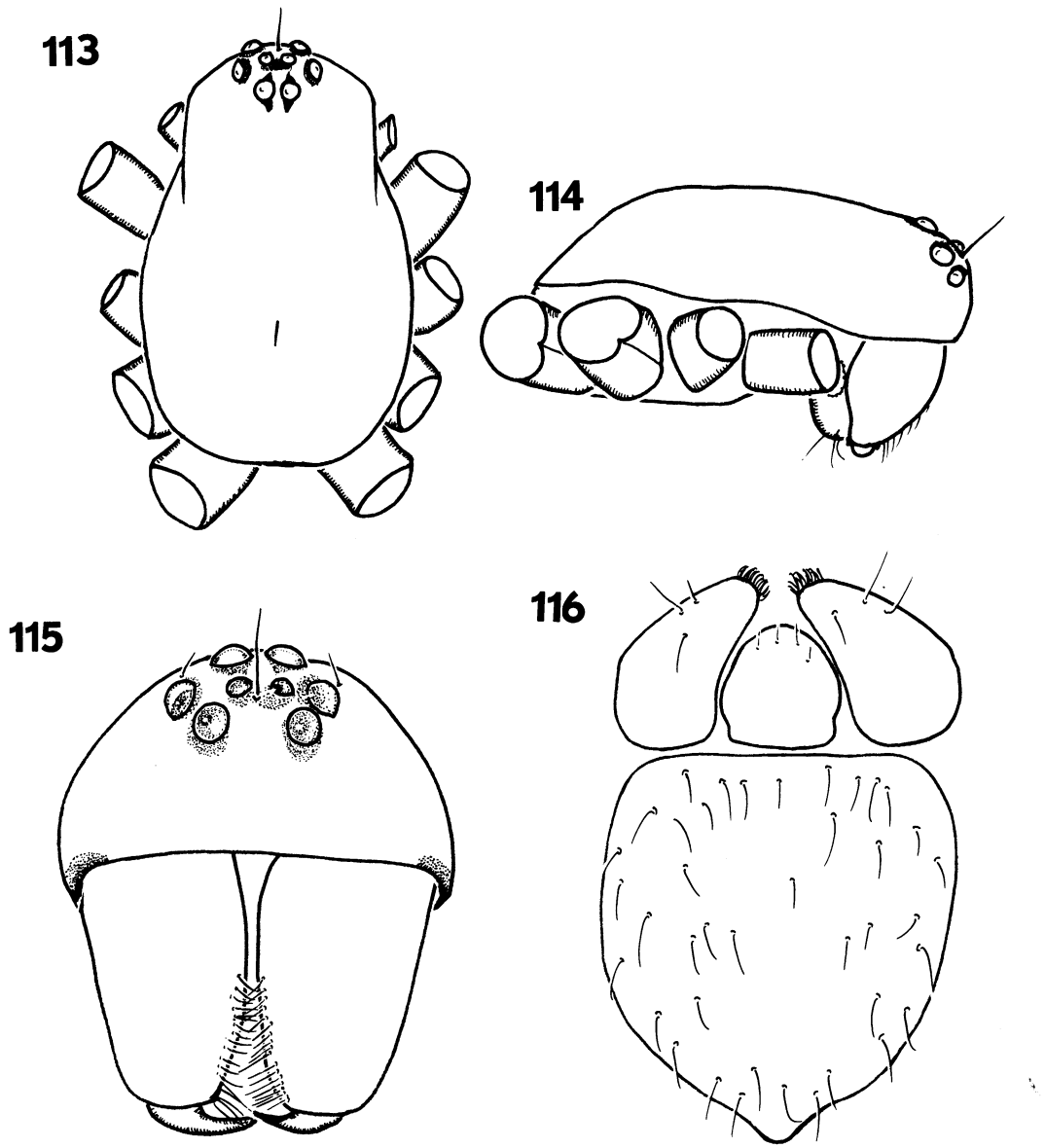
OTHER SPECIES INCLUDED: *L. parahybae* Mello-Leitão and *L. birabeni* Mello-Leitão; *L. stratus* Jocqué and Platnick, 1989.

DISTRIBUTION: South America and Central America (Panama).

MALLINELLA STRAND

Storena (part): Simon, 1893b: 429. Brignoli, 1982: 346. Ono, 1983: 211.

Mallinella Strand, 1906: 670; 1908: 89.



Figs. 113–116. *Hetaerica aresca.* **113.** Juvenile carapace, dorsal view. **114.** Juvenile carapace, lateral view. **115.** Juvenile carapace, frontal view. **116.** Sternum, labium, and endites.

Langbiana Hogg, 1922: 286. Bosmans and Van Hove, 1986a: 20 (NEW SYNONYMY).
Suffucia: Brignoli, 1982: 344. Not Simon, 1983d, 1983b.
Suffucioides Jézéquel, 1964: 334. Van Hove and Bosmans, 1984: 76.

TYPE SPECIES: *Mallinella maculata* Strand.

The types of this species and those of *Mallinella scutata* Strand were destroyed during the war (Renner, personal commun.). However, Strand's (1906) description leaves little doubt as to the generic identity of these species. Later (1913) he described two more species in the genus (*M. notipyga* and *M. vittiventris*) of which he said that they are very closely related with the type species. It is indeed true that the African representatives are very similar as far as their somatic characters are con-

cerned. Caporiacco (1947) correctly attributed a juvenile specimen of a new species (*M. subinermis*) to the genus, which indicates that it is relatively easily recognized.

DIAGNOSIS: Recognized by the sternum with triangular extensions fitting in coxal concavities and the presence of a row of short spines in front of the tracheal spiracle; males have a well-developed conductor which is a terminal excrescence of the tegulum besides the tegular apophysis which is of similar size.

DESCRIPTION: Medium-size spiders (4.00–8.00) with smooth to slightly rugous teguments. Carapace almost hairless, apart from a few longer hairs in eye region and around fovea; widest between coxae III and IV, narrowed to about 0.65 times maximum width in females, to about 0.50 maximum width in males. Cervical grooves poorly indicated, if at all. Profile domed with highest point of profile just in front of fovea.

Color: Carapace, chelicerae, and sternum red to dark chestnut brown; legs from yellow over orange to dark brown; abdomen pale to dark gray, usually with paler dorsal pattern consisting of few rounded dots; males most often with narrow pale brown scutum in anterior half; venter usually with dark longitudinal lines on pale background.

Eyes in two rows; both rows strongly procurved. All eyes subequal, circular, pale, only AME dark; AME less than their diameter apart, at about one diameter from the ALE; PME separated by about one diameter, at about twice that distance from PLE. MOQ slightly wider in front than in back and about 1.3 times longer than wide. Clypeus rather high: between 3 and 6 times diameter of ALE; straight; with some dispersed hairs. Chilum single, trapezoidal, with concave inferior margin and slightly bulging center. Chelicerae poorly haired but with distomesal group of hairs; condyle well developed; no marginal teeth; fang short and thick. Endites with anteromesal scopula. Labium triangular, with narrowed base, sparsely haired. Sternum roughly triangular with straight anterior margin and rounded sides; these have short triangular extensions fitting in coxal concavities.

Legs: Formula 4123 or 4132; spination variable; spines usually few and long on first pairs of legs, more numerous and shorter on legs III and IV. Paired tarsal claws with 8 (on posterior pairs) to 12 teeth. Third tarsal claw on small onychium. Trichobothria in two rows on T, in one row on Mt and t. Hinged hairs present. Metatarsal ventral tufts present. No scopulae or claw tufts.

Abdomen oval; thinly haired; without muscle points. Spinnerets: PS 2-segmented not in one piece as drawn by Bosmans and Van Hove (1986a). Tracheal spiracle narrow, straight, in front with row of short spines. Tracheae divided from the beginning into 4 parallel thin ducts. Colulus represented by few hairs only. Epiandrum present.

Male palp: tibia with short lateral apophysis; cymbium with lateral fold, which may be short or extend to cymbial tip. Tegulum with two small membranous areas separating three sclerified areas: the distal terminal "conductor" which is a strongly sclerotized sclerite, the median tegular apophysis which is equally well developed and sclerotized, and the embolic base in the back from which the slender embolus originates.

Female palp with cylindric tarsus, with several spines, finely dentate claw turned inward over 45°.

Epigyne: Ventral aspect very simple: short hairless plate of variable shape; internal ducts usually forming tight corkscrew.

OTHER SPECIES INCLUDED: Many described and undescribed Afrotropical (see Bosmans and Van Hove, 1986a, 1986b; Van Hove and Bosmans, 1984) and Oriental species (Bosmans and Hillyard, in prep.); one species (*M. zebra* [Thorell], new combination) also occurs in Australia.

DISTRIBUTION: Paleotropical region, northwestern Australia.

NATURAL HISTORY: Representatives of the genus *Mallinella* are typical forest dwellers. They are night active and hide in a silk-lined retreat in the litter layer during the day. The fact that the substratum in which they burrow, humid litter, is usually rather soft explains their relatively poorly developed "burrowing gear," i.e., leg spines.

Mallinella vittiventris Strand
Figures 117–123

Mallinella vittiventris Strand, 1913: 336 (descr. ♀).
Mallinella notipyga Strand, 1913: 337 (descr. ♂♀) (NEW SYNONYMY).

TYPE MATERIAL: Holotype female: Zaire, Kivu, Kwidjwi, 1907 (ZMB 13875) (examined).

Paratype: 1 juv: same data as Ht (ZMB 13857) (examined).

Note: The females of *M. vittiventris* and *M. notipyga* are conspecific. Their epigynes have a different aspect because of what is supposed to be the result of postcopulatory plugging. Removal of particles of sticky matter from the copulatory openings reveals the identity of the epigynes. *M. vittiventris* has page priority.

DIAGNOSIS: Males of this species are recognized by the shape of the embolus, which is bifid at the distal extremity, and by the tip of the tegular apophysis which is split, the ends diverging. The female has a typical epigyne.

DESCRIPTION: *Female:* Total length 7.79 (6.51–7.98); carapace 3.62 (2.79–3.75) long, 2.50 (1.96–2.58) wide.

Color: Carapace medium to pale reddish brown, with faint grayish radiating striae. Legs uniform yellowish orange. Abdomen pale sepia with 3 or 4 pale chevrons in posterior half of dorsum, sometimes united to longitudinal bar with sinuous sides; venter pale with 2 longitudinal sepia stripes in middle and oblique one on either side.

Eyes: a: 1.00 (0.31); b: 0.89; c: 1.04; d: 1.04; e: 0.37; f: 0.96; g: 0.67; h: 1.63. MOQ: AW = 0.86 PW; AW = 0.78 L.

Legs: Spination: femora I d4*pl1 II d3*pl1 III d3*pl2*rl1 IV d4*pl2*rl1; patellae I-II-III pl1 IV pl1rl1; tibiae I v2-2-2 II pl2*v1-2-2 III pl2*d2*rl2*v2-2-2 IV pl2*d2*rl2*v1-1-2; metatarsi I pl1v2-2-2 II pl1v2-2-2 III 12 disp. IV 14 disp. Measurements:

	I	II	III	IV
F	1.66	1.49	1.47	1.82
P	0.65	0.65	0.69	0.73
T	1.29	1.01	1.09	1.45
Mt	1.25	1.17	1.39	1.13
t	1.11	0.99	0.91	2.02
Tot	5.96	5.31	5.55	7.15

Epigyne: Fig. 123.

Male: Total length: 5.42 (5.10–6.05); carapace 2.83 (2.83–3.50) long, 2.21 (2.21–2.63) wide.

Color: As in the female but dorsum of abdomen with narrow medium brown scutum in anterior half.

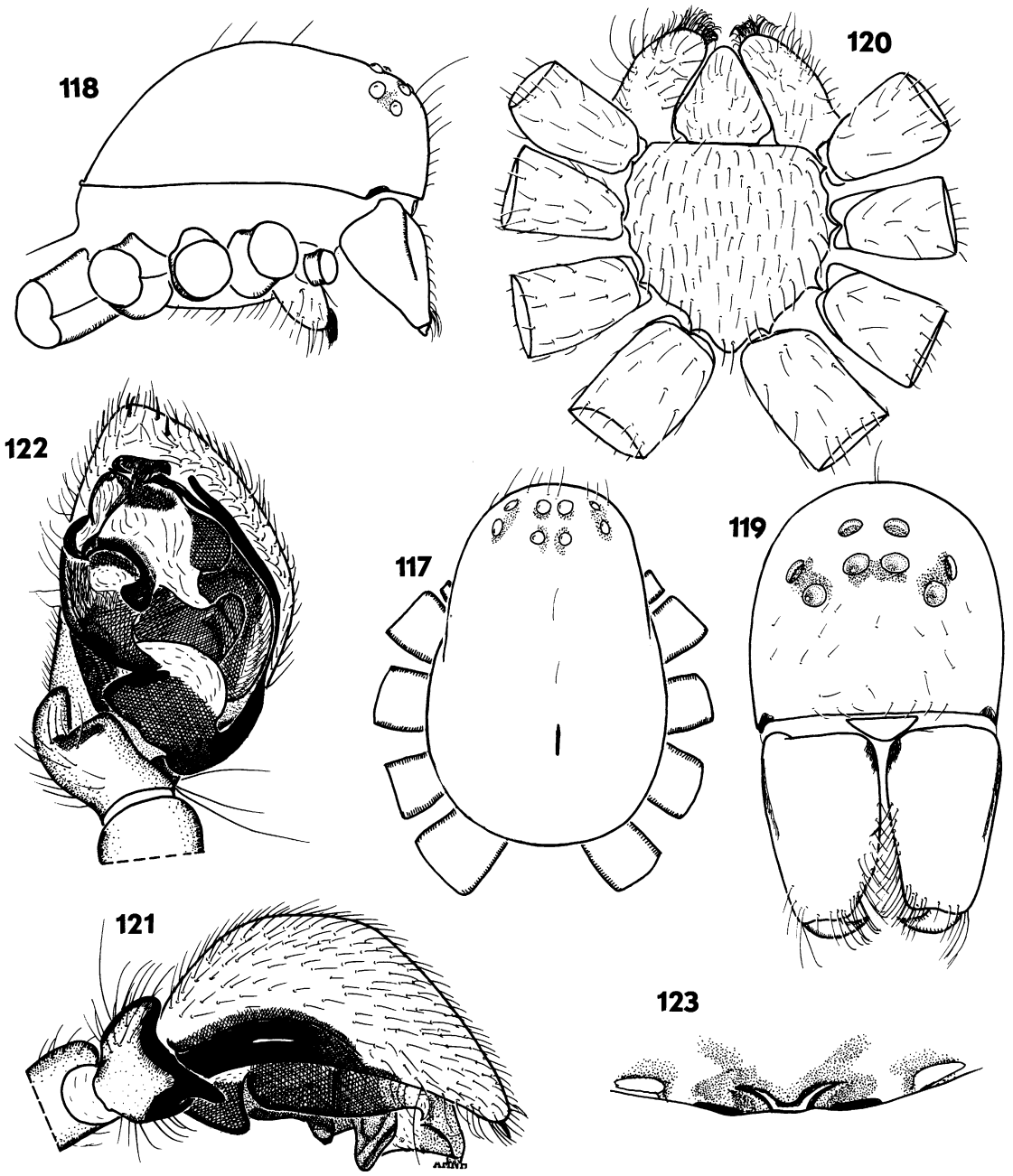
Eyes as in the female.

Legs: Spination: femora I d3*pl1 II d3*pl1 III d3*pl2*rl1 IV d4*pl2*rl1; patellae I-II-III pl1rl1 IV pl1rl1; tibiae I v2-2-2 II pl1v1-2-2 III pl2*d2*rl2*v2-1-2 IV pl2*d2*rl2*v2-2-2; metatarsi I v2-2-2 II v2-2-2 III 14 disp. IV 16 disp. Measurements:

	I	II	III	IV
F	1.78	1.74	1.72	2.12
P	0.71	0.71	0.69	0.77
T	1.57	1.31	1.17	1.66
Mt	1.45	1.39	1.62	2.38
t	1.31	1.09	0.81	1.27
Tot	6.82	6.24	6.00	8.20

Palp (figs. 121, 122): Embolus rather broad with bifid distal extremity, separate tips slightly diverging; extremity of tegular apophysis bifid, tips strongly diverging as seen from side, converging with conductor.

OTHER MATERIAL EXAMINED (all material from MRAC, unless otherwise stated): ZAIRE. – **Kivu**: 1♂, 2♀ (types of *M. notipyga*): Ruwenzori, base of western escarpment, II.1908 (ZMB 13855 and 13856); 3♂, 10♀, 1 juv.: Ruwenzori, northern face, Kikura camp, 2000 m, VII–VIII.1974, M. Lejeune; 3♀: Rwankwi, II.1951, J. Leroy; 1♂: Beni, L. Bonnevie; 1♂, 1♀: Kambaila, Pavua valley, VI.1973, M. Lejeune; 1♀: Kambaila, vallée de Vukaika, VI.1973, M. Lejeune; 2♂: Kambaila, Sindani, 1800 m, V.1973, M. Lejeune; 1♀: Butembo, 1750 m, II–III.1975, M. Lejeune; 1♂, 2♀, 1 juv.: Butembo, 1740 m, III.1965, J. Celis; 1♂, 1♀: road Butembo-Beni (7 km), 1750 m, Kahua forest reserve, 15–20.IV.1974, M. Lejeune; 2♀: Bikara, 18 km S Lubéro, Road Lubéro–Goma, 1200 m; XII.1976, M. Lejeune; 1♂, 2♀, 2 juv.: Butembo, Musosa valley, 1745 m, IV.1968, M. Lejeune; 1♂, 3♀: Musyenene-Kyondo forest, 2200 m, 5–6.IV.1976, M. Lejeune; 1♂: Mt. Lubwe, SE of Butembo, 2040 m, 12.IV.1971, M. Lejeune; 1♀: Biena forest reserve, IV.1969, M. Lejeune; 1♂: Lubéro territory, Katondi, 2200 m, 9.XII.1950, N. Leleup; 1♀: Lubéro territory, Luate waterfall, 1420 m, 1.XII.1966, J. Celis; 1♂, 1♀: road Lubéro-Butembo, Lukanda region, Itanda forest, 2200 m, XII.1974–I.1975, M. Lejeune; 1♂, 1♀: Karisimbi volcano, Rukumi, 3500 m,



Figs. 117–123. *Mallinella vittiventris.* **117.** Female carapace, dorsal view. **118.** Female carapace, lateral view. **119.** Female carapace, frontal view. **120.** Sternum, labium, and endites. **121.** Male palp, lateral view. **122.** Male palp, ventral view. **123.** Epigyne, ventral view.

10.VII.1970, M. Lejeune; 1♀, 1 juv.: Mukando, 1000 m, 28.VIII.1967, J. Celis; 1♂, 2♀: Kabare territory, Nyakasiba, 1900–2350 m, II.1953, N. Leleup; 2♀: Itombwe, Uvira territory, Kalari, moyenne Marunga, 1200 m, VI.1961, N. Leleup; 1♀: Haut Itombwe, source of Kalimabenge, 2800 m, II.1957, N. Leleup; 1♂: same locality, 2400 m, XII.1958, N. Le-

leup; 1♀: Mt. Kasongwere, W slope, 2540 m, 22.VIII.1963, J. Celis; 1♀: Kabare territory, Lwiro, 2000 m, 1953, N. Leleup; 1♂, 1♀: Lubéro, 2200 m, 11.XII.1951, N. Leleup; 7♀: Kalche, Bunyakiri, 1050 m, IX.1953, N. Leleup; 2♂, 7♀: Masisi territory, Mokoto lakes region, 1800 m, VI.1959, N. Leleup; 1♀: Uvira territory, Mt. Kambekulu, 2450 m, VI.1955, N. Leleup; 4♀: Uvira territory, river between Kalimabenge and Kambekulu, V.1962, R. Kiss; 1♂: Lubéro territory, Mulo, 1951, R. Bergmans; 2♀: Lubéro territory, Ribwe Lya cave, 27.I.1966, J. Celis and M. Lejeune; 6♀: Lubéro territory, Kasuo, Kabwe-Ka-Nologwe cave, 1450 m, J. Celis; 1♀, 1 juv.: Mwenga territory, Kitutu, 650 m, 12.IV.1958, N. Leleup; 1♀: Mwenga, Luiko gold mine, 23.I.1952, N. Leleup; 4♀: Bwito, Marlier; **Katanga**: Albertville territory, Bendera, 1000 m, X.1958, N. Leleup; 2♀: Mt. Kabobo, 10 km N Ht. Kiyimbi, 1900 m, X.1958, N. Leleup; 1♂: Mt. Kabobo, Ht. Kiyimbi, 1850 m, V.1958, N. Leleup. RWANDA: – Rugege forest (old name for Nyungwe), Mukokola marsh, 2250 m, D. Laurent; 91♂, 8♀: Nyungwe forest, INRS site, 2300 m, 8.XI–5.XII.1985, R. Jocqué, J.-P. Michiels, and C. Nsengimana.

DISTRIBUTION: Zaire (Kivu and northern Katanga), western Rwanda.

NEOSTORENA RAINBOW

Neostorena Rainbow, 1914: 21.

TYPE SPECIES: *Neostorena venatoria* Rainbow 1914 by monotypy.

DIAGNOSIS: Males of this genus are recognized by the palp, which has a usually flattened cymbium with wide lateral fold ending in a pointed "exit"; the circular tegulum bears a double apophysis: a sclerotized one which is slender, sharp, and pointing outward, and a membranous one, which also points outward, and lies ventrad of the former; the embolus is long and whiplike and originates on the distal extremity of the tegulum.

DESCRIPTION: Medium-size to large spiders (5.00–20.00) with smooth to slightly rugous or strongly granulated teguments. Carapace widest between coxae II and III, narrowed to 0.75–0.80 times maximum width in females, to about 0.65 maximum width in males. Profile with more or less strongly raised cephalic part; more strongly raised in larger species; highest point of profile between PME and fovea. With shallow groove between PME and fovea.

Color: Carapace, chelicerae, and sternum red to dark chestnut brown; legs from yellow over orange to dark brown; abdomen pale to dark gray, with or without pattern.

Eyes in three rows (2-4-2). Second one recurved. All eyes subequal—AME sometimes larger than others—circular, pale, only AME dark; AME 0.1 to 0.4 times their diameter apart, at about one diameter from ALE; PME about 0.3 times their diameter apart and at twice that distance from PLE. MOQ slightly longer than wide and almost as wide in front as in back. Clypeus rather high, between 3 and 6 times diameter of ALE, straight, more or less haired.

Chilum double, sclerites from 1.0 to 2.0 times as wide as high; with few setae. Chelicerae slender to massive; more or less strongly haired; condyle strongly developed; sometimes extended as lateral ridge over entire length; with row of small setae in frontal groove delimiting condyle. Sometimes with small tooth on promargin, hidden from in front by anteromesal group of hairs. Labium roughly triangular with narrow base; sparsely haired. Endites roughly triangular, with slightly broadened base, haired, with anteromesal scopula. Sternum subcircular or oval: slightly narrowed in front, with virtually straight anterior margin, broadly rounded toward posterior end; strongly rebordered in males of undescribed large dark species. No precoxal sclerites but sometimes small triangular extensions fitting in corresponding coxal concavities; small triangular intercoxal sclerites may be present.

Legs: Formula 4123. Spination very variable; spines usually few, but long on first pairs of legs, more numerous and shorter on legs III and IV. All tarsal claws with 8 to 14 teeth. Trichobothria in 2 dorsal and 1 retrolateral row on T, in 1 dorsal and 1 retrolateral row on Mt, in 1 dorsal row on t. Hinged hairs numerous, most dorsal, sometimes lateral. Metatarsal ventral tufts present. Scopulae of hairy or spiniform type; sometimes well developed, sometimes absent.

Abdomen oval; densely haired; with 2 muscle points, sometimes faint. Spinnerets

normal for the subfamily (see note below). Tracheal spiracle very narrow, straight. Tracheae (in *N. minor*) divided from beginning into 4 parallel thin ducts. Colulus represented by narrow, sparsely haired field. Epiandrum poorly developed.

Male palp: Although the somatic characters of representatives of this genus vary, their male palps are very characteristic and similar. Tibia with rather long lateral apophysis, usually thick, pointing forward or outward, ending in sharp tip. Cymbium flattened, more strongly so in larger species, with dorsal field of chemoreceptors near distal tip; posterior and anterior parts of broad lateral fold converge in lateral extension, so-called "exit"; tegulum circular, bearing double distal apophysis with strongly sclerotized part; straight or slightly curved, but always sharp, pointing outward; membranous part ventrad of the former, usually tapering toward lateral side. Whiplike embolus originating dorsad of sclerotized apophysis, describing one loop before joining membranous apophysis.

Epigyne: Ventral aspect very simple: a rather densely haired plate with central concavity with two copulatory holes, apparently plugged after copulation; copulatory ducts long, running back and forth in corkscrew, ending in globular spermathecae near posterior margin of epigyne. Female palp with cylindric tarsus; with numerous spines and finely dentate claw.

Note: Rainbow (1914: 22) stated that the PS are the longest; this is probably incorrect as the anterior ones are about twice as long as those of the posterior pair; they are, however, not 3-segmented as claimed by this author but 2-segmented as in all other Zodariidae.

OTHER SPECIES INCLUDED: *Neostorena grayi,* new species, *Neostorena minor,* new species, *Neostorena victoria,* new species, *Habronestes spirafer* L. Koch, several undescribed.

DISTRIBUTION: Entire Australia.

NATURAL HISTORY: At least some species live in a burrow they close with a trap door which is very rare in the Araneomorpha (see also under *Capheris*). In other species the entrance of the burrow is apparently only slightly surmounted by what is currently called a palisade.

Neostorena venatoria Rainbow
Figures 124–128

Neostorena venatoria Rainbow, 1914: 22 (descr. juv. ♀).

TYPE MATERIAL: Holotype subadult female: Australia, Victoria, Fern Tree Gully (AM: K36174) (examined).

DIAGNOSIS: Representatives of this species are recognized by the annulated brown and yellow femora.

DESCRIPTION: *Juvenile female:* Total length 18.0; carapace 7.60 long, 5.00 wide.

Color: Carapace uniform medium reddish brown; chelicerae reddish brown, with pale retromesal stripe. Sternum medium brown. Legs medium brown except femora: yellow in basal half, dark brown in distal half. Abdomen gray with very faint evidence of dorsal pattern described by Rainbow (1914), mainly characterized by median pale yellow stripe in posterior half.

Eyes: a: 1.00 (0.33); b: 0.73; c: 0.68; d: 0.85; e: 0.30; f: 1.21; g: 0.67; h: 1.64; AL-AL: 2.57. MOQ: AW = 1.02 PW; AW = 0.92 L.

Legs: Measurements:

	I	II	III	IV
F	5.75	5.00	4.16	4.75
P	2.08	2.08	2.08	2.25
T	4.58	3.50	2.67	4.00
Mt	4.58	4.33	4.58	6.33
t	2.67	2.50	2.33	2.92
Tot	19.66	17.41	15.83	21.24

Adults unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

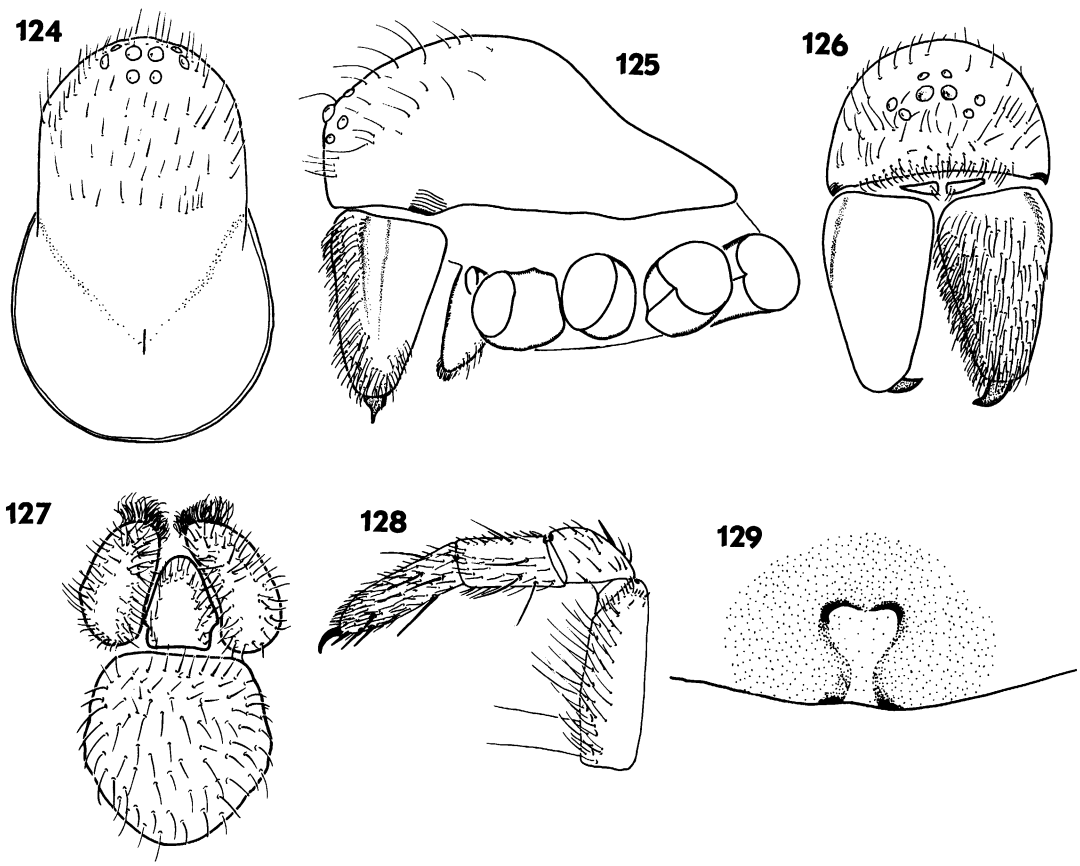
Neostorena grayi, new species
Figure 129

TYPE MATERIAL: Holotype female: Australia, New South Wales, Newport near Sydney, 18.VI.1978, M. Hills (AM, KS1653).

Paratypes: Australia: *New South Wales*: 1♀: together with Ht; 1♀: Lower Portland, Hawkesbury River (AM, KS7337): 1♀: Oatly, 19.IX.1952, L. Skelton (AM, KS15708).

DIAGNOSIS: The species is recognized by its size and its color pattern, having uniform dark legs.

ETYMOLOGY: The species name is a patro-



Figs. 124–129. 124–128. *Neostorena venatoria.* **124.** Female carapace, dorsal view. **125.** Female carapace, lateral view. **126.** Female carapace, frontal view (hairs omitted on right chelicera). **127.** Sternum, labium, and endites. **128.** Female palp, lateral view. **129.** *Neostorena grayi.* Epigyne, ventral view.

nym in honor of Dr. M. Gray who made the material available for study.

DESCRIPTION: *Female:* Total length 15.83; carapace 8.33 long, 5.58 wide.

Color: Carapace dark chestnut brown in cephalic area, reddish brown in thoracic area; chelicerae dark chestnut with retromesal pale stripe. Sternum pale brown; abdomen dark gray with faint pale median stripe in posterior half of dorsum.

Eyes: a: 1.00 (0.33); b: 0.67; c: 0.80; d: 0.67; e: 0.12; f: 0.82; g: 0.30; h: 1.76. MOQ: AW = 1.11 PW; AW = 0.86 L.

Legs: Spination: femora I d2*pl1 II d2*pl1 III d3*pl1-1rl1 IV d3*pl1rl1; patellae I-II-III pl9d1pl1 IV pl9d1-1rl1; tibiae I pl1v2-2-1-2 II pl2*v1-2-1-2 III pl2*d3*rl3*v2-2-2 IV pl3*d3*v1-2-1-1-2; metatarsi I v + pl 20 disp. II v + pl 12 disp. III pl1rl1vdw6 IV pl2*rl1v5dw6.

Epigyne: Figure 129.

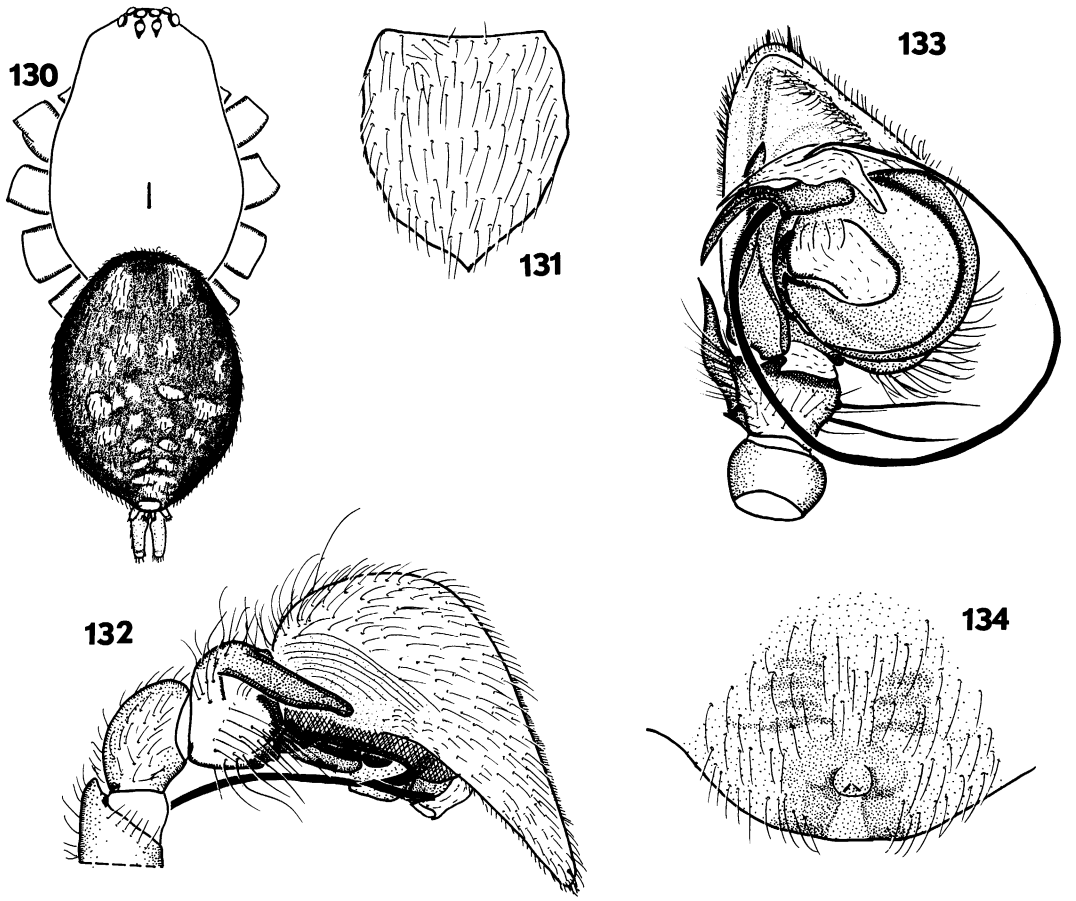
OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: New South Wales.

NATURAL HISTORY: The spider lives in a burrow, the entrance of which is somewhat surmounted by some leaves (L. Skelton, in litt.).

Neostorena minor, new species
Figures 130–134, 141

TYPE MATERIAL: Holotype male: Australia, Queensland, Mt. William (lower slopes), Dalrymple heights nr. Eungella, 21°01'S, 148°36'E, 1120 m, rainforest site 15, IV.1975, M. Gray and C. Horseman (AM, KS6564).



Figs. 130–134. *Neostorena minor.* **130.** Female carapace, dorsal view. **131.** Sternum, labium, and endites. **132.** Male palp, lateral view. **133.** Male palp, ventral view. **134.** Epigyne, ventral view.

Paratypes: Australia: Queensland: 1 sa ♀: together with Ht; New South Wales: 1♂, 4♀, 13 juv: Iluka, 29°24′S, 153°22′E, 3 m, rainforest site 54, IV–V.1976, M. Gray and C. Horseman (AM, KS12685, 12687, 12688, 12691); 1♂: Lorne State Forest near Lorne, site 86, 31°35′S, 152°57′E, 17.XI.1978, D. Milledge, pitfall (AM, KS15982); 6♀, 7 juv.: Cherry Tree North State Forest, W Casino, 28°54′S, 152°45′E, site 53, 400 m, IV–V.1976, M. Gray and C. Horseman (AM, KS10333, 10335, 10337, 10340); 1♀: Wiangaree SF, Brindle Creek, 740 m, 29.II–3.III.1980, rain forest, M. Newton and M. Thayer (AMNH); 2♀, 17 juv.: as previous (AMNH).

DIAGNOSIS: Representatives of this species are easily recognized by their reduced size and rather complex dorsal abdominal pattern; the apophysis of the male palpal tibia is characteristic, as well as the female epigyne.

ETYMOLOGY: This species is a rather small one within the genus, hence its name.

DESCRIPTION: *Male:* Total length 7.49 (6.25–7.49); carapace 3.71 (3.16–3.71) long, 2.54 (2.08–2.54) wide.

Color: Carapace uniform reddish brown with faint radiating striae; chelicerae pale brown; sternum pale brown; legs yellow or yellowish orange. Abdomen: dorsum dark sepia with complex pattern of white spots. Venter mottled with dark on pale background.

Eyes: a: 1.00 (0.15); b: 0.96; c: 0.87; d: 0.96; e: 0.23; f: 0.64; g: 0.45; h: 1.35; AL-AL: 2.25. MOQ: AW = 1.02 PW; AW = 0.92 L. Clypeus 0.48 high (3.3 times diameter of an ALE), straight.

Chilum double: each sclerite almost equilateral triangle with blunt lower angle. Chelicerae with one tooth on promargin.

Legs: Spination: femora I d1 II d1 III rl2* IV d1rl1; patellae I-II-III pl2*d1rl1 IV pl2*d1rl1; tibiae I v5*-2 II v3* III pl2*d3*rl2*v2-2-2 IV pl2*d3*rl2*v2-2-2; metatarsi I v2-2-2 II v2-1-3 III 15 disp. IV 15 disp.; tarsi I v2 II v2 III v3 IV v5. Measurements:

	I	II	III	IV
F	2.25	2.13	1.87	1.92
P	1.00	1.00	0.91	1.00
T	1.88	1.50	1.16	1.79
Mt	1.88	1.63	1.83	2.62
t	1.33	1.17	0.96	1.33
Tot	8.34	7.42	6.75	8.67

Male palp (figs. 132, 133): Tibia with strong, straight lateral apophysis pointing forward, tip blunt as seen from side, sharp as seen from below; cymbium rather strongly curved, pointed exit of lateral fold fairly proximal and not pronounced; tegulum circular; embolus whiplike, originating in front, describing complete loop before joining double tegular apophysis, provided with curved, strongly sclerotized part, and membranous part, both pointing outward.

Female: Total length 6.83 (5.50–7.50), carapace 3.33 (2.67–3.83) long, 2.17 (1.67–2.41) wide.

Color: Very much as in male but with more reddish tinge all over; femora with dark triangle near distal tip on either side.

Eyes: a: 1.00 (0.10); b: 1.10; c: 1.05; d: 0.95; e: 0.40; f: 1.00; g: 0.30; h: 1.90; AL-AL: 2.50. MOQ: AW = 0.92 PW; AW = 0.74. Clypeus 0.53 high or 5 times diameter of ALE.

Legs: Spination: femora I d1 II d1 III-IV d1; patellae I-II-III pl2*d1rl1 IV pl2*d1rl1; tibiae I v1 II v2* III pl2*d3*rl2*v2-2-1 IV pl2*d4*rl2*v1-1-1; metatarsi I v2-1-3 II v2-2-3 III 12 disp. IV 15 disp.; tarsi I v1 II v2 III v4 IV v5. Measurements:

	I	II	III	IV
F	1.87	1.58	1.46	1.79
P	0.83	0.79	0.83	0.96
T	1.33	1.08	0.88	1.42
Mt	1.21	1.68	1.25	2.00
t	0.92	0.79	0.75	0.92
Tot	6.17	5.42	5.17	7.09

Epigyne (figs. 134, 141): With median concavity preceded by corkscrew-shaped spermathecae shining through.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: New South Wales, Queensland.

Neostorena victoria, new species
Figures 135–138

TYPE MATERIAL: Holotype male: Australia, Victoria, 22.3 km N Millewa Sth Bore, 34°35′S, 141°03′E, site 84, XI.1985, drift fence pitfall trap, A. L. Yen (VM).

Paratypes: Australia, Victoria, 131♂: in a quadrangle with the following coordinates as corners: 34°35′S, 141°05′E; 35°33′S, 142°26′E; 34°52′S, 142°37′E; and 34°35′S, 141°03′E, 54 different sites in the vicinity of Hattah, Patchenollock and Murrayville, X–XI.1985, drift fence pitfall traps, A. L. Yen (VM, 5♂ in KBIN); 1♀: Little Desert National Park, via Kiata access, 16.XII.1987, from shallow burrow with twig palisade beside Salt Lake track, P. Hudson (SAMA). South Australia: 1♂: Comet Bore, NW Buns Springs, 3.XII.1978, pitfall trap, AFL and NAW (SAMA).

DIAGNOSIS: The species is recognized by its bright color pattern; males have a typical tibial apophysis which points laterad and tibiae IV slightly curved up; females have the epigyne with central area deepened and wider in the back than in front.

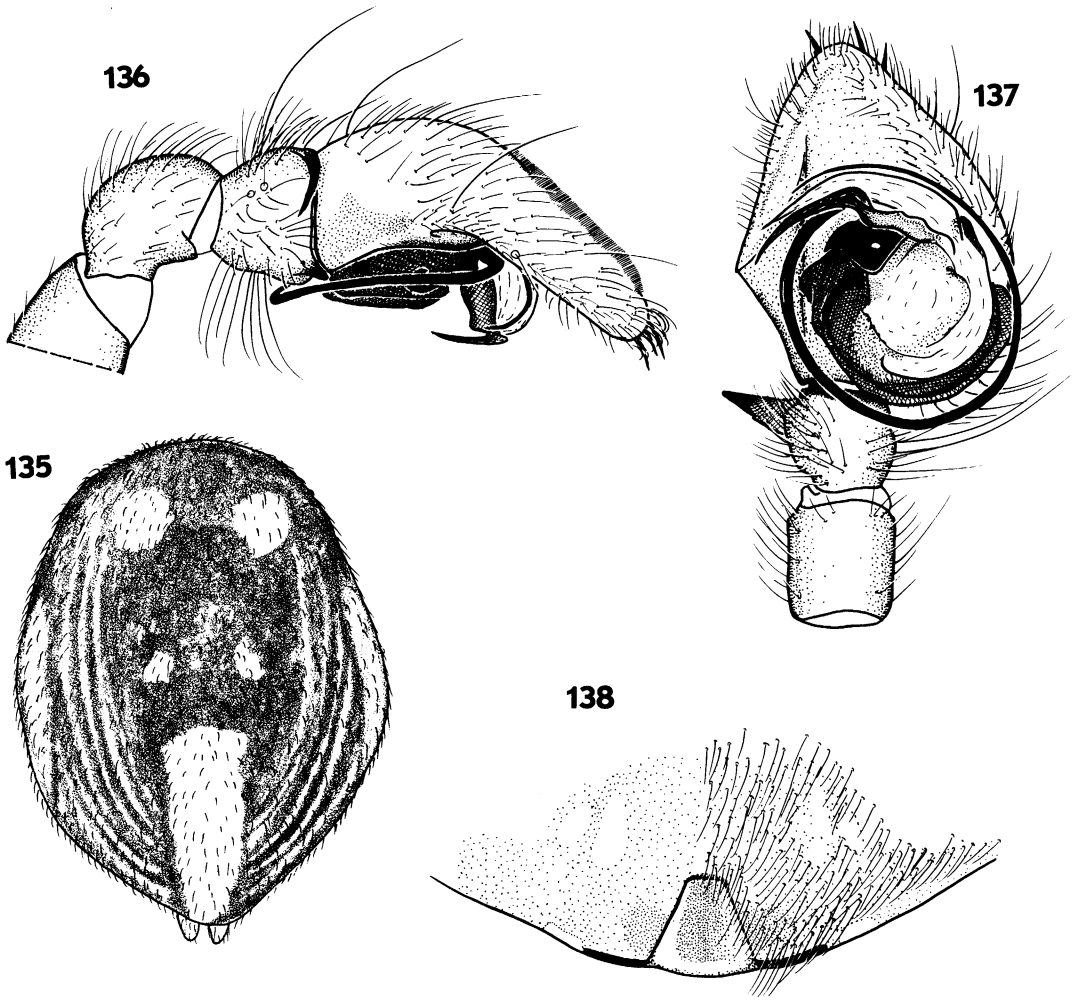
ETYMOLOGY: The species name is a noun in apposition taken from the type locality.

DESCRIPTION: *Male:* Total length 10.80 (6.24–11.00); carapace 5.75 (3.58–6.33) long, 3.75 (2.33–4.25) wide.

Color: Carapace dark reddish brown with black V in front of fovea; chelicerae dark reddish brown, paler, more reddish at both extremities; sternum dark red; legs orange, overlaid with dark streaks on distal part of femora and ventral side of patellae. Abdomen: dorsum dark sepia with 5 white spots: 2 large circular in front, 2 smaller circular in middle, 1 large longitudinal in front of spinnerets (fig. 135). Sides dark with pale, obliquely oval patch; venter uniform gray, slightly mottled with pale.

Carapace coarsely granulate; with strongly raised cephalic area.

Eyes: a: 1.00 (0.31); b: 0.68; c: 0.58; d: 0.71; e: 0.10; f: 0.38; g: 0.35; h: 1.13; AL-AL: 1.94. MOQ: AW = 1.38 PW; AW = 0.98 L. Clyp-



Figs. 135–138. *Neostorena victoria.* **135.** Abdomen, dorsal view. **136.** Male palp, lateral view. **137.** Male palp, ventral view. **138.** Epigyne, ventral view.

eus 0.77 high (3.7 times diameter of ALE), straight, with some long, upturned hairs.

Chilum: Sclerites rather large (0.40) as compared to their height (0.14). Chelicerae without teeth; condyle extending over entire length as lateral ridge. Sternum rather elongate: 2.22 long, 2.00 wide; with lateral triangular extensions corresponding with coxal concavities, three pairs of intercoxal triangles.

Legs: metatarsi IV slightly curved up just before middle; scopula spiniform. Spination: femora I pl1d2* II pl1d2* III d1-2-1rl1 IV d3*rl1; patellae I-II-III pl7d1 IV pl9d1; tibiae I pl2*v2-2-2-1-2 II pl2v2-1-2-2 III pl3*d3*rl2*v2-1-2-2 IV pl3*d3*rl2*v2-2-2; metatarsi I v18**dw4 II pl1v9**dw4 III 21 disp. IV 19 disp. Measurements:

	I	II	III	IV
F	5.33	4.33	4.91	5.50
P	1.67	1.50	1.33	1.58
T	4.50	3.41	2.75	4.16
Mt	5.08	4.50	4.58	6.83
t	2.91	2.50	2.00	2.91
Tot	19.49	16.24	15.58	20.99

Male palp (figs. 136, 137): Tibia with relatively short dorsolateral apophysis pointing laterad and downward; cymbium rather flat with well-developed field of chemoreceptors;

pointed exit of lateral fold at about one-third cymbial length from base; sclerotized tegular apophysis slightly recurved, distal part of membranous apophysis almost straight; tegulum circular; embolus whiplike, originating in front, describing complete loop before joining double tegular apophysis.

Female: Total length: 18.10; carapace 9.33 long, 5.83 wide.

Color: As in male; only difference is color of femora: pale yellow except near distal extremity where darkened as in male.

Legs: Mt IV straight. Tibia with dense dorsal cluster of hairs on distal tip. Spination: femora I pl1d2* II pl1d2* III d1-2-1rl1 IV d3*rl1; patellae I-II pl1 III pl7d1rl1 IV pl12d1rl1; tibiae I pl1v5-5** II pl2*v4-4** III pl3*d3*rl2*v2-2-2 IV pl3*d3*rl2*v2-2-2; metatarsi I v18**dw4 II pl1v9**dw4 III 16 disp. IV 19 disp. Measurements:

	I	II	III	IV
F	7.16	5.58	5.00	6.74
P	2.58	2.50	2.16	2.67
T	5.41	4.08	3.33	4.83
Mt	5.00	4.75	5.41	7.33
t	2.75	2.66	2.75	3.25
Tot	22.90	19.57	18.66	24.82

Epigyne (fig. 138): Central concavity deep, wider in back than in front.

OTHER MATERIAL EXAMINED: None.

NATURAL HISTORY: It is remarkable that not a single female is present in the large sample from the VM. This suggests that the females are relatively inactive and stay in their burrows, unlike the adult males which are easily captured in pitfall traps as they wander in search of a mate..

DISTRIBUTION: Victoria, South Australia.

NOSTERA, NEW GENUS

TYPE SPECIES: *Nostera lynx,* new species.

DIAGNOSIS: Representatives of this genus have three rows of trichobothria on the tibiae; males are recognized by the tarsal cymbium with proximal lateral flange and by the short broad embolus originating on the distal part of the tegulum which has a membranous apophysis. Females have an epigynum with central membranous area; the copulatory ducts begin at its anterior margin and lead to a pair of large spermathecae on the posterior rim of the epigyne.

ETYMOLOGY: *Nostera* is an anagram of *Storena.* The gender is feminine.

DESCRIPTION: Medium size (4.50–7.50) spiders with smooth teguments. Carapace widest between coxae II and III, narrowed to 0.63 maximum width in females, to about 0.50 maximum width in males. Profile domed with highest point just in front of fovea in females, in between fovea and PME in males.

Color: Carapace, chelicerae, and sternum reddish brown with faint darker pattern in cephalic area; legs yellowish orange; abdomen dark sepia with typical pattern of pale dots and chevrons.

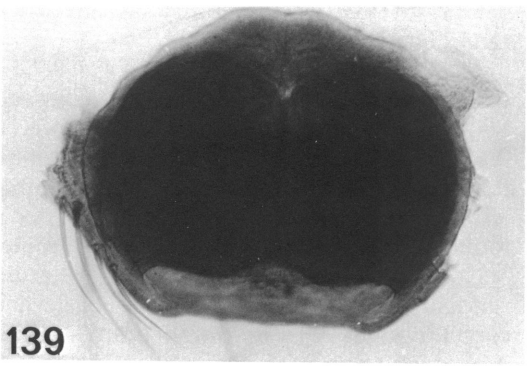
Eyes in 3 rows (2-4-2). Second one virtually straight. All eyes subequal, circular, pale, only AME dark. AME close together, about one diameter from PME, these slightly larger. ALE twice their diameter apart. PLE close together. MOQ longer than wide, slightly narrower in front than in back. Clypeus slightly convex; rather low: 2 to 2.5 times diameter of ALE. With few hairs.

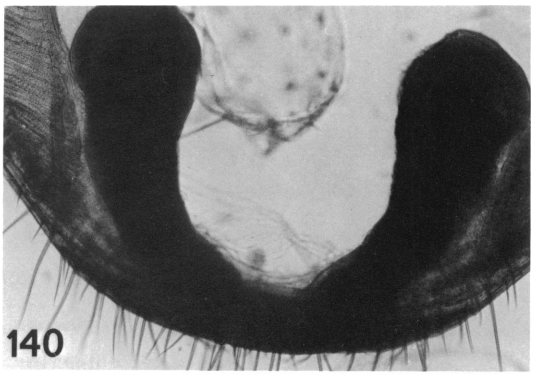
Chilum single: sclerite elongate, fusiform, about 3 times longer than wide; with few hairs. Chelicerae rather slender; quite densely haired in front; with one tooth on promargin, hidden from in front by anteromesal group of hairs. Labium narrowed at base; sparsely haired. Endites rather short and broad, with slightly broadened base, haired, with anteromesal scopula. Sternum subcircular: slightly narrowed in front, broadly rounded toward posterior end; with small triangular extensions fitting in between coxae. No inter- or precoxal sclerites.

Legs: Formula 4123; spination: spines few but long on first pairs of legs, more numerous but shorter on legs III and IV. All tarsal claws with approximately 8 teeth. Single claw on well-developed onychium. Trichobothria in 2 dorsal and 1 retrolateral row on T, in 1 dorsal and 1 retrolateral row on Mt, in 1 dorsal row on t. Hinged hairs present. Metatarsal ventral tufts poorly developed.

Abdomen oval; without muscle points. Tracheal spiracle very narrow, procurved, very close to spinnerets. Spinnerets: posterior pairs smaller in males than in females. Colulus represented by broad, sparsely haired field. Epiandrum poorly developed.

Male palp: Tibia with short lateral apophysis, sometimes bifid; cymbium with proxi-





Figs. 139–142. Cleared epigynes, dorsal view. **139.** *Forsterella faceta.* **140.** *Mallinella vittiventris.* **141.** *Neostorena minor.* **142.** *Nostera lynx.*

mal lateral flange; embolus short, broad, originating on anterior part of tegulum, which has simple membranous apophysis.

Epigyne: Simple; with central membranous area, copulatory ducts originating from its anterior margin; spermathecae large, situated near posterior end of epigyne.

Female palp with slender conical tarsus, provided with spines on mesal and ventral sides.

OTHER SPECIES INCLUDED: Several undescribed.

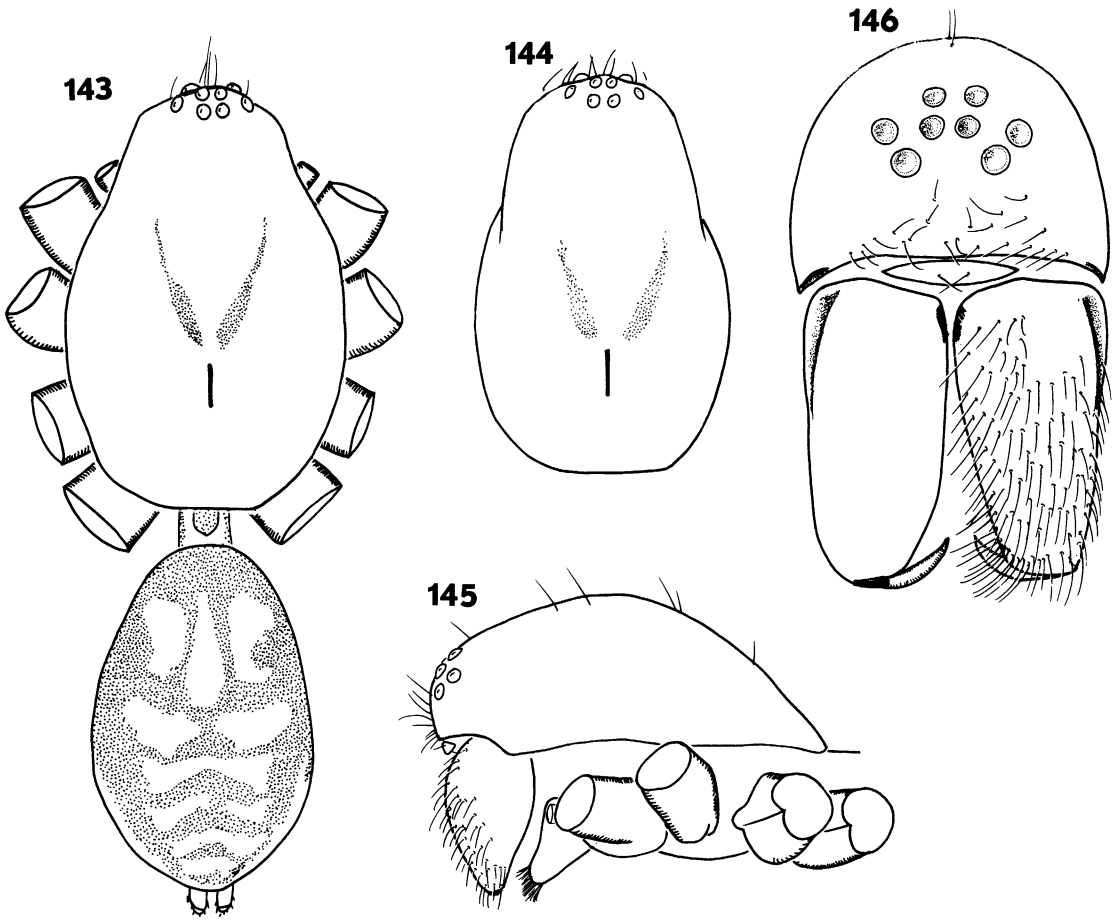
DISTRIBUTION: Queensland, New South Wales.

Nostera lynx, new species
Figures 142–150

TYPE MATERIAL: Female holotype: Australia, Queensland, Binnaburra lodge, Lamington N.P., 28°11′S, 153°11′E, 2.VII.1986, M. Harvey and P. Vaughan (VM).

Paratypes: Queensland: 2 juv.: together with Ht; 2♀, 7 juv.: Lamington National Park, Binna Burra, 900 m, 23.VI–7.VII.1988, *Nothofagus* grove, litter, S. and J. Peck (AMNH); 1♀: 11 km E Marburg 27°34′S, 152°43′E, 26.VII.1986, M. Harvey and P. Vaughan (VM). New South Wales: 1♂, 3♀, 15 juv.: 30 km NNW Kyogle, Roseberry State Forest: Mt. Glennie, 820 m, 1.VIII.1982, S. Peck (AMNH); 1♀: 15 km N Bateman's Bay, Kiola SF, forest drive, 35°37′S°, 16′E, 17.X.1979, C. Horseman (AM, KS5505); 2♀: 8.III.1979 (AM KS2820); 2♀: 9.IV.1979 (AM, KS2917); 2♀, 3 juv.: 15 km N Batemans, Kiola forest park, 30 m, 30.VIII.1982, S. and J. Peck (AMNH); 5♀: Kiola state forest, rest area, 33°36′S, 150°15′E, C. Horseman (AM, KS2806, 2♀ in KBIN).

DIAGNOSIS: The male of this species is recognized by the single lateral tibial apophysis on the male palp; the female has a typical epigyne with a heart-shaped central area.



Figs. 143–146. *Nostera lynx*. **143.** Male habitus, dorsal view. **144.** Female carapace, dorsal view. **145.** Female carapace, lateral view. **146.** Female carapace, frontal view (hairs omitted on right chelicera).

ETYMOLOGY: *lynx* is a noun in apposition referring to the pattern of the carapace which depicts the typical ears of this animal.

Female: Total length 6.24 (4.67–5.59); carapace 2.58 (2.38–2.71) long, 1.71 (1.42–1.75) wide.

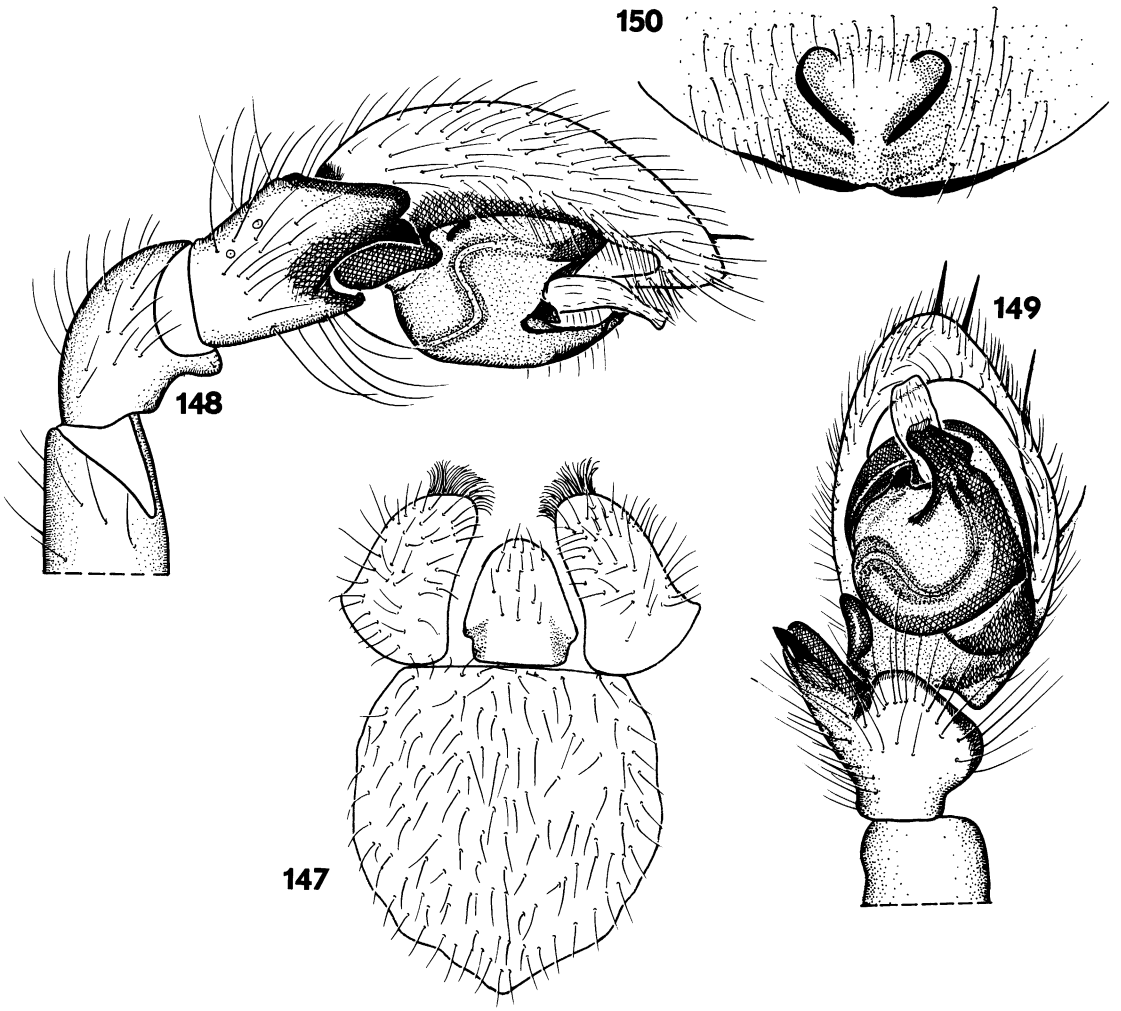
Color: Carapace, chelicerae, and sternum brownish orange; carapace with two faint striae pointing forward in front of fovea; legs yellowish orange; abdomen: dorsum dark sepia with seven pairs of white spots, usually united to chevrons from third pair onwards (fig. 143); sides pale with three dark sepia, oblique streaks in posterior half; venter pale, in middle with broad sepia line running from epigastric fold to spinnerets and flanked on either side by series of darker spots coalescing with dark stripes converging from sides.

Eyes: a: 1.00 (0.09); b: 1.16; c: 1.16; d: 1.26; e: 0.31; f: 0.42; g: 0.31; h: 1.16. MOQ: AW = 0.88 PW; AW = 0.79 L. Clypeus 0.28 high, slightly convex; with about 20 hairs.

Legs: Spination: femora I d1 II d1 III d1 IV d1; patellae I-II-III pl2*rl1 IV pl2*rl1; tibiae I-II v1 III pl2*d3*rl2*v1-1-2 IV pl2*d3*rl2*v1-2-2; metatarsi I v1-1-2 II v2-1-3 III 14 disp. IV 16 disp. Measurements:

	I	II	III	IV
F	1.55	1.33	1.21	1.53
P	0.68	0.65	0.65	0.71
T	1.19	0.93	0.75	1.17
Mt	1.01	0.91	0.93	1.55
t	0.63	0.63	0.65	0.73
Tot	5.07	4.44	4.18	5.69

Epigyne (figs. 142, 150): Central area heart-shaped.



Figs. 147–150. *Nostera lynx.* **147.** Sternum, labium, and endites. **148.** Male palp, lateral view. **149.** Male palp, ventral view. **150.** Epigyne, ventral view.

Male: Total length 5.25; carapace 2.75 long, 1.88 wide.

Color as female but slightly darker, pattern on carapace more marked.

Eye position and relative width as in the female.

Legs: Spination: femora I d1pl1 II d1 III d1 IV d2; patellae I-II-III pl2*rl1 IV pl2*rl1; tibiae I v1-1-2 II pl1v1-1-2 III pl2*d3*rl2*v2-1-2 IV pl2*d3*rl2*v1-2-2; metatarsi I v2-2-3 II v2-2-3 III 14 disp. IV 17 disp. Measurements:

	I	II	III	IV
F	1.87	1.59	1.43	1.92
P	0.79	0.73	0.71	0.77
T	1.47	1.13	0.91	1.31
Mt	1.33	1.21	1.37	1.96
t	0.87	0.79	0.77	1.01
Tot	6.34	5.45	5.19	6.97

Male palp (figs. 148, 149): Tibia with single lateral apophysis, slightly indented at tip, upper point blunt, lower one sharp; proximal flange well developed; embolus short, broad, slightly tapering, curved outward; subtegulum well developed, visible in mesal view.

Juveniles: Have typical adult abdominal pattern mainly characterized by broad dark streak on venter; tarsi fusiform: appears to be common feature of juvenile Zodariidae.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Southern Queensland, New South Wales.

PLATNICKIA, NEW GENUS

Drassus (part): Nicolet, 1849: 455. Simon, 1864: 126.
Storena (part): Simon, 1889: 218; 1893b: 428.

TYPE SPECIES: *Drassus elegans* Nicolet.

DIAGNOSIS: Recognized by the high carapace with a cluster of hairs in front of the fovea; the male palp is characterized by its simple, elongate, tegular apophysis.

ETYMOLOGY: The genus name is a patronym in honor of Dr. N. Platnick who collected quite a number of representatives of this taxon in southern Chile.

DESCRIPTION: Medium-size spiders (4–7) with smooth teguments.

Carapace longly oval, narrowed in front to ±0.7 maximum width in males, to ±0.8 maximum width in females. In profile evenly rounded with highest point just in front of fovea, where there a group of long hairs, which may extend into cephalic area.

Color: Carapace yellowish to dark reddish orange, often with broad dark margin, or entire thoracic area dark brown to black. Sternum pale yellowish orange to dark reddish brown. Legs yellowish orange with darker rings, or with entirely black segments. Abdomen with contrasted dorsal pattern of black spots on white background or vice versa. Venter with dark and white patches.

Eyes in two strongly procurved rows; all light, circular. AME the smallest: diameter about 0.65 times that of other eyes; those subequal; less than half their diameter apart and at same distance from ALE. PME about their radius apart and at slightly more than their diameter from PLE. MOQ distinctly wider behind than in front, slightly longer or as long as wide in back. Clypeus slightly concave, retreating, as high as diameter of ALE; with some long curved hairs.

Chilum single, poorly developed triangle with few hairs. Chelicerae relatively short, with lateral condyle strongly developed; promargin with 1 or 2 small teeth; with cluster of promesal hairs. Fangs short. Endites relatively short, roughly rectangular; anteromesal scopula poorly developed. Labium rounded. Sternum roughly triangular; length about 1.3 times width; anterior margin often slightly concave; slight extensions corresponding with coxal concavities sometimes present.

Legs: Formula 1423 (♂) or 4123 (♀). Spination: femora with 1 to 3 dorsal spines; anterior legs with a few spines on T and Mt. Posterior legs with numerous spines on P, T, and Mt. No scopulae or claw tufts. Distal extremity of tarsi slanting backward; claws implanted in shallow concavity; claws large with 10 to 13 teeth. Trichobothria in 2 rows on T, in 1 row on Mt and t. Hinged hairs present on T and Mt.

Abdomen oval; 6 spinnerets; anterior pair long, biarticulate, conical; posterior pair much smaller, cylindrical, provided with large spigots; median pair tiny. Tracheal spiracle narrow, with well delimited chitinous lip on anterior margin; tracheae bifurcated into 4 narrow tubes just in front of spiracle, each finely divided just behind petiolus. Colulus represented by group of hairs. Epiandrum well developed.

Male palp: Tibia with short, indented lateral apophysis. Embolus originating on mesodistal part of tegulum and mostly hidden on unexpanded palp; tegulum with relatively long, narrow apophysis originating on distal part of tegulum; tegulum slightly modified, sclerified, partly hidden by the apophysis.

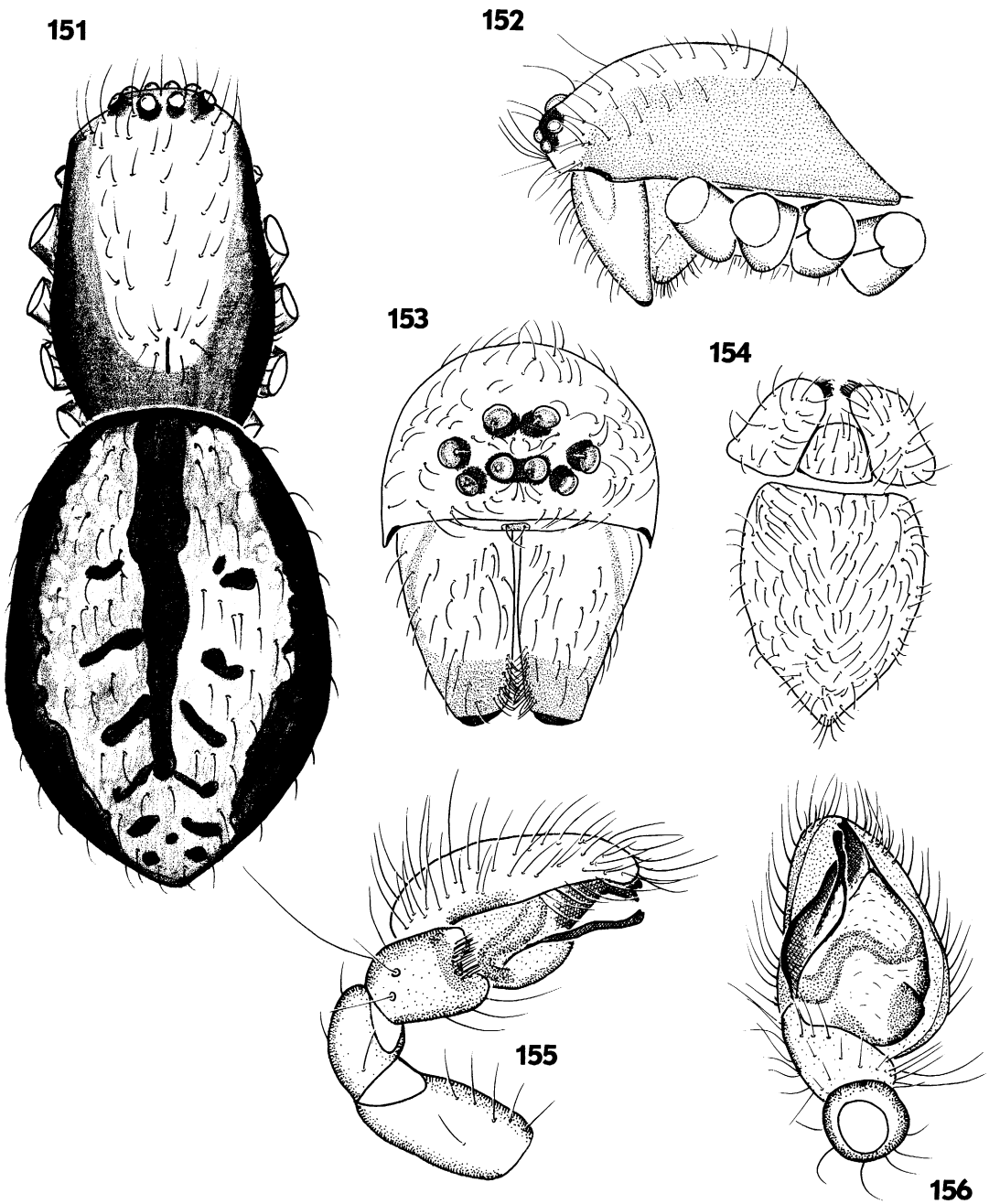
Epigyne with simple rectangular or triangular plate near posterior margin; with 2 central concavities, often plugged; copulatory ducts short, directly ventrad of spermathecae. Female palp with pectinate claw, turned inward over 45°.

OTHER SPECIES INCLUDED: *Storena bergi* Simon; a few undescribed species.

DISTRIBUTION: Southern Chile, southwestern Argentina, Falkland Islands.

Platnickia elegans (Nicolet), new combination
Figures 151–160

Drassus elegans Nicolet, 1849: 455 (descr. ♀). Simon, 1864: 126.
Drassus similis Nicolet, 1849: 456 (descr. ♀). Simon, 1864: 126 (NEW SYNONYMY).
Storena elegans Simon, 1889: 218; 1893b: 428, 429. Merian, 1913: 9.

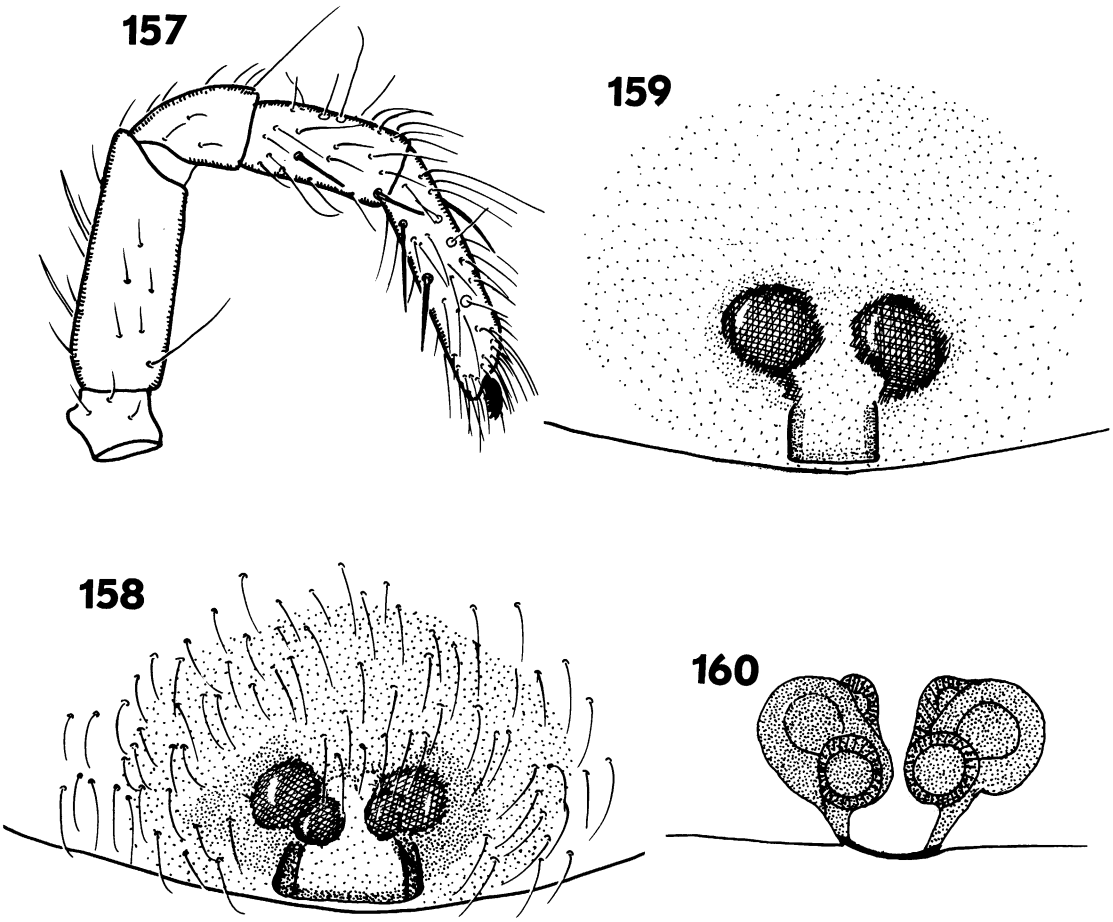


Figs. 151–156. *Platnickia elegans.* **151.** Female habitus, dorsal view. **152.** Female carapace, lateral view. **153.** Female carapace, frontal view. **154.** Sternum, labium, and endites. **155.** Male palp, lateral view. **156.** Male palp, ventral view.

TYPE MATERIAL: Lectotype female (here designated): Chile (MNHN) (examined).

Paralectotypes: 4♀: together with Lt.

DIAGNOSIS: *P. elegans* has a typical abdominal pattern; the male is further recognized by the tegular apophysis which stands clearly free from the sclerified distal tegular extension and the partly hidden embolus. In the



Figs. 157–160. *Platnickia elegans.* **157.** Female palp, lateral view. **158.** Epigyne of Ht, ventral view. **159.** Epigyne of female from Illapel (KBIN), ventral view. **160.** Epigyne, cleared dorsal view.

females, the central concavities are separated from the posterior margin by the median plate. (In *P. bergi* the central concavities are adjacent to the posterior margin as they are situated at each side of the median plate.)

DESCRIPTION: *Male:* Total length 3 90; carapace 2.00 long, 1.35 wide.

Color: carapace medium brown, foveal area paler; sternum pale brown; chelicerae dark brown; legs: F yellow with distal half darkened; P yellow, suffused with black; T yellow with dark distal ring; Mt and t brownish yellow. Abdomen: dorsum white with black median stripe from front to middle; sides black in superior, white in posterior half; venter black; spinnerets brown.

Eyes: a: 1.00 (0.095); b: 1.26; c: 1.32; d: 1.37; e: 0.42; f: 0.42; g: 0.63; h: 0.42. MOQ: AW = 0.74 PW; AW = 0.74 L.

Legs: Spination: femora I pl1d3* II pl1d3* III pl3*d2*rl3* IV pl1d3*rl1; patellae I-II-III pl1rl1 IV pl1; tibiae I pl1 II pl1-1 III pl1rl1-1v2-2 IV rl1v1-2; metatarsi I v3 II v1-4 III rl1dw6v2 IV rl1dw6v2. Measurements:

	I	II	III	IV
F	1.37	1.25	1.19	1.41
P	0.58	0.54	0.51	0.61
T	1.21	1.01	0.83	1.13
Mt	1.25	1.17	0.97	1.17
t	0.89	0.73	0.67	0.71
Tot	5.31	4.71	4.16	5.02

Male palp (figs. 155, 156): Lateral tibial apophysis with shallow indentation. Tegular apophysis standing free from distal sclerotized tegular extension, slightly swollen at tip; sclerotized tegular extension almost straight,

incised at extremity; only base of embolus visible in unexpanded palp.

Female (from Pucara): Total length 4.63; carapace 2.46 long, 1.57 wide.

Color: Cephalic area yellow to pale brown; thoracic area dark brown to black. Legs as in male: F pale, darkened in distal half; P and T yellow with dark distal rings; Mt and t brownish yellow. Abdomen: dorsum white with dark median stripe sometimes extending to rear and flanked by small oblique patches (fig. 151). Stripe sometimes much shorter, reaching hardly half abdominal length, without small black patches alongside; sides dark in superior half, pale in inferior half, sometimes extending on venter, which is most often black.

Eye pattern as in male.

Legs: Spination: femora I pl1d3* II pl1d3* III d1 IV d1-1; patellae I-II-III pl1rl1 IV pl1; tibiae I-II pl1-1v2 III pl1-1rl1-1v1-2 IV rl1v1-2; metatarsi I v3 II v2-4 III pl1rl1dw6v2 IV pl1rl1v12dw6. Measurements:

	I	II	III	IV
F	1.45	1.25	1.17	1.45
P	0.65	0.54	0.52	0.65
T	1.21	1.05	0.81	1.17
Mt	1.11	0.91	0.91	1.19
t	0.67	0.56	0.65	0.69
Tot	5.10	4.32	4.06	5.15

Epigyne (figs. 158–160): Width and shape of median plate rather variable: sides parallel or strongly converging toward the front explaining synonymy of the Nicolet species. Central openings usually plugged.

OTHER MATERIAL EXAMINED: CHILE.—1♀: Ht *Drassus similis* Nicolet (MNHN); 1♂: Bio Bio Prov., El Manzano nr. Contulmo, 15.XII.1985, L. E. Pena (AMNH); 1♀: Valdivia Prov., Purolon, NW Panguipulli, 10.I.1985, L. E. Pena; 1♂, 6♀, 4 juv.: Malleco Prov., Malacalhuello, 9–15.XII.1985, L. E. Pena (AMNH); 1♂: Bio Bio Prov., Caledonia, E Mulchen, 700 m, 10–15.II.1981, L. E. Pena (AMNH); Coquimbo Prov., El Bato, Illapel, 600–1300 m, 24–31.X.1954, L. Pena, G.20.275 (KBIN). ARGENTINA.—1♂, 1♀: Nunquen, Pucara, II.1961, M. Galiano (MACN); 1♂: Nunquen, Pucara, V.1972, S. Shajoskoy (MACN); same locality V.1972, Duret (MACN); 2♂, 4♀: same locality, II.1963, S. Shajoskoy (MACN); 1♂: as previous, 1♂, 1♀: San Martin de los Andes, XI–XII.1985, Gentil (MACN).

DISTRIBUTION: Chile and Argentina, foothills of the Andes between approximately 36 and 42°S.

SELAMIA SIMON

Selamia Simon, 1873: 69 (descr. new genus); 1884a: 326. Bosmans and Van Hove, 1986a: 17 (gen. rev.).

Storena (part): Simon, 1893b: 429 (synonymized); 1885: 30; 1903: 987. Merian, 1910: 29. Brignoli, 1982: 344.

TYPE SPECIES: *Lachesis reticulata* Simon.

DIAGNOSIS: Representatives of this genus are recognized by the long posterior spinnerets (length of PS = 0.8 length of AS), the normal nonspiniform scopulae, the toothed chelicerae, and the trichobothria in four rows on T; the clypeus is low.

DESCRIPTION: Medium-size spiders (±10) with elongate oval carapace, widest between coxae II and III; narrowed in front to about 0.6 times maximum width in males and 0.70 times maximum width in females. In profile rather low, thoracic area higher than cephalic area; highest point just in front of fovea. Cervical grooves poorly indicated.

Color: Carapace and chelicerae reddish brown, legs and sternum orange; abdomen on dorsum with pale pattern on dark gray background.

Eyes in two strongly procurved rows; subcircular, light, subequal. AME less than their radius apart, less than their diameter from ALE. PME less than their diameter apart, twice their diameter from PLE. MOQ as wide in front as in back, about 1.2 times as long. Clypeus relatively low (height 1.5 to 2 times diameter of ALE), retreating; provided with some long hairs.

Chilum double: 2 triangles with similar height and width, provided with few setae. Chelicerae strongly tapering, with lateral condyle; densely haired, setae more closely set in distal part. Promargin with one large and one small tooth; fang relatively long. Endites convergent, with anteromesal scopula. Sternum oval, slightly longer (1.2 times) than wide; without lateral extensions or intercoxal sclerites. Labium slightly longer than broad.

Legs: Formula 4123; short and strong. Spination: few spines on T and Mt of anterior

pairs. Numerous strong spines on posterior pairs. Metatarsal tufts poorly developed on III and IV, Mt hardly swollen at distal extremity. Three tarsal claws; paired claws with about 10 teeth. Scopulae not spiniform but hairy. Trichobothria dispersed or in 4 rows on T, in 2 rows (1 dorsal, 1 retrolateral) on Mt, 1 dorsal row on t.

Abdomen oval. Without scuta, but area on front of epigastric furrow slightly chitinized. Four dorsal muscle points. Six spinnerets: both anterior and posterior pairs biarticulate. Both sexes with well-developed PS (length PS = ±0.8 length AS). Colulus represented by 2 groups of a few hairs.

Male palp: Tibia with large lateral apophysis. Cymbium with dorsal flat area covered with short hairs, probably chemoreceptors; basolateral fold with ventral concavity. Tegulum transversally divided into proximal and distal part; former with short, curved inward, sclerotized apophysis; latter with conductor-like apophysis with prolateral concavity. Embolus originating on mesal side of tegulum, slender, curved.

Female palp with conical tarsus; tarsal claw toothed, turned inward over 30°.

Epigyne with deep central concavity. Copulatory ducts short, leading to kidney-shaped spermathecae in posterior half of epigyne.

Other species included: *Selamia histrionica* Simon, *Selamia segmentata* Simon, *Storena tribulosa* Simon (Bosmans, personal commun.). *Habronestes islamita* Simon, *Habronestes libani* Simon belong in *Storamia.*

DISTRIBUTION: Western Palearctic.

NATURAL HISTORY: These spiders hide by day in a sand-covered silken retreat that serves at the same time as a hiding corner and as a capturing device; prey are ambushed from underneath the retreat.

Selamia reticulata (Simon)
Figures 161–168

Lachesis reticulata Simon, 1870: 53 (descr. ♂♀); 1871: VII.

Selamia reticulata: Simon, 1873: 70, pl. II, figs. 1–3; 1874: 240; 1885: 30 (key). Cuni y Martorell, 1880: 220, 1883: 93.

Selamia segmentata: Simon, 1885: 29 (descr. immat.) (Ht immat. ♀ in MNHN) (examined) (NEW SYNONYMY).

Storena reticulata: Simon, 1893b: 428; 1899: 83; 1914: 226, 234. Galiano, 1910: 80, 394. Berland, 1914: 110. Reimoser, 1926: 135. Bosmans and Van Hove, 1986a: 17, 18.

TYPE MATERIAL: Whereabouts of type material unknown.

DIAGNOSIS: The male is easily recognized by the shape of the palpal tibia; the female has a typical epigyne.

DESCRIPTION: *Male:* Total length 7.7–9.4; carapace 3.58–4.38 long, 2.33–3.00 wide.

Color: Carapace and chelicerae reddish brown; legs and sternum orange. Abdomen with pale pattern on dark sepia background (fig. 161), sides and venter dark sepia, mottled with white.

Eyes: a: 1.00 (0.15); b: 1.13; c: 0.90; d: 1.26; e: 0.33; f: 0.73; g: 0.53; h: 1.73; i: 0.47. MOQ: AW = 1.00 PW; AW = 0.81 L.

Legs: Spination: femora I pl1d1 II pl1d1 III pl1d1rl1 IV d1rl1; patellae I-II-III pl2*rl1 IV pl2*rl2*; tibiae I v1-2 II v1-2 III pl2*d3*rl2*v2-3-2 IV pl2*d3*rl2*v2-3-2; metatarsi I v2-2-2-2 II v2-2-2 III 18 disp. IV 20 disp. Measurements (specimen with carapace length 4.04 and carapace width 2.75):

	I	II	III	IV
F	2.50	1.87	2.00	2.63
P	1.08	1.08	1.08	1.25
T	1.87	1.54	1.25	1.83
Mt	1.87	1.67	1.67	2.67
t	1.17	1.08	1.04	1.08
Tot	8.51	7.26	7.04	9.47

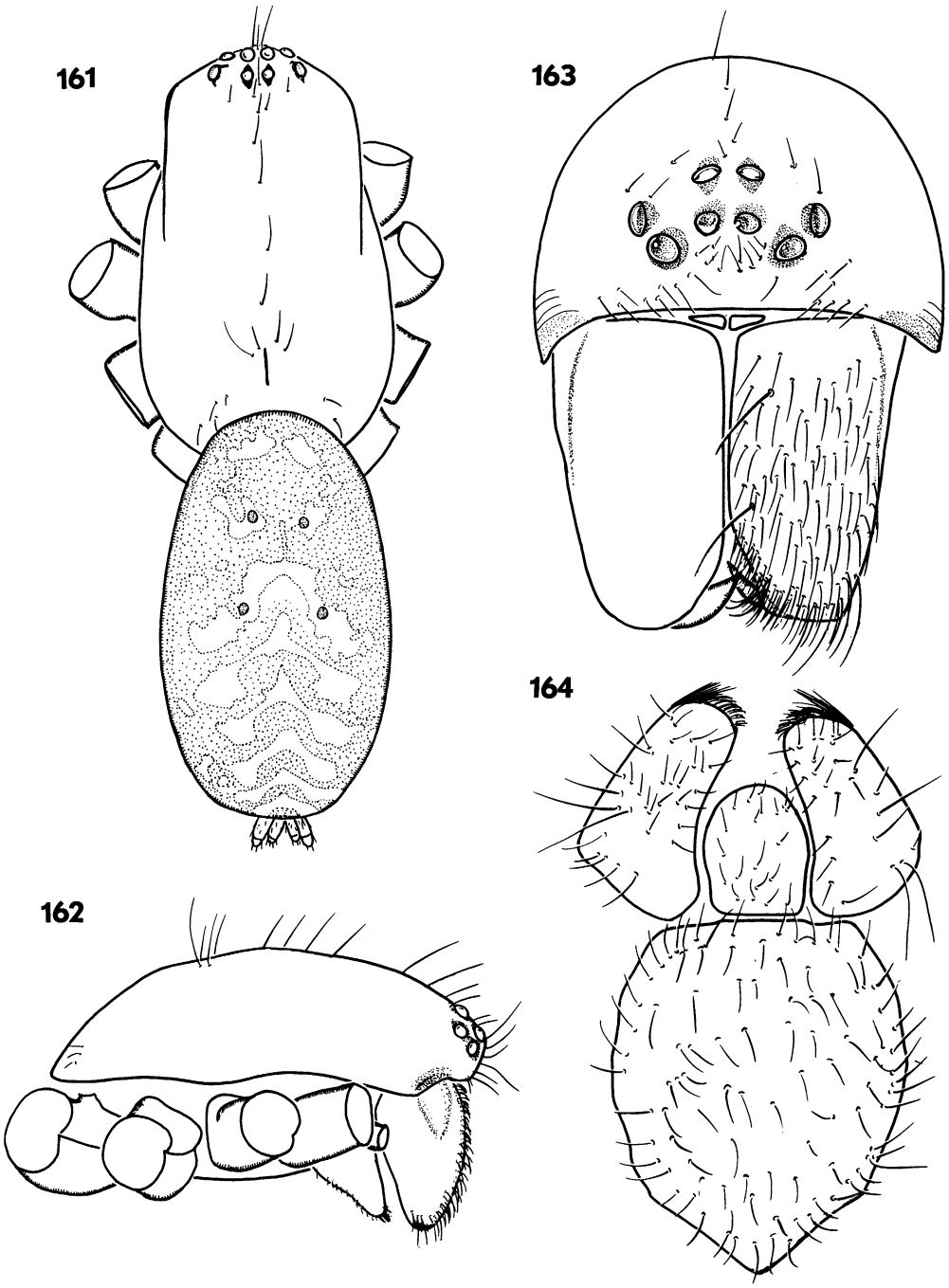
Male palp (figs. 165–166): Palpal tibia with broad slightly curved dorsolateral apophysis and much narrower parallel ventrolateral apophysis.

Female: Total length 7.9–10.1; carapace 3.41–4.75 long, 2.08–3.16 wide.

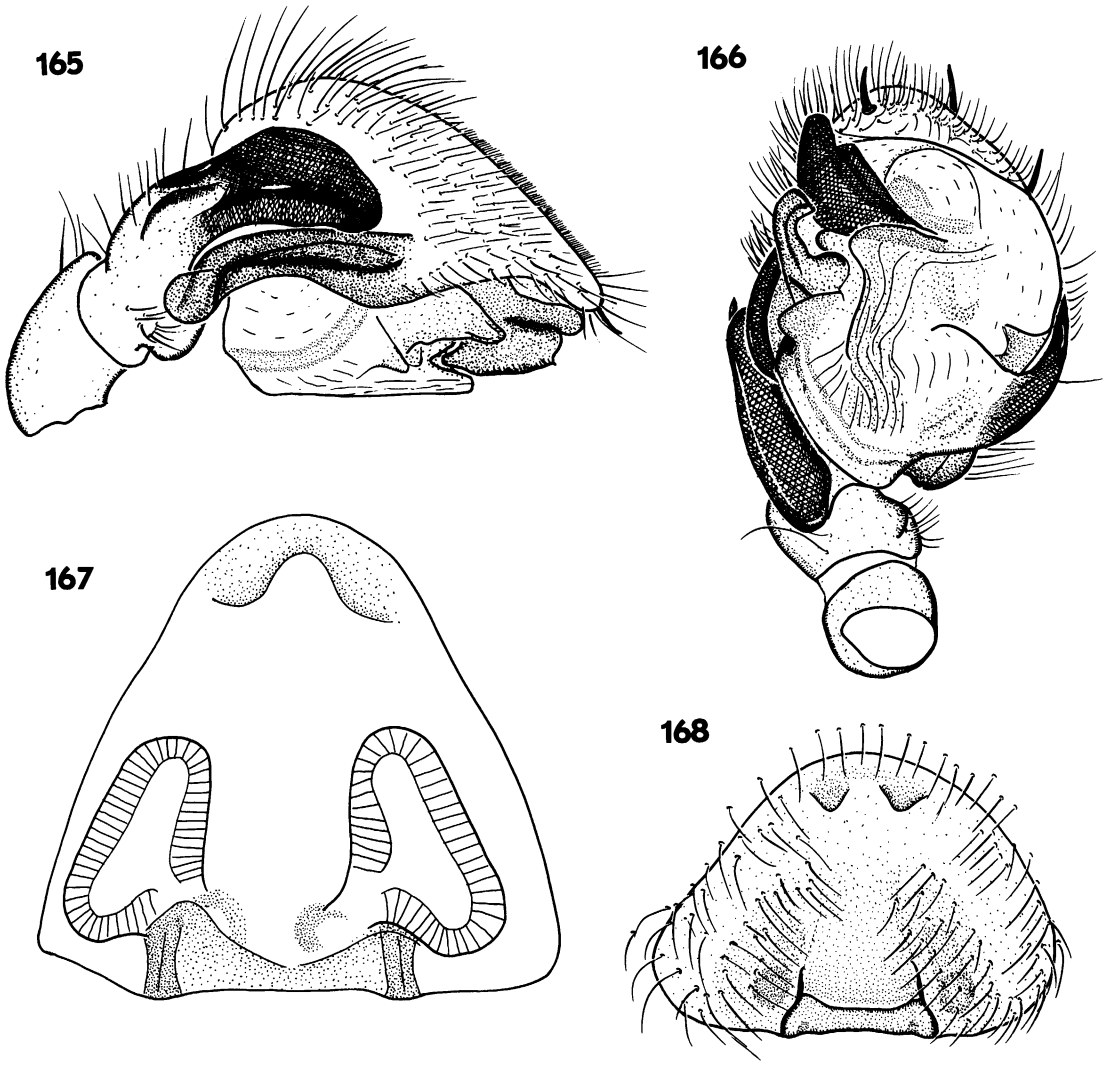
Color and eye pattern as in male.

Legs: Spination: femora I d1 II d1 III d1rl1 IV d1rl1; patellae I-II-III pl2*rl1 IV pl2*rl1; tibiae I v1-2-2 II v1-2-2 III pl2*d3*rl2*v2-2-2 IV pl2*d3*rl2*v2-2-2; metatarsi I v2-2-2-2 II v2-2-2-2 III 18 disp. IV 20 disp. Measurements (specimen with carapace length 3.79 and carapace width 2.42):

	I	II	III	IV
F	2.29	2.08	1.66	2.38
P	1.00	1.00	0.83	1.17
T	1.75	1.33	1.04	1.75
Mt	1.54	1.46	1.58	2.38
t	1.00	0.83	0.96	1.12
Tot	7.59	6.71	6.09	8.80



Figs. 161–164. *Selamia reticulata.* **161.** Female habitus, dorsal view. **162.** Female carapace, lateral view. **163.** Female carapace, frontal view (hairs omitted on right chelicera). **164.** Sternum, labium, and endites.



Figs. 165–168. *Selamia reticulata.* **165.** Male palp, lateral view. **166.** Male palp, ventral view. **167.** Epigyne, ventral view. **168.** Epigyne cleared dorsal view.

Epigyne: Figs. 167, 168.

OTHER MATERIAL EXAMINED: 7♂, 23♀, 7 immat.: specimens from France, Spain, and Algeria in one tube (MNHN 2939); 1♂: Spain, Andalucia, Torre de la Higuera near El Rocio, IV.1971, pitfall in dunes, R. Jocqué (personal collection); 1♂, 2♀: IV.1988, further as previous.

DISTRIBUTION: Western Mediterranean.

STORAMIA, NEW GENUS*

Lachesis (part): O. P.-Cambridge, 1872: 265.

Habronestes (part): Simon, 1873: 72; 1874: 253.

Storena (part): Simon, 1892a: 82.

TYPE SPECIES: *Lachesis meadii* O. P.-Cambridge.

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* *Note added in proof.* A paper of G. Levy was received just before the delivery of the first proof of the present article. It contains the description of the new genus *Pax* (p. 339) which is doubtlessly synonymous with *Storamia,* described here. [G. Levy, 1990. Spiders of the genus *Lachesana* and a new storenoid genus from Israel (Araneae: Zodariidae). Zool. J. Linn. Soc. 98: 327–362.)

DIAGNOSIS: The habitus is very similar to that of specimens of *Mallinella.* In the latter there is always a row of modified hairs in front of the spinnerets, absent in *Storamia.* Females have an epigyne with broad superficial copulatory ducts. Males have a palp with a complex tibia provided with well-developed dorsolateral and ventrolateral apophyses, and a small apophysis in between. Conductor and tegular apophysis of comparable size. Both sexes further differ with members of *Mallinella* by the absence of hinged hairs and the presence of abdominal muscle points.

ETYMOLOGY: *Storamia* is a contraction of *Storena* and *Selamia.* The gender is feminine.

DESCRIPTION: Medium-size spiders (4.00–6.00) with smooth to slightly rugous teguments. Carapace almost hairless, apart from a few longer hairs in eye region and around fovea; widest at level of coxae II, narrowed to about 0.70 times maximum width in females, to about 0.60 maximum width in males. Cervical grooves poorly indicated if at all. Profile domed with highest point of profile just in front of fovea.

Color: Carapace and sternum medium to dark chestnut brown; sternum medium brown; legs orange to dark brown; abdomen: dorsum and sides dark sepia with pale spots; venter pale with sepia longitudinal lines. In male with pale brown dorsal scutum. Eyes in two rows; both rows strongly procurved. All eyes subequal, circular, pale, only AME dark; AME about one radius apart, at about one diameter from ALE; PME slightly less than diameter apart, about twice that distance from PLE. MOQ slightly wider in back than in front, about 1.2 times longer than wide. Clypeus high: about 5 times diameter of ALE; straight; with some dispersed hairs.

Chilum single; triangular, inferior tip sharp, sticking out above main part of that sclerite, can be regarded as tooth. Chelicerae poorly haired but with distomesal group of hairs; condyle well developed; no marginal teeth; fang short, thick. Endites with anteromesal scopula. Labium triangular, with narrowed base, sparsely haired. Sternum roughly triangular, with straight anterior margin and rounded sides; with short triangular extensions fitting in coxal concavities.

Legs: Formula 4123 or 4132. Spination: medium size and few spines on legs I and II, more numerous but shorter spines on legs III and IV. Paired tarsal claws with 6 (on posterior pairs) to 10 teeth. Third tarsal claw on a slight onychium. Trichobothria in 2 rows on T in 1 row on Mt and t. Hinged hairs absent. Metatarsi distally swollen and ventral tufts present. No scopula or claw tufts.

Abdomen oval; thinly haired; with two muscle points. Spinnerets as usual in the subfamily. Tracheal spiracle very narrow, straight. Colulus represented by a few hairs only. Epiandrum present.

Male palp: Tibia with large lateral apophyses: one large dorsolateral, one similar ventrolateral, third smaller one between them. Cymbium laterally broadly folded, dorsal edge of fold with sclerotized ridge; ventrally with proximal downpointing horn. Tegulum divided transversally: distal part bears conductor and tegular apophysis, both of similar size; the latter situated on membranous support; proximal piece bears strong embolus originating at back, making half-loop before reaching conductor.

Epigyne: With strongly sclerotized, roughly oval plate, anteriorly delimited by membranous area. Broad, wound copulatory ducts shine through, end in large mediodorsal, oval spermathecae. Female palp with strongly tapering tarsus; with few spines and finely dentate claw turned inward over 45°.

OTHER SPECIES INCLUDED: *Habronestes libani* Simon and *Habronestes islamitica* Simon. Specimens in MNHN, examined.

DISTRIBUTION: Middle East.

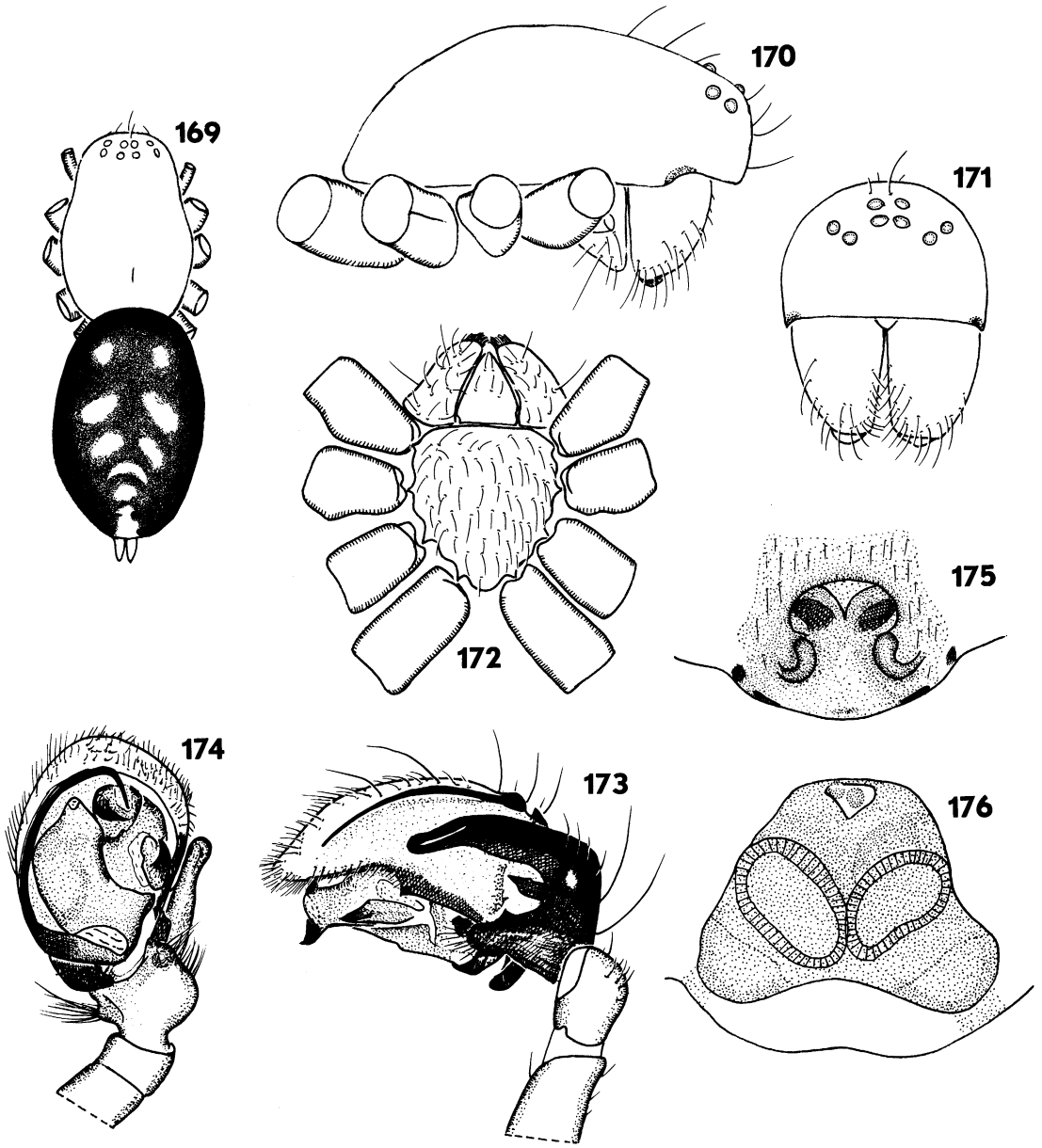
Storamia meadii (O. P.-Cambridge), new combination
Figures 169–176

Lachesis meadii O. P.-Cambridge, 1872: 65 (descr. ♂♀).
Habronestes meadi: Simon, 1873: 73; 1874: 253.
Storena meadi: Simon, 1892a: 82.

TYPE MATERIAL: Lectotype male (here designated): Palestina, Jericho (UMO).

Paralectotypes: 2♀: together with Lt.

DIAGNOSIS: Males are recognized by the shape of the palpal tibial apophyses, whereas



Figs. 169–176. *Storamia meadii.* **169.** Female habitus, dorsal view. **170.** Female carapace, lateral view. **171.** Female carapace, frontal view. **172.** Sternum, labium, and endites. **173.** Male palp, lateral view. **174.** Male palp, ventral view. **175.** Epigyne, ventral view. **176.** Epigyne, cleared dorsal view.

the female has a typical epigyne.

DESCRIPTION: *Male:* Total length 5.00; carapace 2.54 long, 1.79 wide.

Color: Carapace uniform reddish brown; chelicerae, chilum, and sternum orange. Legs uniform yellowish orange. Abdomen with pale brown dorsal scutum overlying the pattern as in figure 169. Sides dark sepia; venter pale with pale sepia longitudinal stripes surrounding 2 white blotches in front of spinnerets. Epiandrum pale brown.

Eyes: a: 1.00 (0.10); b: 1.14; c: 1.04; d: 1.14;

e: 0.38; f: 0.95; g: 0.67; h: 1.83; i: 0.28. MOQ: AW = 0.86 PW; AW = 0.80 L.

Legs: Spination: femora I d2* II d2*pl1 III d3*pl1rl1 IV d3*pl1rl1; patellae I-II-III pl1rl1 IV pl1rl1; tibiae I v1-2-2 II v1-2-2 III pl2*d2*rl2*v2-2-2 IV pl3*d3*rl3*v2-2-2; metatarsi I v2-2-2 II v2-2-2 III 15 disp. IV 15 disp. Measurements:

	I	II	III	IV
F	1.41	1.23	1.11	1.51
P	0.63	0.62	0.61	0.69
T	1.11	0.89	0.81	1.31
Mt	1.09	1.01	1.17	1.82
t	0.93	0.83	0.65	0.85
Tot	5.17	4.58	4.34	6.18

Male palp (figs. 173, 174).

Female (from Israel, measurements for a Lt between brackets): Total length: 6.83 (6.25); carapace 3.00 (2.92) long, 1.96 (1.92) wide.

Color: As in male but dorsum of abdomen without scutum, pattern clear. Venter pale with 2 longitudinal pale sepia stripes ending in quadrangular spot in front of spinnerets.

Eyes as in male.

Legs: Spination: femora I d2* II d2* III d4*pl1rl1 IV d4*pl1rl1; patellae I-II-III pl1 IV pl1rl1; tibiae I v1-2-2 II v1-2-2 III pl3*d3*rl3*v2-2-2 IV pl3*d5*rl2*v2-2-2; metatarsi I v2-2-2 II v2-2-2 III 12 disp. IV 16 disp. Measurements:

	I	II	III	IV
F	1.38	1.29	1.33	1.71
P	0.75	0.67	0.71	0.75
T	1.25	1.00	0.96	1.33
Mt	1.63	1.08	1.20	1.88
t	1.00	0.71	0.75	0.92
Tot	6.00	4.75	4.96	6.59

Epigyne: Figs. 175, 176.

OTHER MATERIAL EXAMINED: 1♀, 1 sa ♀: Israel, Negev desert, Sede Boger, I.1987, V. and B. Roth (collection?); 1♂, 1♀: Jordan, Waad al Haasa, S Dhiban, Kings Road, 16.III.1977, R. Kinzelbach (SMF).

DISTRIBUTION: Jordan, Israel.

STORENA WALCKENAER

Storena Walckenaer, 1805: 83 (descr. new genus); 1833: 38; 1837: 202, 361, 362. Lucas, 1840: 364. Simon, 1864: 380; [not 1885: 30 (part)]; 1893b: 408, 423 (part); (not Simon, 1903: 987). L. Koch, 1866: 2, 191; 1872: 298. O. P.-Cambridge, 1869: 52 (part); not F.O.P. Cambridge, 1899: 54. Hogg, 1900: 95 (part). not Rainbow, 1912: 191. Merian, 1910: 29 (part); 1911: 173; 1913: 27, 47, 58; not Merian, 1913: 9. not Comstock, 1910: 323. Lehtinen, 1967: 265., Brignoli, 1982: 344 (part). Bosmans and Van Hove, 1986: 17.

Habronestes (part): L. Koch, 1872: 299.

TYPE SPECIES: *Storena cyanea* Walckenaer, by monotypy.

Note: The type species, *Storena cyanea* Walckenaer, is probably one of the most enigmatic spiders ever described. Even more, it is a very important one, since the name *Storena* has been used for a pleiad of spiders throughout the world. Walckenaer did not designate types and we are therefore completely dependent on his description. This original description depicts a very remarkable spider (7.5 total length) with a bright red carapace of which the cephalic area is blackened, with red legs with dark extremities and with a bluish abdomen provided with some pale spots (the number and color are unknown). The eyes are said to be much like in *Latrodectus* (!?) but in three rows.

So far, the spider depicted could be *Nicodamus* (see the picture in Child, 1965: 38). However, Walckenaer informs us of, and stresses, the fact that the leg formula is 1234, or that the legs of the third pair are longer than those of the fourth. *Nicodamus* does not have such a leg formula and no Australian zodariid is known with such legs. According to several Australian spider specialists to whom the problem was explained, there is no spider in Australia that would completely match Walckenaer's description. It was suggested that the lost type specimen could have been a teratological specimen with regenerated fourth legs. If this is true, many possibilities are open. The drawings of the mouth parts and those of the eyes could indeed be those of a zodariid. The short cheliceral fangs and the shape of the endites as well as the eye position resemble very much a zodariid. Therefore, and for the sake of stability, it was decided to keep the name for one of the more common Australian genera of the Zodariidae. Moreover, it is a genus in which the color pattern indeed matches the description given by Walckenaer except that the abdomen is not bluish. The question remained which species to choose. I have examined

nearly a hundred tubes with representatives of what will now be called *Storena*. However, in one case only there were a male and a female in the same sample. Describing an isolated male or female could have created a new problem since females tend to be similar. It was therefore decided to take the single sample with both male and female for the designation of a neotype, especially since it came from the Victoria province. This is within reasonable distance from Kangaroo Island, where the original specimen is supposed to have been collected (Davies, in litt.).

DIAGNOSIS: This genus is recognized by the light brown pitted shield on the dorsum of the abdomen. Individuals have a very typical habitus: the legs and carapace are red, the latter often with a black cephalic part, the abdomen is dark gray with three or five white spots on dorsum and the light brown shield in between them.

DESCRIPTION: Medium-size to large spiders (8.00–20.00) with smooth or granulated teguments; finely haired. Carapace oval, elongate; widest at level of coxae II, narrowed to about 0.8 times maximum width in females, to about 0.7 maximum width in males. Profile strongly raised in cephalic area, with highest point in front of fovea. Eye area slightly protruding above clypeus.

Color: Carapace red or reddish brown, cephalic area usually darker, sometimes black. Chelicerae dark reddish brown; sternum orange, legs orange to red, Mt and t sometimes darkened. Abdomen pale to dark gray, with 3 or 5 pale spots on dorsum, unpaired one in front of spinnerets; pale brown, pitted shield in between spots. (This shield is not called a "scutum" because it is found in males as well as females, its surface structure is different from that of the usual scutum and it is placed in the middle of the abdomen whereas the ordinary scutum always sits in front.) Venter often with longitudinal pale stripes.

Eyes in 3 rows (2-4-2). Second recurved as seen from above, slightly procurved, as seen from in front. All eyes circular, pale. AME the largest. AME almost touching or up to radius apart, at about their diameter from PLE. ALE about 3 times their diameter apart. PME about their diameter apart. Clypeus retreating; slightly convex, almost 4 times as high as diameter of ALE.

Chilum double, 2 broad triangles, each with several hairs. Chelicerae massive, densely haired in front; with strong lateral condyle; with two teeth on anterior margin. Endites strongly narrowed toward extremity. Labium triangular. Sternum longer than wide (1.2–1.3 times), roughly triangular, and widest near anterior margin. With small triangular extensions fitting in coxal concavities.

Legs: Formula 1423 or 4123. Anterior legs with some long ventral spines. Posterior legs with numerous short dorsal, pro- and retrolateral spines and some long ventral ones. Tarsi slightly widened toward distal extremity; proximal tip with transversal dorsal ridge. Three claws; paired ones with about 12 teeth, distal ones implanted on lateral side, proximal ones in axis of claw. Scopulae spiniform. All Mt swollen at distal tip and with ventral tuft of hairs. Hinged hairs present. Trichobothria in 4 rows on T, in 1 row on Mt and t.

Abdomen oval, with pale brown dorsal shield, provided with numerous hairs and pits. One muscle point on each side of shield. Six spinnerets with usual arrangement and structure. Colulus a dense group of hairs, faintly divided longitudinally. Tracheal spiracle narrow, straight. Area surrounding epigyne sclerotized. Epiandrum present in males.

Male palp with complex tibia, with at least 2 lateral apophyses, sometimes up to 4, ranging from dorsolateral to ventrolateral. Cymbium with large basolateral flange. Embolus with broad base, sometimes tapering toward extremity; but strong and rigid to tip; often coiled, then hiding entire tegulum as seen ventrally. Subtegulum strongly developed. No conductor, its role probably taken over by cymbial flange.

Female palp with cylindrical tarsus with numerous spines; claw finely toothed, turned inward over ±45°.

Epigyne with big median plate, extending forward from posterior margin. In dorsal view with 2 massive spermathecae in anterior half, connected to posterior margin by 2 strongly sclerotized copulatory ducts, sometimes with atrium at base of spermathecae.

The only cocoon I have seen (*S. colossea*) is a papery oval (8 by 16) container with a flat side, with which it had apparently been attached. The eggs, some 50 in number, are 1.2 in diameter.

OTHER SPECIES INCLUDED: *Storena colossea*

Rainbow, *Storena formosa* Thorell, *Storena deserticola,* new species; several undescribed.

DISTRIBUTION: Eastern and central Australia.

Storena cyanea Walckenaer
Figures 177–180

Storena cyanea Walckenaer, 1805: 83, pl. 9, figs. 85, 86 (descr. imm.); 1837: 361 (descr. imm.). Lucas, 1840: 364 (descr. imm.); 1849: 51 (descr. imm.). L. Koch, 1872: 299 (descr. imm.). Simon, 1893b: 429. O.P.-Cambridge, 1903: 495. Rainbow, 1911: 149. Davies, 1985: 120.

Storena procera Thorell, 1890: 340 (descr. ♀). Rainbow, 1911: 151 (NEW SYNONYMY).

TYPE MATERIAL: Neotype male (here designated): Australia, Victoria, Mt. Waverley, 3.VII.1972, P. Pridmore (VM).

DIAGNOSIS: Males of this species are recognized by the shape of the palpal tibia with three short lateral apophyses. The female epigyne is characterized by the interrupted dark margin of the posterior plate. In *Storena collossea* the shape of the plate is similar but the dark margin surrounding the plate is continuous.

DESCRIPTION: *Male* (data for male of Violet Town between parentheses): Total length 10.7 (9.79); carapace 5.33 (5.99) long, 3.08 (3.66) wide.

Color: Carapace: cephalic area dark brown to black, thoracic part orange to red; chelicerae black, with pale lateral condyle; sternum dark orange to reddish brown; legs orange to dark red, darkened toward extremity. Abdomen gray with five white dorsal spots: two, closely set in front, two, more widely spaced in the middle, fifth one in front of spinnerets. Narrow pale brown scutum in front of "pitted shield." Sides and venter gray, slightly mottled with pale.

Eyes: a: 1.00 (0.30); b: 0.63; c: 0.78; d: 0.87; e: 0.33; f: 0.33; g: 0.43; h: 0.97; AL-AL: 2.03. MOQ: AW = 1.40 PW; AW = 1.16 L.

Legs: Spination: femora I d2*pl1 II d4*pl1 III d3*pl3*rl1 IV d3*rl1; patellae I-II pl1 III pl5d1rl1 IV pl5d1rl1; tibiae I pl2*v2-2-2-2 II pl4*v2-2-2-1-2 III pl2*d3*rl4*v2-2-2 IV pl3*d2*rl4*v2-2-2; metatarsi I v8 disp. II pl2v10** III 18 disp. IV-20 disp. Measurements:

	I	II	III	IV
F	3.54	3.25	2.92	3.50
P	1.25	1.25	1.46	1.58
T	3.08	2.67	2.08	3.50
Mt	3.62	3.21	3.04	4.17
t	2.25	2.04	1.58	1.71
Tot	13.96	13.76	12.43	11.09

Male palp (figs. 177, 178): Tibia with 3 short lateral apophyses: a rounded prolateral one, a sharp ventrolateral one pointing forward, and a sharp ventrolateral one pointing backward. Embolus massive, originating on anterior part of tegulum and describing complete loop; ending in broad blunt tip. (It is not entirely sure that the embolus is complete but it is not very likely that on each of the 4 palps examined, the embolus should have broken off at the same spot.)

Female: Total length 15.41; carapace 6.83 long, 4.16 wide.

Color as in the male except for the absence of the pale brown, narrow dorsal scutum in front of the pitted shield and 3 longitudinal pale stripes on venter.

Eyes as in male.

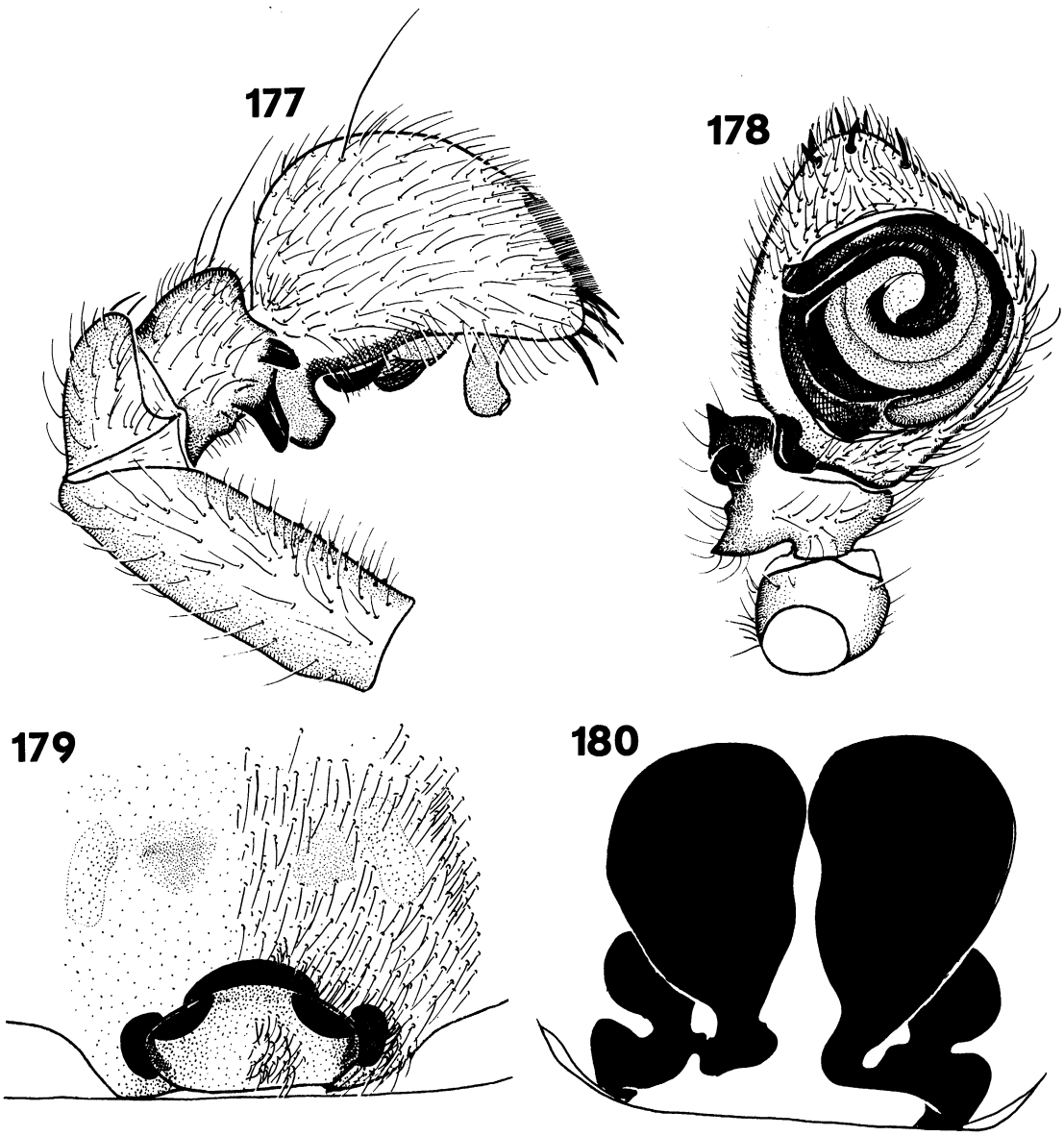
Legs: Spination: femora I d2*pl1 II d3*pl1 III pl1d3*rl1 IV d3*rl1; patellae I-II pl1 III pl4d1rl1 IV pl4d1rl1; tibiae I pl1v9** II pl4*v9** III pl4*d3*rl2*v2-2-2 IV pl4*d2*rl3*v2-2-2; metatarsi I v12** II pl1v12** III 18 disp. IV 18 disp. Measurements:

	I	II	III	IV
F	4.17	3.75	3.25	4.09
P	1.67	1.58	1.75	1.92
T	3.38	2.84	2.17	3.50
Mt	3.67	3.42	3.04	4.38
t	1.67	1.92	1.33	1.67
Tot	14.55	13.51	11.54	15.55

Epigyne (figs. 179, 180): with broad posterior plate; anterior concave corners, without the outer broad black borderline. Copulatory ducts short, broad, ending in strongly sclerotized spermathecae; these elongate, flat, curved downward.

OTHER MATERIAL EXAMINED: 1♀: together with neotype; 1♂: Australia, Victoria, Violet Town, 17.XII.1965; 1♀ (Ht of *Storena procera* Thorell): Australia (NHRS 247).

DISTRIBUTION: Australia, Victoria Province.



Figs. 177–180. *Storena cyanea*. **177.** Male palp, lateral view. **178.** Male palp, ventral view. **179.** Epigyne, ventral view. **180.** Epigyne, cleared dorsal view.

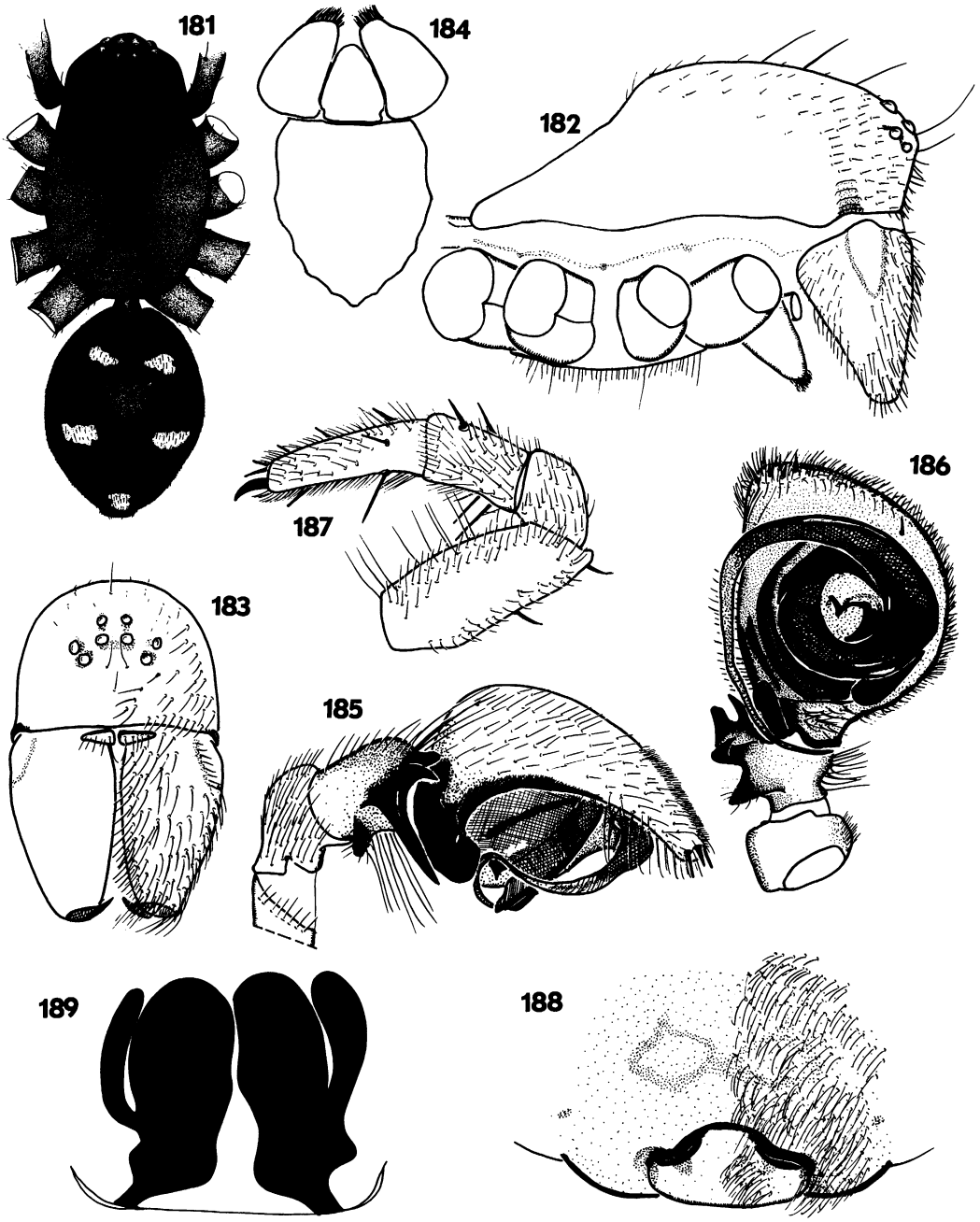
Storena colossea Rainbow
Figures 181–189

Storena colossea Rainbow, 1920: 237 (descr. ♀).

TYPE MATERIAL: Holotype in SAMA (not examined); 1♀ "cotype": Australia, Lord Howe Island (AM KS6627) (examined).

DIAGNOSIS: The male is easily recognized by the features of the palp, with four lateral tibial apophyses; the female has a typical epigyne, with broad median plate; its anterior margin broadly bordered with black.

DESCRIPTION: *Female* (figures between brackets are from continental specimens): total length 14.32 (12.9–17.5); carapace 7.50 (6.4–7.9) long, and 4.25 (3.7–4.6) wide.



Figs. 181–189. *Storena colossea.* **181.** Female habitus, dorsal view. **182.** Female carapace, lateral view. **183.** Female carapace, frontal view (hairs omitted on right chelicera). **184.** Sternum, labium, and endites. **185.** Male palp, lateral view. **186.** Male palp, ventral view. **187.** Left female palp, lateral view. **188.** Epigyne, ventral view. **189.** Epigyne, cleared dorsal view.

Color: Carapace bright red with darker cephalic area (ranging from jet black to dark reddish). Chelicerae dark reddish brown to black; sternum orange. Legs orange with Mt and t dark brown to black. Abdomen dark gray with pale brown median shield and 2 pairs of white patches on each side; 2 anastomosing triangles in front of spinnerets.

Carapace with cephalic area smooth to strongly granulated.

Eyes: a: 1.00 (0.28); b: 0.89; c: 0.75; d: 0.89; e: 0.50; f: 1.00; g: 0.75; h: 1.71. MOQ: AW = 1.10 PW; AW = 1.06 L.

Legs: Spination: femora I pl1d2* II pl1d3* III pl1d3*rl1 IV d3*rl1; patellae I-II-III pl4*d2*rl1 IV pl2d1rl1; tibiae I pl1v2-2-2 II pl2*v2-2-2 III disp. 10v2-2-2 IV disp. 9; metatarsi I v2-2-3 II v2-1-2-3 III 14 disp. IV v2-2-2 12 disp. Measurements:

	I	II	III	IV
F	4.71	4.21	3.84	4.58
P	1.96	1.92	1.83	2.13
T	3.96	3.34	2.50	3.62
Mt	4.25	3.37	3.34	4.79
t	2.50	1.96	1.67	1.96
Tot	17.38	15.09	13.18	17.10

Epigyne (figs. 188, 189): Central plate covering posterior third of epigyne; anterior margin of plate broadly bordered with black.

Male: Total length: 11.6–13.0; carapace 6.16–6.74 long, 3.83–4.00 wide. Ocular area 1.33 wide.

Color as in female, but cephalic area usually darker and more strongly reticulated.

Eyes as in female.

Leg spination as in female, except P IV with more spinules: pl7d5rl1. Measurements:

	I	II	III	IV
F	4.59	4.04	3.50	4.54
P	1.62	1.62	1.62	1.67
T	4.42	3.34	2.50	3.75
Mt	4.88	3.96	3.88	5.42
t	3.17	2.50	2.08	2.43
Tot	18.68	15.47	13.59	17.80

Palp (figs. 185, 186): Tibia with 4 lateral apophyses; ventrolateral one pointing forward, long, sharp. Embolus long, coiled, ending in long, tapering filament.

Variability: There is some doubt about the conspecificity of specimens from Lord Howe Island, the type locality, and those from the continent. The epigynes and palps are very similar but continental specimens usually have a darker and more strongly granulated cephalic area which is almost smooth in the examined cotype of *S. colossea.*

MATERIAL EXAMINED: AUSTRALIA: New South Wales: 1♀: Sackville, J. Saunders (AM, KS3391); 1♀: Bilpin, Kurragong, 7.I.1930, E.M. Hurst (AM KS15174); 2♂: between Lithgow and Mudgee, along running stream, 16.III.1986, P. Docker (AM, KS16532); 1♂: Bilpin (AM, KS11403); 1♀: Tom Ugly's Point, 28.I.1952, D. O. Connor (AM, KS15607); 1♂: Narrabeen (AM, KS15602); 2♂: Sydney (AM, KS11598); 1♂: Lugarno, IV.1975, Packer (AM, KS14698); 3♂: Bombala, V.1937, A. J. Barrett (AM, KS15706 and KS15599); 1♂: Boggabilla, 10.III.1970, J. Cann (AM, KS15632); 1♀: Nowra, 25.V.1971 (AM, KS15606); 1♂: Wolumla, nr. Bega, 2.IV.1986, K. Savage (AM, KS16550); 1♀ with egg sac: Jenolan, XII.1979, under log (AM, KS9973); 1♀: no data (MNHN 15451); 1♀ with egg cocoon: nr. Mt. Wilson, 900 m, 22.XII.1962, Ross and Cavagnaro (CAS); Lord Howe Island: 1♀: XI.19?? (AM, KS15673); 1♀: station 35, 130 m, under bark (AM, KS15639); 2♀: without further data (AM, KS15676 and KS17058); Victoria: 1♂: East Gippsland, Wrong Creek Trail, Rodger R forest block, I.1983, pitfall, D. Allen (AM, KS12616).

Storena deserticola, new species
Figures 190, 191

TYPE MATERIAL: Holotype male: Australia, Northern Territory, 7 mi W Timber Creek, 21.X.1962, Ross and Cavangnaro (CAS).

Paratype: 1♂: Northern Territory: Katharine Gorge, 15 km N Katharine, 6–8.XI.1984, M. and B. Baehr (ZSMC).

DIAGNOSIS: Males of this species are easily recognized by the large AME and by the short, unlooped embolus.

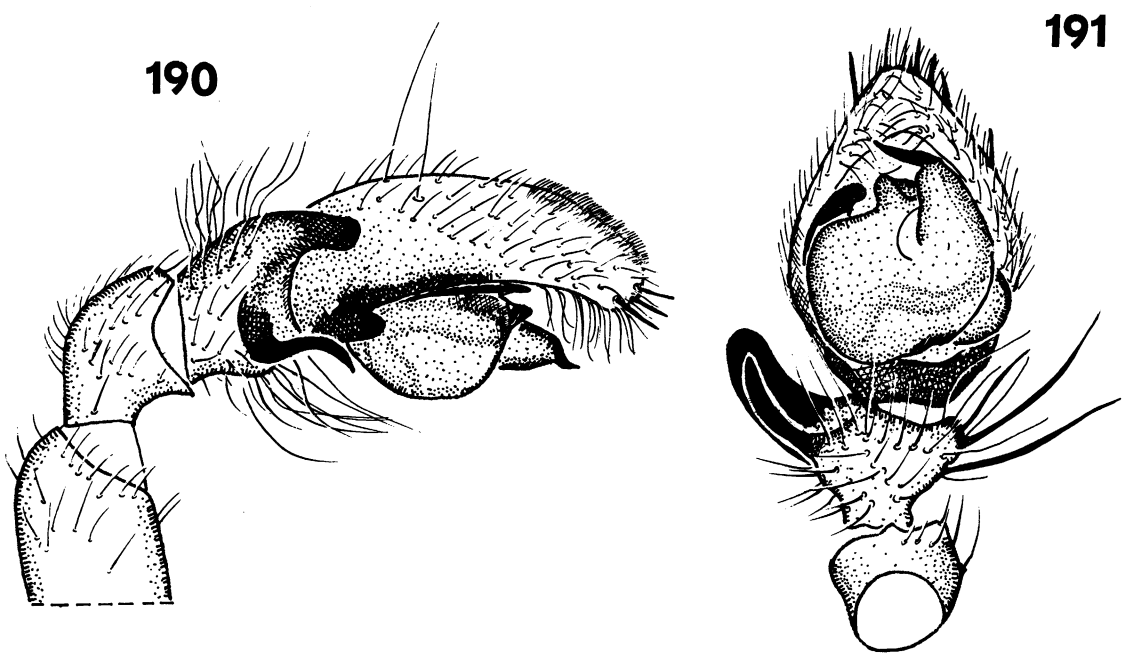
ETYMOLOGY: The name of the species is derived from the habitat it was found in.

DESCRIPTION: *Male:* Total length 10.0; carapace 5.58 long, 3.33 wide.

Color: Carapace dark reddish brown, somewhat darker in cephalic area; covered with gray hairs. Chelicerae dark reddish brown, sternum dark reddish, with darker lateral margins. Abdomen dark gray with pair of white blotches just behind pale brown, dorsal shield and single one in front of spinnerets.

Eyes: a: 1.00 (0.41); b: 0.68; c: 0.61; d: 0.73; e: 0.07; f: 0.24; g: 0.83. MOQ: AW = 1.37 PW; AW = 1.18 L.

Legs: Spination: femora I d3*pl1 II d3*pl1 III pl3*d3*rl2* IV d3*rl1; patellae I-II-III pl4*d2rl1 IV pl5*d1rl1; tibiae I pl2*v2-2-2-2 II pl2*v2-2-2-1-1 III pl4*d4*rl4*v2-2-2 IV pl4*d4*rl4*v2-2-2; metatarsi I v9 disp. II pl1v13 III 14 disp. IV 16 disp.



Figs. 190, 191. *Storena deserticola.* **190.** Male palp, lateral view. **191.** Male palp, ventral view.

Male palp (figs. 190, 191): Embolus very short, not looped; with broad base and sharp tip pointing laterad.

Female: Unknown.

Variability: The male of Pine Creek has 5 abdominal pale dots as is usual in the genus. The embolus is shorter and the course of the seminal duct in the tegulum somewhat less strongly curved. In the absence of more material, these differences are considered as intraspecific variation.

OTHER MATERIAL EXAMINED: 1♂: Australia, Northern Territory, Pine Creek, 150 m, 23.X.1962, Ross and Cavagnaro (CAS).

DISTRIBUTION: Australia, Northern Territory.

STOROSA, NEW GENUS

TYPE SPECIES: *Storosa obscura,* new species.

DIAGNOSIS: Recognized by the AME on a slight tubercle and the high double chilum. Males are characterized by the palpal tibia with dorsal concavity and ventrolateral backpointing knob as well as the presence of a distal tegular membrane.

ETYMOLOGY: *Storosa* is an arbitrary combination of letters. The gender is feminine.

DESCRIPTION: Medium-size to large spiders (7.0–13.0). Carapace rather high and elongate, with widest point at level of coxae II; narrowed in front to about 0.6 (males) to 0.75 (females) times maximum width. Profile domed, with highest point in between fovea and PME. Tegument slightly reticulated with faintly marked median groove between eyes and fovea. Clypeus strongly retreating.

Color: Prosoma dark reddish or chestnut brown, with sternum and legs somewhat paler. Abdomen dark gray or sepia with simple pale pattern.

Eyes in two strongly procurved rows; all eyes pale (AME dark?), circular, subequal in size. AME on top of low, frontal tubercle (more strongly marked in females); AME about their radius apart, at about their diameter from ALE; PME about their diameter apart, at twice that distance from PLE. MOQ longer than wide (±1.1 times). Clypeus about two or three times as high as diameter of ALE, convex, strongly retreating.

Chilum double, high, each triangle half as high as wide. Chelicerae with strong lateral condyle; slightly striated in front; with anteromesal group of hairs; one tooth on promargin. Fangs short and broad. Endites strongly converging; with distomesal scopu-

la. Labium triangular with narrowed base. Sternum almost oval, fairly broad in front; in some species with boss in the center posterior half. Without lateral excrescences or intercoxal sclerites.

Legs: Formula 4123. Spination: anterior pairs of T and Mt with some ventral pairs and isolated spines; posterior pairs with numerous dispersed spines on T and Mt. Scopula spiniform. Mt distally swollen, with distoventral group of hairs. Hinged hairs present. Superior pair of tarsal claws with about 10 lateral teeth. Trichobothria in 2 rows on T and Mt, in 1 row on t.

Abdomen oval, with 2 muscle points. With faint narrow dorsal scutum in males. Six spinnerets, median pair very small, hidden by other 4. Colulus represented by 2 small groups of hairs. Tracheal spiracle narrow, semicircular, procurved, just in front of spinnerets.

Male palp: Tibia with dorsal concavity, posteriorly delimited by 1 or 2 apophyses, anteriorly extended in distolateral apophysis; with ventrolateral backpointing knob. Cymbium with lateral swelling, lodging distolateral tibial apophysis. Embolus relatively broad, originating posterolaterally on tegulum, which has prolateral apophysis and distal membrane. Epiandrum present.

Epigyne with central orifices. Copulatory ducts run to front and back before entering spermathecae, situated near posterior margin of epigyne.

Female palp with cylindrical tarsus with toothed claw, onychium-like protuberance underneath it. Tarsal claw turned inward over 45°.

OTHER SPECIES INCLUDED: *Storena tetrica* Simon (type examined); *Storena torosa* Simon; several undescribed.

DISTRIBUTION: Australia: Queensland, New South Wales.

Storosa obscura, new species
Figures 192–199

TYPE MATERIAL: Male holotype: Australia, New South Wales, Castle Hill, 27.III.1979, D. Lee (AM, KS2741).

Paratypes: New South Wales: 1♂: Watson's Bay, Gap Park, 5.XI.1980 (AM, KS6066); 1♂: Gosford, 27.III.1979, R. Mascord (AM, KS4141); 1♀: Schofields, 20.XII.1972, in soil cell under log, R. MacDonald (AM, KS15654); 1♀: Windsor, 23.III.1979 (AM, KS3469); 1♀: Sydney, Mortdale, 20.X.1951, N. J. Camps (AM, KS15700); 1♂: Hornsby, 24.IV.1971, M. Robinson (AM, KS15686); 1♂: Sydney, Balgowlah, IV.1939, H. C. Raven (AMNH); 1♀: Gwydir Hwy, E side, Gibraltar Range, 450 m, 28.XI.1962, Ross and Cavagnaro (CAS); 1♀: Wagga Agric. College, 275 m, 11.XII.1962, Ross and Cavagnaro (CAS); 2♂, 1♀: Kiwarrak SF near Taree, pitfall, 10.II.1980, D. Milledge (AM); *Queensland*: 1♀: 4 mi N Yarraman, 400 m, 23.XI.1962, Ross and Cavagnaro (CAS).

DIAGNOSIS: Recognized by the almost uniform gray dorsum of the abdomen; males are characterized by a sternal boss and by the shape of the tibial apophyses, females by the typical epigyne.

ETYMOLOGY: *Obscura* obviously refers to the general color of this species.

DESCRIPTION: *Male:* Total length 8.52 (8.46–9.24); carapace 4.54 (4.33–4.91) long, 3.00 (2.91–3.16) wide.

Color: Carapace dark chestnut brown with bluish luster when dry. Slightly reticulated in cephalic area, more strongly so in thoracic area. Chilum, chelicerae, and labium dark brown. Sternum medium brown. Legs medium brown, suffused with blackish lines on F and T. Epiandrum and sclerotized area in front, medium brown, just as tracheal spiracle and spinnerets.

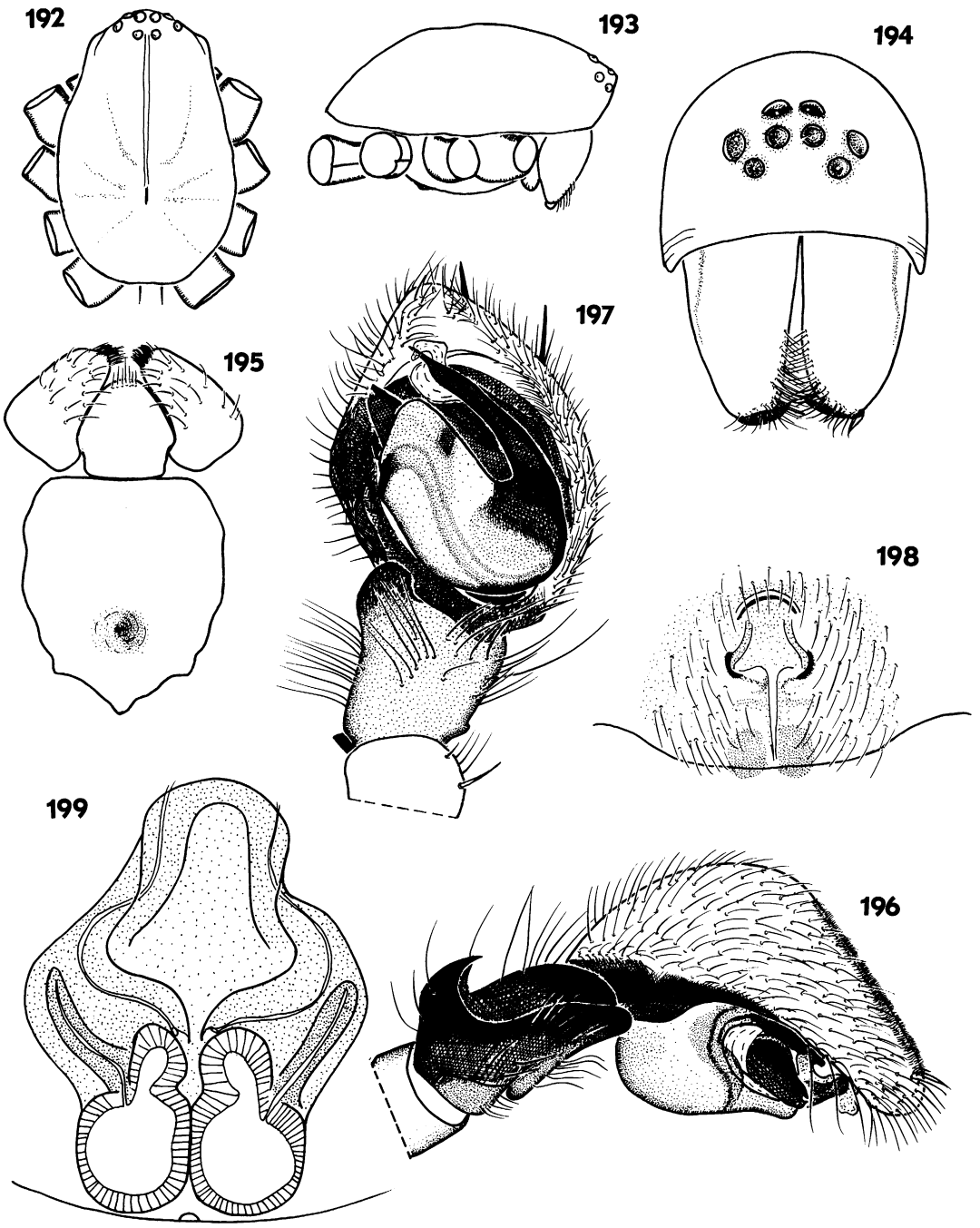
Eyes: a: 1.00 (0.19); b: 1.08; c: 0.85; d: 0.92; e: 0.41; f: 0.72; g: 0.61; h: 1.43; i: 0.36. MOQ: AW = 1.04 PW; AW = 0.94 L.

Sternum with marked boss in posterior half.

Legs: Spination: femora I d1p1l II d1p1l III d1p1l-1 IV d1-1-2; patellae I-II-III d1p1l1rl1 IV d1p1l1rl1; tibiae I v2-1-2 II v3* III d3*pl2*rl2*v2-1-1 IV d3*pl2*rl2*v2-1-1; metatarsi I v2-1-2 II v3* III d3*pl2*rl2*v2-1-1 IV d4*pl2*rl2*v2-2-2. Measurements:

	I	II	III	IV
F	3.00	2.63	2.42	3.12
P	1.08	1.08	1.13	1.17
T	2.50	2.00	1.58	2.46
Mt	2.42	1.63	2.38	3.58
t	1.92	2.17	1.25	1.71
Tot	10.92	9.51	8.76	12.05

Male palp (figs. 196, 197): Tibia with deep dorsal concavity, posteriorly delimited by strong dorsal apophysis, anteriorly produced into short rounded lateral apophysis.



Figs. 192–199. *Storosa obscura.* **192.** Female carapace, dorsal view. **193.** Female carapace, lateral view. **194.** Female carapace, frontal view. **195.** Sternum, labium, and endites. **196.** Male palp, lateral view. **197.** Male palp, ventral view. **198.** Epigyne, ventral view. **199.** Epigyne, cleared dorsal view.

Female: Total length 9.70 (9.24–11.66), carapace 4.92 (4.83–4.92) long, 3.16 (2.91–3.25) wide.

Color as in male, except for dorsum of abdomen, which lacks sclerotized area in front and is gray all over.

Eyes as in male.

Palp with numerous spines: F: d1; P: pl1; T: 5 disp.; t: 14 disp., mainly pl. Claw with 6 teeth. Further as male.

Epigyne: Figures 198, 199.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Australia: New South Wales, Queensland.

TENEDOS O. P.-CAMBRIDGE

Tenedos O. P.-Cambridge, 1897: 6 (descr. new genus).

Tijuca Mello-Leitão, 1925: 461 (descr. new genus; preoccupied by *Tijuca* Férussac 1829 [Aves]). Holt, 1926: 85 (type species *Tijuca eduardoi* Mello-Leitão).

Naibena Chamberlin, 1925: 214 (descr. new genus). (Type species *Naibena barrona* Chamberlin.) NEW SYNONYMY.

Tijucaia Mello-Leitão, 1940: 33 (nomen novum for *Tijuca*). NEW SYNONYMY.

TYPE SPECIES: *Tenedos lautus* O. P.-Cambridge.

DIAGNOSIS: Recognized by the small AME, smaller than the other eyes; males have a suprategulum and tegulum with converging apophyses; females have an epigyne with a long cul de sac tube in front of the spermathecae.

DESCRIPTION: Medium-size spiders (4–7 mm) with elongate carapace; 1.4 to 1.8 times longer than wide; narrowed in front to 0.5–0.7 times maximum width, reached at level of coxae II. Highest point of profile between eyes and fovea, sharply falling behind PME. Fovea shallow.

Color: Prosoma, including legs, chelicerae, and sternum orange to reddish brown; abdomen pale to dark gray with pale pattern on dorsum.

Carapace slightly granulated or smooth.

Eyes: Both rows procurved, posterior one sometimes almost straight. Eyes rather small. AE equidistant; AME ±1 diameter apart; ALE larger than AME. PME about their radius apart, 3 to 4 times that distance from PLE. PME slightly smaller than PLE. MOQ longer than wide, narrower in front than behind. Clypeus high, 4 times diameter of ALE; very slightly sinuous, with few setae.

Chilum single, broad, short, crescent-shaped, sometimes divided or absent. Chelicerae 1.5 times to twice as long as wide at base; slightly pubescent in front, with row of long hairs distomesally; lateral condyle strongly developed; no marginal teeth; fangs short. Endites triangular with anteromesal scopula. Labium elongate, triangular; longer than wide (±1.2 times). Sternum triangular, with sinuous margins; longer than wide (±1.2 times), without lateral extensions.

Legs: Formula 4123. Spination: poor on legs I and II; more numerous spines on legs III and IV. Three tarsal claws; 10 to 12 teeth on superior tarsal claws. Trichobothria: in 2 rows on T, in 1 row on Mt and t. Hinged hairs present. Scopulae normal, spiniform or absent; ventral distal group of hairs on Mt III and IV poorly developed.

Abdomen elongate, oval; 6 spinnerets; PS and MS very small, AS long, biarticulate, distal segment very short. Colulus represented by group of hairs. Tracheal spiracle just in front of spinnerets, procurved, with sclerified anterior lip.

Male palp: Tibia with 2 lateral and 1, sometimes small, dorsal apophysis; cymbium with proximal lateral lamella; embolus long, implanted on retromesal side of tegulum, fitting in distal groove of the latter; tegulum divided in proximal and distal part, here called suprategulum; each part with apophysis, their tips strongly converging.

Female with cylindrical palpal tarsus, provided with toothed claw.

Epigyne with central concavity or opening with 2 long, curved, cul de sac tubes in front of spermathecae (in *barrona,* no other epigynes cleared).

OTHER SPECIES INCLUDED: *Storena absoluta* Gertsch and Davis (Ht in AMNH, examined); *Naibena barrona* Chamberlin; *Storena cufodontii* Reimoser (holotype in NHMW, examined); *Tijuca eduardoi* Mello-Leitão, *Storena mundella* Gertsch and Davis (Ht in AMNH, examined); *Storena tinga* F. O. P.-Cambridge; *Storena veracruzana* Gertsch and Davis (Ht in AMNH, examined); several undescribed species.

DISTRIBUTION: Central and northern South America, Central America, southern Mexico.

Tenedos lautus O. P.-Cambridge
Figures 200–205

Tenedos lautus O. P.-Cambridge, 1897: 226 (descr. ♂).

Storena lauta: F. O. P.-Cambridge, 1899: 54.

TYPE MATERIAL: Holotype male: Guatemala, Antigua, Stoll leg (BMNH) (examined).

DIAGNOSIS: Males are recognized by the palpal characteristics, mainly by the large rounded lateral and the hook-shaped dorsolateral apophyses.

DESCRIPTION: *Male:* Total length 5.42; carapace 2.91 long, 1.95 wide.

Color: Prosoma including legs orange brown; abdomen dark gray with pale dorsal pattern; anterior part with 2 large reniform patches followed by series of chevrons, anterior 2 interrupted in middle. Venter pale with longitudinal black stripe in middle and black ring around spinnerets.

Eyes: a: 1.00 (0.06); b: 1.54; c: 1.61; d: 1.54; e: 0.61; f: 0.76; g: 0.61; h: 1.69. MOQ: AW = 0.71 PW; AW = 0.71 L.

Legs: Spination: femora I d1-1-2 II d1-1-2 III d1-1-1-2 IV d1-1-1-2; patellae I-II-III pl2d3* IV pl2d3*rl1; tibiae I v1-1-2 II v1-1-2 III pl3*d3*rl2*v2-2 IV pl3*d3*rl2*v2-2; metatarsi I pl1v2-2-2 II pl2*v2-2-2 III w4w4w4 IV ?. Measurements:

	I	II	III	IV
F	1.88	1.70	1.62	2.04
P	0.73	0.73	0.71	0.81
T	1.45	1.21	1.05	1.54
Mt	1.54	1.45	1.72	?
t	?	0.87	0.81	1.15
Tot	?	5.96	5.90	?

Male palp (figs. 204, 205): Aspect of palp slightly different from that of some congenerics because embolus lies on dorsal side of suprategulum. In other species embolus visible on unexpanded palp since lying on ventral side of suprategulum.

Female: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

Tenedos tinga (F. O. P.-Cambridge), new combination
Figure 206

Storena lauta O. P.-Cambridge, 1898: 279 (descr. ♀).

Storena tinga F. O. P.-Cambridge, 1899: 54 (nomen novum for *lauta*).

Note: O. P.-Cambridge obviously described a species, *S. lauta* (♀) which he considered to be different from *T. lautus* (♂). As F. O. P.-Cambridge synonymized *Tenedos* with *Storena,* he had to give the last one described a new name because of the homonymy. It now appears that *Tenedos* is a valid genus, but, on the other hand, that *Storena lauta* O. P.-Cambridge is congeneric with *Tenedos lautus* O. P.-Cambridge. Therefore, the homonymy still exists and the new name given by F. O. P.-Cambridge remains valid.

TYPE MATERIAL: Holotype female: Mexico, Amula in Guerrero, H. H. Smith (BMNH) (examined).

DIAGNOSIS: The female of this species is recognized by the epigyne, in which the central plate has a membranous central part.

DESCRIPTION: *Female:* Total length: 5.79; carapace 2.71 long, 1.71 wide.

Color: Carapace, chelicerae, and sternum orange brown; legs yellowish orange; abdomen dark gray with pale pattern; venter pale with some darker mottling.

Eyes: a: 1.00 (0.07); b: 1.57; c: 1.57; d: 1.57; e: 0.43; f: 0.86; g: 0.71; h: 2.28. MOQ: AW = 0.62 PW; AW = 0.59 L.

Chilum present but not strongly chitinized.

Legs: Spination: femora I d1-1-2 II d1-1-2 III d1-1-2 IV d1-1-2; patellae I-II-III pl2d1rl1 IV pl1d1rl1; tibiae I pl1v1-1-2 II pl2*v1-1-2 III pl3*d3*rl2*v2-2-2 IV pl4*d4*rl3*v2-2-2; metatarsi I v2-1-2 II v2-2-2 III w4w4w4 IV w4w4w4w3. Measurements:

	I	II	III	IV
F	1.67	1.46	1.33	1.71
P	0.54	0.54	0.67	0.79
T	1.29	1.04	0.92	1.33
Mt	1.29	1.17	1.25	1.87
t	1.00	0.83	0.75	0.88
Tot	5.79	5.04	4.92	6.59

Epigyne: Figure 206.

Male: Unknown.

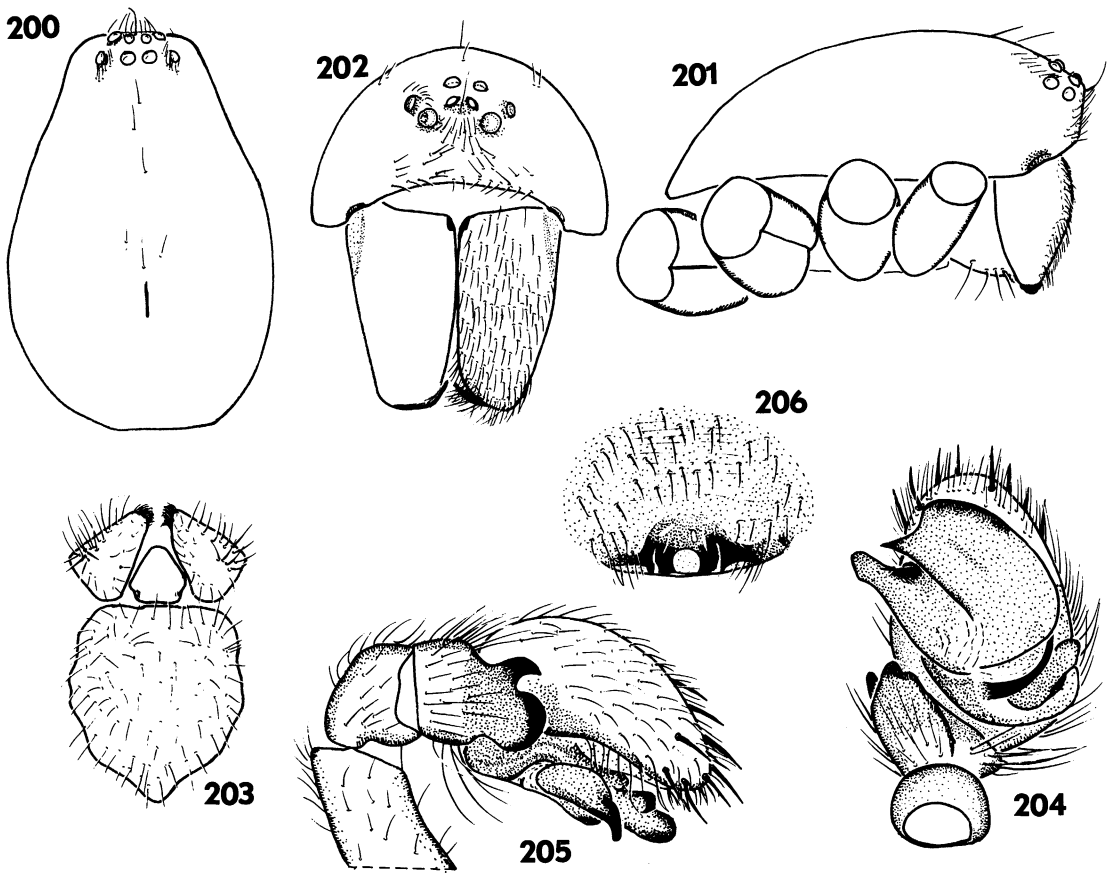
OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

Tenedos eduardoi (Mello-Leitão), new combination
Figures 207–212

Tijuca eduardoi Mello-Leitão, 1925: 462 (descr. new species, ♂). Holt, 1926: 85.

Note: Mello-Leitão proposed a new name for *Tijuca* (i.e., *Tijucaia*) in his key to the



Figs. 200–206. 200–205. *Tenedos lautus*. **200.** Male carapace, dorsal view. **201.** Male carapace, lateral view. **202.** Male carapace, frontal view (hairs omitted on right chelicera). **203.** Sternum, labium, and endites. **204.** Male palp, lateral view. **205.** Male palp, ventral view. **206.** *Tenedos tinga*. Epigyne, ventral view.

genera of Zodariidae but did not combine it with the name of the type species.

TYPE MATERIAL: Holotype male: Brasil, Rio de Janeiro, Tijuca, E de Moraes Mello (MNRJ) (examined).

DIAGNOSIS: Males of this species are recognized by the shape of the palpal tibia, mainly the rounded dorsolateral apophysis, the short lateral tooth, and the short, sharp dorsal apophysis.

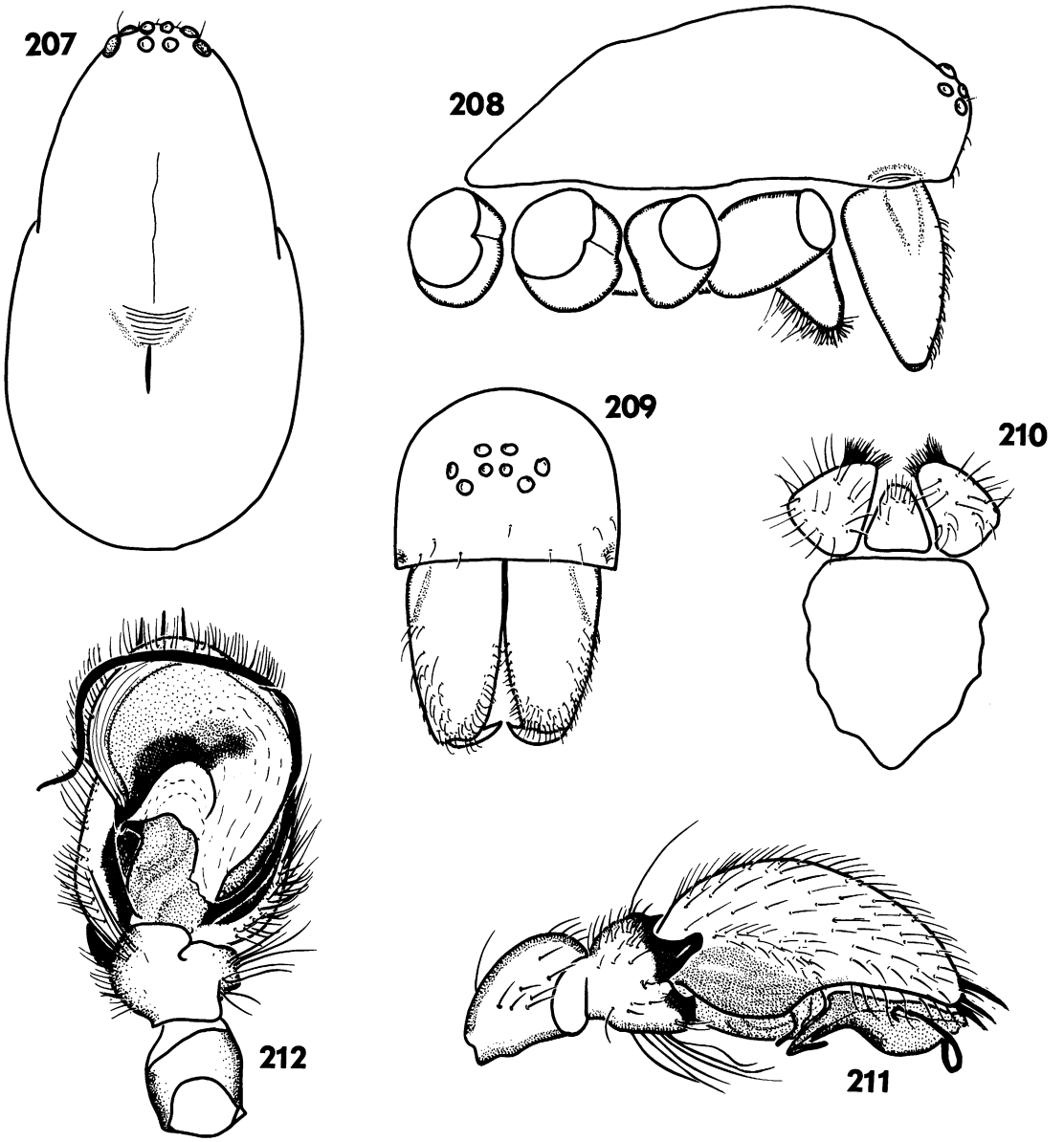
DESCRIPTION: *Male:* Total length 6.85; carapace 3.54 long, 2.04 wide.

Color: Carapace reddish brown; legs uniform brown; chelicerae and sternum reddish brown. Abdomen pale gray with two rows of white spots, posterior two anastomosing.

Eyes: a: 1.00 (0.10); b: 1.14; c: 1.05; d: 1.24; e: 0.38; f: 0.38; g: 0.57; h: 1.24. MOQ: AW = 0.89 PW; AW = 0.78 L.

Legs: Spination: femora I pl1d3* II pl1d3* III pl2*d1-2-2 IV pl1d1-1-2; patellae I-II-III pl2-2-1d3*rl1 IV pl1-1-2-2d3*rl1; tibiae I pl1v14 disp. II pl2-1v2-2-2-1 III pl4*d3*rl3*v2-2-2 IV pl4*d4*rl3*v2-2-2; metatarsi I v2-2-2 II v2-2-2 III pl1-1-2d1rl3*v2-2-2 IV pl1-1-2d1rl3*v2-2-2. Measurements:

	I	II	III	IV
F	2.02	1.86	1.72	2.12
P	0.79	0.83	0.85	0.91
T	1.76	1.43	1.25	1.76
Mt	1.70	1.60	1.68	2.46
t	1.15	1.13	1.21	1.47
Tot	7.42	6.85	6.71	8.72

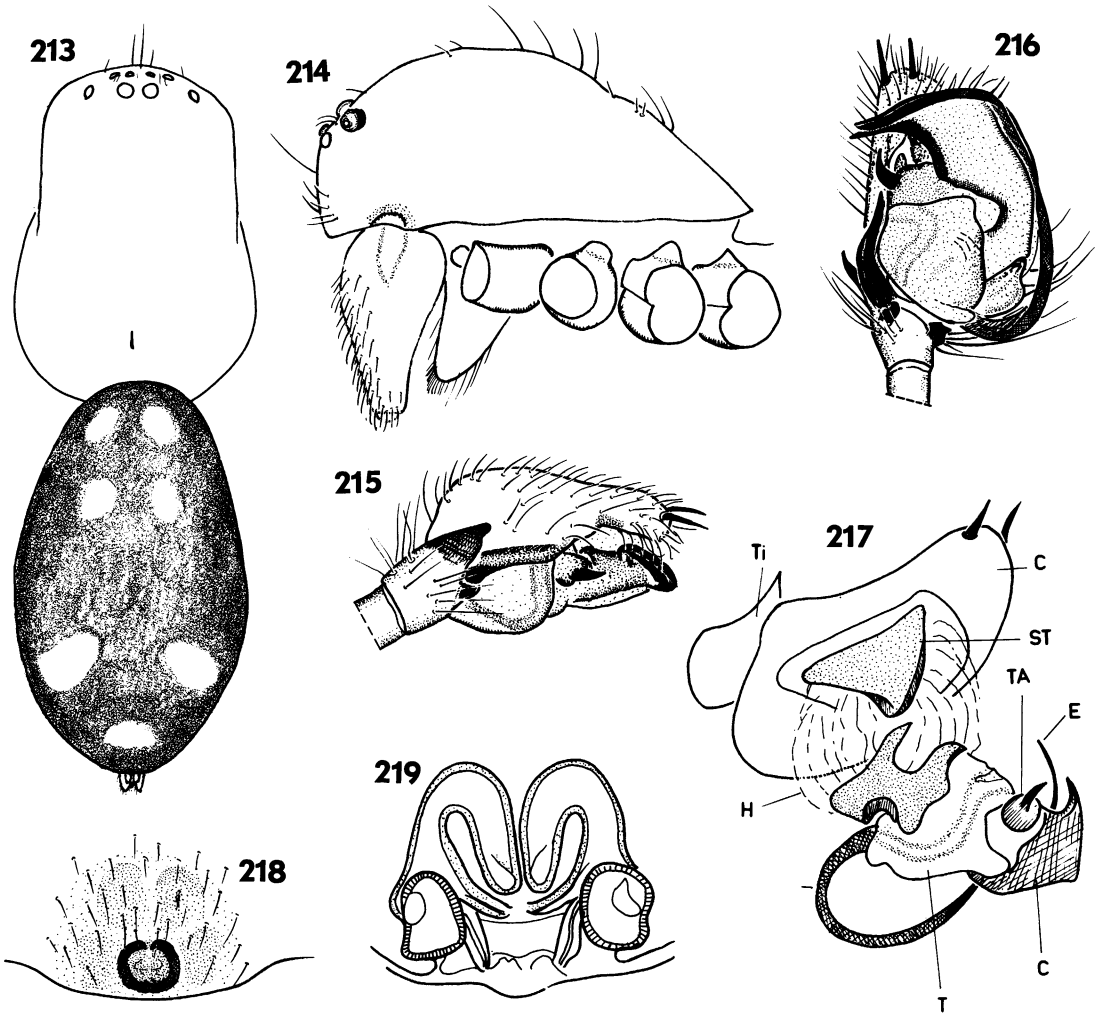


Figs. 207–212. *Tenedos eduardoi.* **207.** Male habitus, dorsal view. **208.** Male carapace, lateral view. **209.** Male carapace, frontal view. **210.** Sternum, labium, and endites. **211.** Male palp, lateral view. **212.** Male palp, ventral view.

Scopulae on t and distal third of Mt.
Male palp: Figures 211, 212.
Female: Unknown.
OTHER MATERIAL EXAMINED: None.
DISTRIBUTION: Only known from type locality.

Tenedos barronus (Chamberlin), new combination
Figures 213–219, 250

Naibena barrona Chamberlin, 1925: 214 (descr. imm.)



Figs. 213–219. *Tenedos barronus.* **213.** Female habitus, dorsal view. **214.** Female carapace, lateral view. **215.** Male palp, lateral view. **216.** Male palp, ventral view. **217.** Male palp expanded, ventral view. **218.** Epigyne, ventral view. **219.** Epigyne, cleared dorsal view (C = Cymbium, E = Embolus, H = Haematodocha, ST = Subtegulum, T = Tegulum, TA = Tegular Apophysis, Ti = Tibia).

Storena barroana: Banks, 1929: 55. Chickering, 1947: 133.

TYPE MATERIAL: Holotype imm. ♀: Panama, Barro Colorado Island, (MCZ 1267) (examined).

DIAGNOSIS: Recognized by a typical pattern of small white spots on the dorsum of the abdomen; the male has a relatively short and curved tegular apophysis and a very short dorsal tibial apophysis; the epigyne is characterized by the central lip overhanging the posterior margin and the long recurved ducts in the anterior part.

DESCRIPTION: *Immature* (Ht): Total length 4.50; carapace 1.85 long, 1.17 wide.

Color: Carapace reddish brown, paler around fovea with dark margin. Chelicerae orange brown; legs pale orange; abdomen pale gray with white spots (fig. 213); venter pale gray with faint median stripe and 2 stripes in front of spinnerets joining darker pattern on dorsum, thus delimiting oval pale patch on posterior side.

Carapace (figs. 213, 214): Smooth cervical grooves poorly indicated; rather high.

Eyes: a: 1.00 (0.04); b: 1.62; c: 1.62; d: 1.62; e: 0.75; f: 0.75; g: 0.75; h: 3.00. MOQ: AW = 0.69 PW; AW = 0.65 L.

Chilum double: 2 transversal triangular sclerites, 0.22 long, 0.06 wide. Chelicerae 0.68 long.

Legs short, stout. Tarsi slightly fusiform (a juvenile character of most Zodariidae), though slightly flattened laterally. Three large tarsal claws, paired ones with many (±15) teeth. Spination: femora I d1-1 II d1-1 III d1-1 IV d1-1; patellae I-II-III d2 IV d3; tibiae I v1 II v1-1 III d5v1-1-1 IV d5v1-1-1; metatarsi I-II v2 III 5 disp. v2-2 IV 7 disp. v1-2. Measurements:

	I	II	III	IV
F	1.09	0.83	0.83	1.09
P	0.44	0.42	0.36	0.49
T	0.85	0.70	0.62	0.91
Mt	0.86	0.70	0.81	1.27
t	0.57	0.44	0.55	0.78
Tot	3.82	3.12	3.17	4.55

Male: Total length 4.58 (4.25–4.79); carapace 2.37 (2.13–2.62) long, 1.62 (1.50–1.67) wide.

Color as in the juvenile but carapace more reddish, cephalic area with a broad dark margin on either side. Abdominal dorsal pattern as in juvenile but with narrow sepia scutum in anterior half.

Eye pattern as in juvenile.

Legs: Tarsi not fusiform but slightly widened toward extremity. Spination: femora I pl1d3* II pl1d3* III pl1d3*rl1 IV pl1d3*rl1; patellae I-II-III pl2d1rl1 IV pl1d1rl1; tibiae I v2-2-2 II pl2*v1-2-2 III pl2*d3*rl2*v2-1-2 IV pl3*d3*rl2*v2-2-2; metatarsi I v2-2-3 II v2-1-3 III 14 disp. IV 16 disp. Measurements:

	I	II	III	IV
F	1.53	1.33	1.33	1.66
P	0.61	0.61	0.61	0.71
T	1.41	1.05	0.91	1.41
Mt	1.45	1.33	1.47	2.14
t	1.01	0.79	0.77	1.01
Tot	6.01	5.11	5.09	6.92

Male palp (figs. 215, 217): Tibia with very small dorsal apophysis; dorsolateral apophysis relatively long, tapering but blunt; ventrolateral one short, with rounded tip. Tegular apophysis short, hook-shaped. Suprategular apophysis broadly arched outward.

Female: Total length 6.00 (3.54–6.75); carapace 2.58 (1.67–3.00) long and 1.66 (1.08–2.04) wide.

Color and eye pattern as in immature.

Legs: Spination: femora I pl1d3* II pl1d3* III pl1d2* IV d3*rl1; patellae I-II-III pl2d1rl1 IV pl1d1rl1; tibiae I v2-1-2 II pl2*v1-1-1 III pl2*d3*rl2*v2-1-2 IV pl2*d3*rl2*v1-1-2; metatarsi I v2-1-3 II v2-1-3 III 14 disp. IV 16 disp. Measurements:

	I	II	III	IV
F	3.12	2.71	2.50	3.21
P	1.38	1.33	1.38	1.46
T	2.50	2.04	1.67	2.71
Mt	2.50	2.17	2.54	4.04
t	2.42	1.42	1.29	1.79
Tot	11.93	9.67	9.38	13.22

Epigyne (figs. 218, 219, 250): With central subcircular plate, its posterior margin overhanging epigastric furrow. In dorsal view with two large dead-end tubes running forward and back again.

OTHER MATERIAL EXAMINED: Panama: 17♂, 97♀, 106 imm.: Barro Colorado Island between 1934 and 1964, mostly without precise dates, independently collected by Chickering, Zetek, and Banks (MCZ); 1♂, 1♀, 2 imm.: Canal Zone, Upper Gardens; V.1964 (MCZ); 1♀: El Valle, VI.1936, Chickering (MCZ).

DISTRIBUTION: Panama, Canal Zone.

STORENOMORPHINAE SIMON 1890

TYPE GENUS: *Storenomorpha* Simon.

Members of this subfamily are recognized by the eyes which are all pale. They have strongly curved, short anterior claws (the posterior ones are sometimes slightly less curved, fig. 19) implanted in a distal tarsal concavity. With the Lachesaninae and the Cydrelinae they share the presence of a basolateral extension of the endites.

The spiders belonging to this family are probably the sole representatives of the Zodariidae which are not real ground-living spiders. Their morphological adaptations—the presence of well-developed scopulae, short curved tarsal claws, elongation of the body, reduction of the spination on legs III and IV

in favor of the spination on legs I and II—all point in the direction of a life in the shrub or tree layer, possibly in holes in trunks.

CHARIOBAS SIMON

Chariobas Simon, 1893b: 416 (descr. new genus).

TYPE SPECIES: *Chariobas cylindraceus* Simon.

DIAGNOSIS: Recognized by the closely set eyes, all less than one radius apart and by the shape of the abdomen, not overlying the carapace and provided with two elongate muscle points just behind the petiolus. The cymbium of the male palp ends in a sharp point.

DESCRIPTION: Medium-size spiders (5.0–11.5). Carapace granulated, has sparse, sometimes silvery, hairs. Elongate: at least twice as long as wide. Widest between coxae II and III; anteriorly narrowed to about 0.6 times maximum width in males, to about 0.7 times maximum width in females.

Color: Carapace and chelicerae orange to dark chestnut brown. Sternum yellowish to reddish brown. Legs yellow to orange. Abdomen gray with pale dorsal pattern and pale spots on venter.

Eyes closely set in two strongly procurved rows. All circular and light; all subequal and less than their radius apart. MOQ quadrangular or slightly longer than wide. Clypeus slightly concave, retreating, with some long hairs in inferior part; twice as high as the diameter of ALE.

Chilum absent or represented by broad, oval or crescent-shaped sclerite, provided with 6–8 hairs. Chelicerae short, thick, with large lateral condyle, haired in distomesal anterior surface. Without teeth. Fangs short, thick at base. Endites rather elongate; labium twice as long as wide, roughly diamond shaped. Sternum elongate, anterior margin straight, sharply pointed behind; without sclerotized extensions.

Legs: Formula 1423. Spination very variable, sometimes limited to a few spines on Mt I–IV, sometimes with numerous prolateral spines on T I and Mt I and ventral spines on T and Mt III and IV, with intermediates. Scopulae on t and distal end of Mt. Three claws on legs I and II, only 2 on legs III and IV; paired claws closely set in shallow concavity; with about 12 teeth. Hinged hairs present on T and Mt. Trichobothria: 1 or 2 trichobothria on proximal end of T, 1 distal on Mt, and 4 on t.

Abdomen elongate, cylindriform, more than 3 times longer than wide; frontal part retreating, not overhanging posterior part of carapace; with 4 or 6 muscle points, anterior ones, just behind petiolus, elongate; always present. Six spinnerets, all biarticulate. AS conical, PS cylindrical, almost as long as former; MS minute. Colulus represented by single group of hairs. Tracheal spiracle short, straight, posterior rim sclerotized.

Male palp: Tibia with lateral apophysis, which may be short or fairly long, reaching ¾ length of cymbium, pointed at its extremity. Bulbus with variable mesal swelling of subtegulum; embolus originating on anterior part of tegulum with tendency to be corkscrew-shaped. Epiandrum present.

Epigyne with chitinized lateral areas and membranous central part with copulatory openings. Ducts short, broad, describing single loop, ending in sometimes ill-defined spermathecae.

Female palp short, strong, with toothless claw; sometimes with some prolateral spines.

OTHER SPECIES INCLUDED: *Chariobas navigator* Strand (type in ZMB, examined); *Chariobas mamillatus* Strand (type in ZMB, examined); a few described and undescribed species.

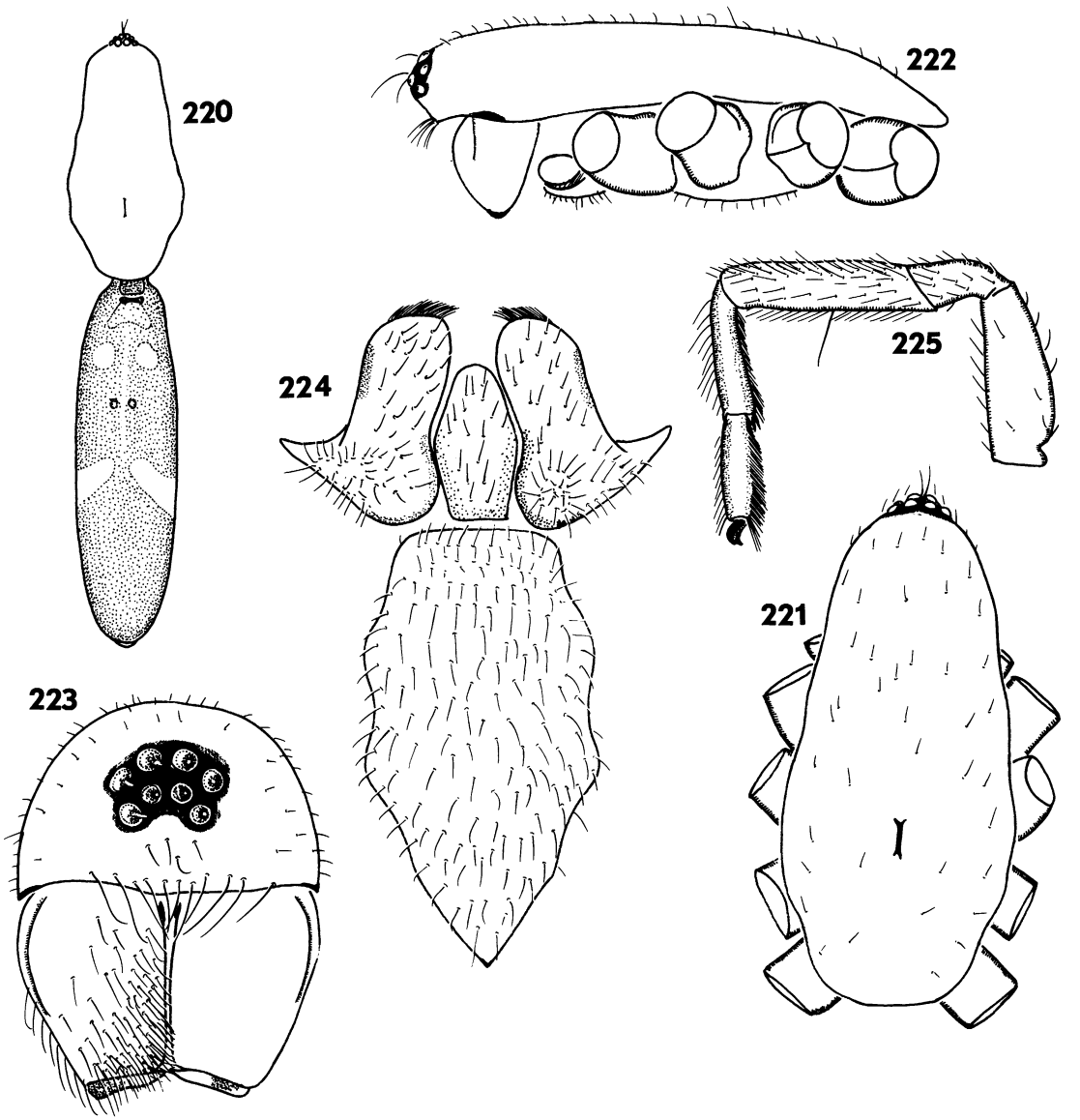
DISTRIBUTION: Tropical Africa.

Chariobas cylindraceus Simon
Figures 220–230

Chariobas cylindraceus Simon, 1893c: 315 (descr. juv. ♀). Lessert, 1929: 110, figs. 5, 6 (descr. juv. ♀); 1936: 229, figs. 24, 25 (descr. ♀). Jézéquel, 1964: 338, fig. 19a, b (descr. ♂). Not Lawrence, 1942: 142, fig. 1 (descr. ♂).

TYPE MATERIAL: Holotype juvenile female: whereabouts of this specimen unknown, probably lost.

Note: Jézéquel (1964) has seen the type specimen of this species which was most probably deposited in MNHN. However, examination of the specimen would not solve the problem of the identity of the species as it is a juvenile female. For the sake of stability I consider the species described by Lessert and Jézéquel as *C. cylindraceus.* A problem



Figs. 220–225. *Chariobas cylindraceus.* **220.** Female habitus, dorsal view. **221.** Female carapace, dorsal view. **222.** Female carapace, lateral view. **223.** Female carapace, frontal view (hairs omitted on left chelicera). **224.** Sternum, labium, and endites. **225.** Female right leg I, mesal view.

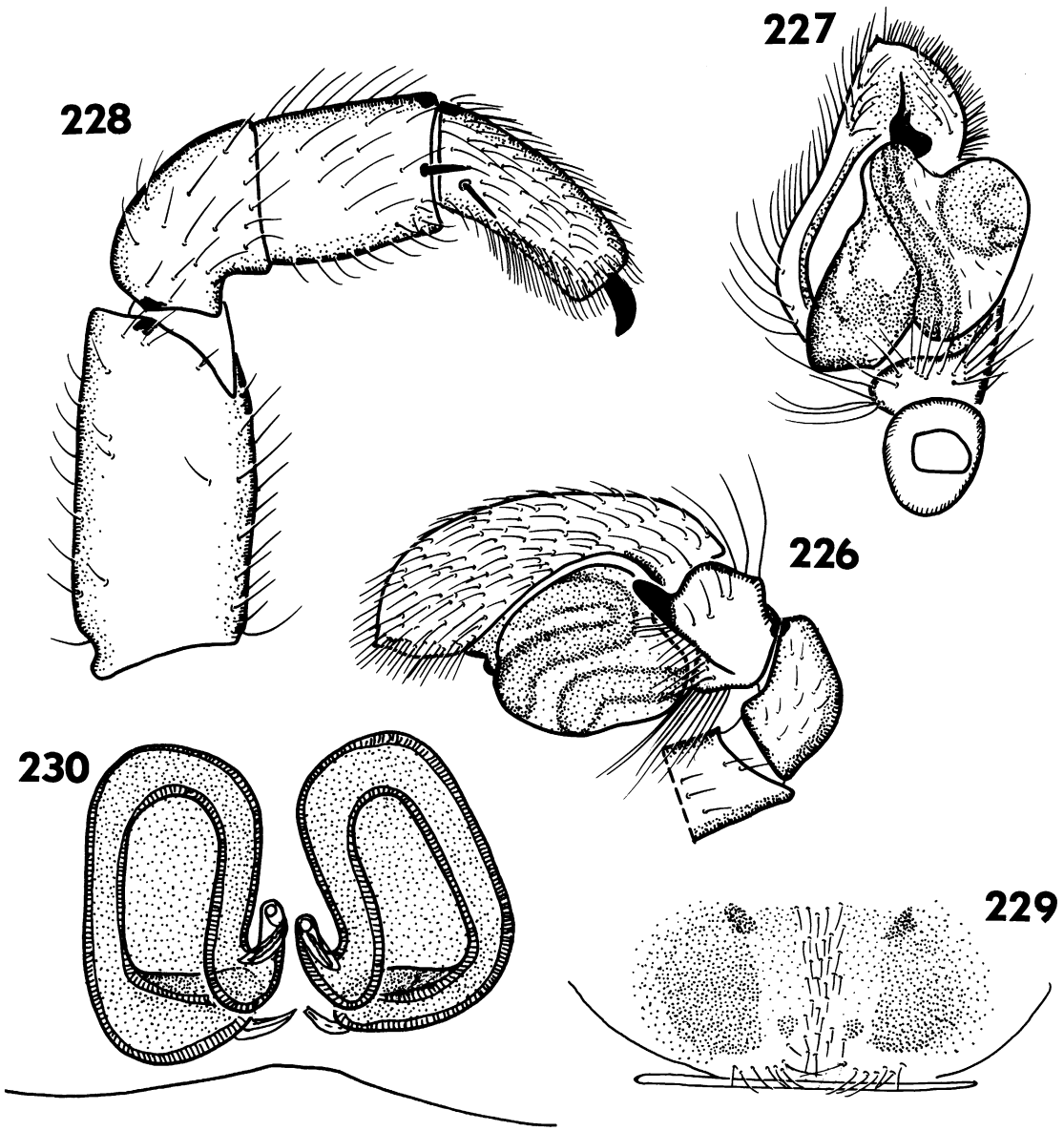
will arise if more species are found in West Africa.

DIAGNOSIS: Males are recognized by the details of the male palp: the large swollen subtegulum and the short frontal embolus; females are diagnosed by the epigyne as in figures 229, 230.

DESCRIPTION: *Female:* Total length 8.41; carapace 3.38 long, 1.54 wide.

Color: Carapace orange with darker margin; chelicerae orange. Sternum brownish orange; legs: F orange, T and P mostly yellow, sometimes only in proximal part, remainder yellowish orange; Mt and t orange. Abdomen gray with 4 pale patches on dorsum: 2 small ones in front, 2 obliquely oval ones in middle. Venter pale gray with paler patch behind each lung spiracle and single one in front of spinnerets.

Carapace finely granulated.



Figs. 226–230. *Chariobas cylindraceus*. **226.** Male palp, lateral view. **227.** Male palp, ventral view. **228.** Left female palp, mesal view. **229.** Epigyne, ventral view. **230.** Epigyne, cleared dorsal view.

Eyes: a: 1.00 (0.09); b: 1.11; c: 1.06; d: 1.00; e: 0.44; f: 0.22; g: 0.33; h: 0.44. MOQ: AW = PW; AW = 0.79 L.

Legs: Spination very poor: a pair of distoventral spines and 2 or 3 stiff setae on Mt I–IV. Measurements:

	I	II	III	IV
F	1.45	1.33	1.11	1.47
P	0.67	0.65	0.50	0.67
T	1.39	1.43	0.81	1.31
Mt	1.15	0.91	0.57	1.07
t	0.83	0.73	0.55	0.69
Tot	5.51	5.05	3.53	5.21

Epigyne: Figures 229, 230.

Male: Total length 6.08; carapace 2.91 long, 1.33 wide. Carapace more strongly granulated, darker than in female; slightly narrower in front. Color of epiandrum dark brown.

Further as female.

Male palp: Figures 226, 227.

OTHER MATERIAL EXAMINED: 18♀, 17 imm.: Ivory Coast, Lamto, 1963–1964, Jézéquel (MNHN); 1♂, 5♀: same locality, 1971, J. Van Mol (MRAC); 2♀: Zaire, Lukafu, XII.1930, De Witte (MRAC).

DISTRIBUTION: Ivory Coast, Gabon, Zaire, Angola.

CICYNETHUS SIMON

Patiscus Simon, 1893b: 415 (descr. new genus), preoccupied by *Patiscus* Stäl, 1877 (Orthoptera).
Cicynethus Simon, 1910: 180 (descr. new genus).
Patiscana Strand, 1934: 274 (nomen novum for *Patiscus*) (NEW SYNONYMY).

TYPE SPECIES: *Patiscus peringueyi* Simon, 1893b, by original designation.

DIAGNOSIS: Recognized by the elongate carapace with rows of hairs on circular supports, the strong first legs (leg formula 1423) with well-developed spination absent on the other legs.

DESCRIPTION: Medium-size to large spiders (8.5–11.0) with elongate oval carapace, widest at level of coxae II; narrowed in front to about 0.5 times maximum width in males and 0.6 times maximum width in females; beset with rows of sometimes flattened hairs on circular supports.

Color: Carapace yellow to brownish orange, sometimes with darker longitudinal central and/or lateral bands; chelicerae and sternum yellow to brownish orange; legs yellow, sometimes with darker stripes. Abdomen pale gray with 6 muscle points; sometimes with darker longitudinal bands. Epiandrum medium brown.

Eyes closely grouped, in 2 strongly procurved rows (as seen from in front); all eyes pale, circular, subequal; MOQ quadrangular or slightly longer than wide. Clypeus slightly convex, its height once to twice width of ALE; with some longer hairs along inferior margin.

Chilum crescent-shaped, sometimes divided, with about 10 hairs. Chelicerae short, swollen in middle, entirely covered with hairs, increasing in length downward and toward mesal side. No marginal teeth; fangs short, thick at base. Endites slightly converging, broad at base, tapering toward rounded extremity; with terminal scopula and some stiff hairs behind it. Labium longer than, or as long as broad. Sternum longer than wide, with gently rounded sides ending in sharp tip, with straight anterior margin.

Legs: Formula 1423. Legs relatively short and strong. Legs I markedly more strongly developed, with stronger spination than other legs. Tarsi slightly curved, with 3 claws; paired claws with about 6 teeth; unpaired claw very short; no claw tufts; ventrally with some stiff setae or scopulae. Spination: spines very short, few. Trichobothria in 2 rows on T, in 1 row on MT and t.

Abdomen longly oval. Six spinnerets: AS and PS both biarticulate, of comparable length; MS very short. Colulus represented by group of hairs.

Male palpal tibia with strong lateral apophysis. Cymbium with canaliculate distal spines. Tegulum transversally divided; embolus originating on anterior margin of posterior part of tegulum; tegular apophysis on anterior margin of anterior part; basal hematodocha visible in ventral view, striated.

Female palp with fusiform tarsus, provided with toothed claw. Adult females unknown.

OTHER SPECIES INCLUDED: *Cicynethus acanthopus* Simon 1911, *Cicynethus floriumfontis*, new species; a few undescribed species.

DISTRIBUTION: Southern Africa.

Cicynethus acanthopus Simon
Figures 233–235

Cicynethus acanthopus Simon, 1910: 181 (descr. subad. ♀).

TYPE MATERIAL: Holotype subadult female: Namibia, Grand Namaqualand, Lüderitz Bay, Angra Pequena, Schultze (MNHN 3290) (examined).

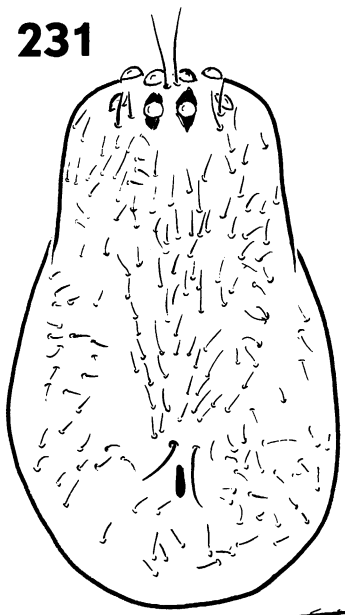
DIAGNOSIS: Recognized by the presence of flattened hairs on the carapace.

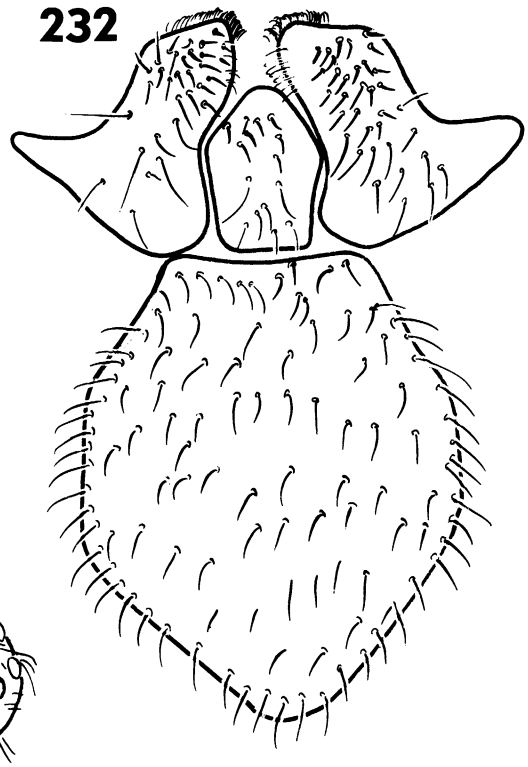
DESCRIPTION: *Subadult female:* Total length 10.4; carapace 4.92 long, 2.86 wide.

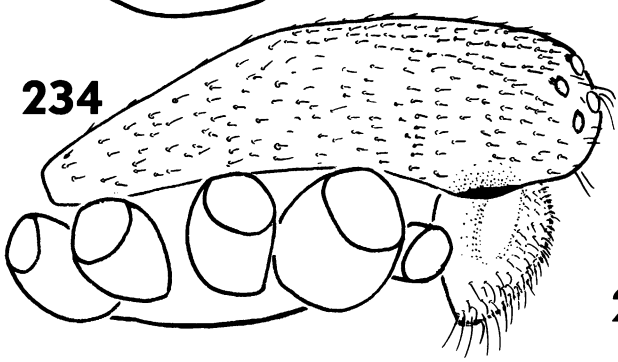
Color: Carapace yellow with pale brown band from fovea to ocular area. Legs yellow. Sternum pale yellow. Abdomen pale gray with longitudinal pale brown stripe, darker in middle. Carapace with rows of flattened hairs on circular supports.

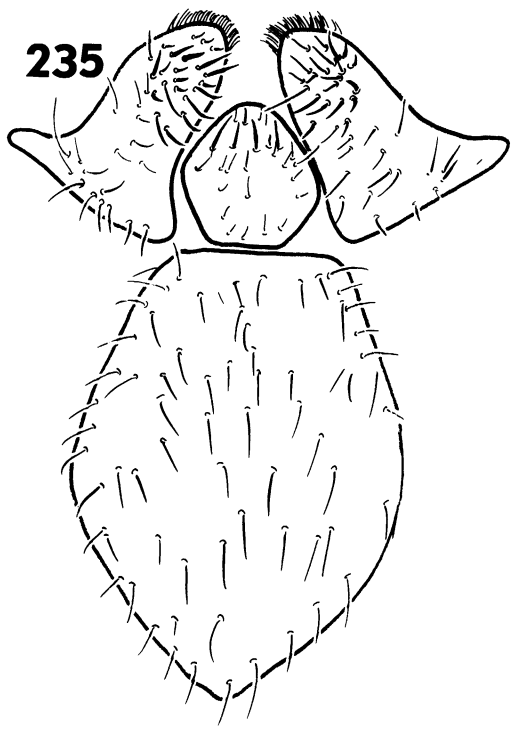
Eyes: a: 1.00 (0.13); b: 1.00; c: 0.96; d: 1.00; e: 0.52; f: 0.29; g: 0.59; h: 0.52. MOQ: AW = 1.00 PW; AW = 0.97 L. Clypeus 0.36 high or 2.8 times diameter of ALE.

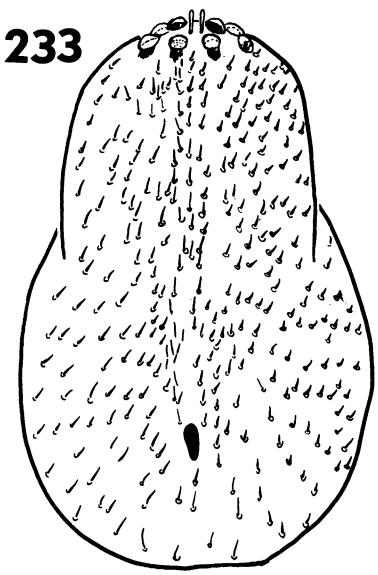
Legs: Spination: femora I pl1 II-III-IV; pa-











Figs. 231–235. 231–232. *Cicynethus peringueyi.* **231.** Juvenile carapace, dorsal view. **232.** Sternum, labium, and endites. 233–235. *Cicynethus acanthopus.* **233.** Juvenile carapace, dorsal view. **234.** Juvenile carapace, lateral view. **235.** Sternum, labium, and endites.

tellae I-II-III-IV; tibiae I v2-2-2-2 II v1-1-1 III v1 IV v1-1; metatarsi I rl2*pl2*v2-2-2 II rl1v2-2-2 III v2-2-2 IV v1-2-1-2; tarsi I pl2v2* II-III-IV. Measurements:

	I	II	III	IV
F	3.18	2.57	1.80	2.76
P	1.43	1.17	0.95	1.27
T	2.59	2.12	1.48	2.12
Mt	1.96	1.70	1.27	2.12
t	1.11	1.00	0.79	0.95
Tot	10.27	8.53	6.31	9.22

Trichobothria short, stiff, only 2 per row.

Male and adult female unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

Cicynethus peringuyei (Simon), new combination
Figures 231–232

Patiscus peringueyi Simon, 1893e: 315 (descr. subad. ♀); 1893b: 416.

Patiscana peringueyi Strand, 1934: 274 (nomen novum for *Patiscana*).

TYPE MATERIAL: Holotype subadult female: South Africa, Cape Town (MNHN 3293) (examined).

DIAGNOSIS: No clear diagnosis can be given for this species, which is only know from a subadult female.

DESCRIPTION: *Subadult female:* Total length 10.9; carapace 4.13 long, 2.60 wide.

Color: Carapace yellow with narrow median brown band between fovea and PME, 2 larger bands on each side along dark brown margin. Chelicerae yellow at base, giving way to brown at distal end. Sternum yellow and brown, with dark brown margin. Legs yellow with mediodorsal brown band on F, brownish mottling on other legs; t evenly brown. Abdomen pale gray with darker longitudinal bands.

Eyes: a: 1.00 (0.13); b: 0.92; c: 0.85; d: 0.92; e: 0.61; f: 0.85; g: 0.69; h: 1.30. MOQ: AW = 0.1.10 W, 0.85 L. Clypeus 0.28 mm high or slightly less than diameter of ALE. Labium longer than wide.

Legs: Spination reduced to one pair of ventral spines on all metatarsi; numerous long stiff hairs, which may replace ordinary spines. Tarsi with dense ventral coating of fine hairs, not as dense as ordinary scopulae. Measurements:

	I	II	III	IV
F	3.07	2.54	1.91	2.65
P	1.48	1.06	1.00	1.11
T	2.54	1.96	1.43	2.17
Mt	2.01	1.54	1.11	1.80
t	1.43	1.11	0.95	1.11
Tot	10.54	8.21	6.41	8.85

Male and adult female unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

Cicynethus floriumfontis, new species
Figures 236–241

TYPE MATERIAL: Holotype male: South Africa, Cape Province, Cradock, SE 3225Ba, Museum Staff, VIII–X.1985, pitfall trap (NMBA 1170).

ETYMOLOGY: *floriumfontis* is a latinization of "Bloemfontein."

DIAGNOSIS: So far the holotype is the only male in the genus known.

DESCRIPTION: *Male:* Total length: 10.84; carapace 5.00 long, 3.04 wide.

Color: Carapace yellowish brown, with dark brown median band and dark brown lateral margin. Chelicerae yellowish brown, darkened along margins. Sternum yellow, gradually darker toward dark brown margin. Legs yellow with dark dorsal, pro-, and retrolateral stripes on femora and dark spots at base of hairs throughout. Tarsi I and II brown. Abdomen pale gray with 6 muscle points. Epiandrum distinct, medium brown.

Carapace: Figures 236, 237. Hairs not in clear rows but rather dispersed; circular supports distinct.

Eyes: a: 1.00 (0.19); b: 1.05; c: 0.71; d: 1.05; e: 0.63; f: 0.58; g: 1.26; h: 0.89. MOQ: AW = 1.25 PW; AW = 1.00 L.

Legs: Spination consisting of 4 strong distoventral spines on each Mt. Long stiff setae on F, T, Mt, and t. Measurements:

	I	II	III	IV
F	3.42	2.63	2.50	3.38
P	1.63	1.04	1.21	1.46
T	2.96	1.79	1.79	2.50
Mt	2.63	1.58	1.29	2.29
t	1.58	1.17	1.00	1.21
Tot	12.32	8.21	7.79	10.80

Male palp: Figures 239, 240.

Female: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

MADRELA, NEW GENUS

TYPE SPECIES: *Madrela madrela,* new species.

DIAGNOSIS: Representatives of this storenomorphine genus are recognized by the elongate, posteriorly pointed abdomen. Males recognized by the palp with patellar apophysis.

ETYMOLOGY: *Madrela* is a contraction of Madagascar and *Cydrela.* The gender is feminine.

DESCRIPTION: Medium-size spiders (6.5–12.0) with smooth teguments. Carapace longly oval (L/W = 1.45–1.75), strongly narrowed in front to 1.5 times maximum width in males, to 1.6 times maximum width in females. Profile rather flat with highest point between fovea and eyes. Clypeus strongly retreating.

Color variable, prosoma ranging from dark chestnut to pale orange. Abdomen with pale spots on dark background.

Eyes: AER far to front and strongly procurved; PER recurved. All eyes light, circular. AME their radius apart, at same distance from ALE. PME their diameter apart and slightly more than twice that distance from PLE. MOQ: slightly wider in front than in back; longer than wide. Clypeus straight, strongly retreating, with few hairs; about 2.5 times diameter of ALE.

Chilum double; both parts broadly triangular, tapering laterad, lateral margins poorly delimited. Chelicerae relatively short, thick; with condyle; without marginal teeth; sparsely haired in front. Fangs short. Endites enlarged at base; with anteromesal scopula. Labium slightly narrowed at base, narrowed in front. Sternum longer than wide (± 1.25 times), roughly triangular, with sinuous sides, concavities corresponding with coxae; posteriorly pointed. Precoxal sclerites at II, III, and IV in ♀, only at II in ♂. Intercoxal sclerites slender.

Legs: Formula 1423. Tarsi widened toward extremity. Paired claws in shallow distal concavity, strongly curved, with about 13 teeth. Unpaired claw small on t III and IV; replaced by onychium on t I and II. With more or less developed scopula but always with dense tuft under claws. Spination more strongly developed in male than in female; in male with pro- and retrolateral rows of spines on F.

Abdomen elongate, pointed behind. Muscle points usually less obvious in females than in males. AS conical, PS cylindrical. MS with 2 or 3 large spigots in females, without in males. Tracheal spiracle narrow. Colulus represented by small group of hairs.

Male palp: Patella with simple lateral apophysis. Tibia with pointed dorsolateral apophysis. Cymbium with distal end ventrally swollen, not excavated as usual in Zodariidae. Embolus originating on posterior part of tegulum, ending against slender tegular apophysis which points outward.

Female palp with cylindrical tarsus, mesally with numerous short spines; claw finely dentate, turned inward over 90°. Epigyne with more or less sclerified central concavity.

OTHER SPECIES INCLUDED: *Storenomorpha angusta* Simon (Ht examined), see Jocqué and Bosmans, 1989.

DISTRIBUTION: Madagascar.

Madrela madrela, new species
Figures 242–249

TYPE MATERIAL: Holotype male: Madagascar, Tamatave Province, Seranambe, Mananare, X.1963, Peyrieras (MNHN).

Paratypes: 3♂, 2♀: together with Ht (MNHN, 1♂ 1♀ in MRAC).

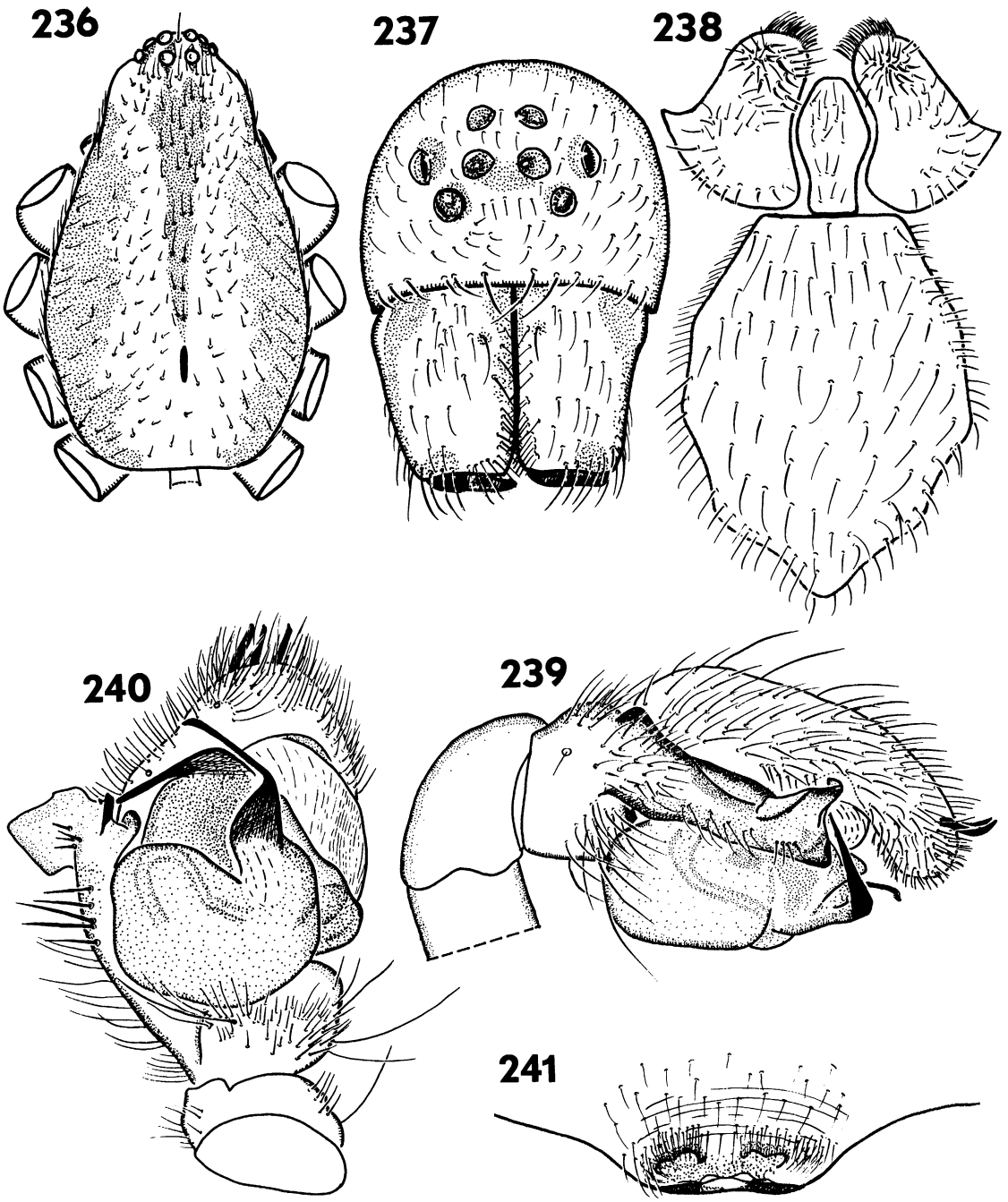
DIAGNOSIS: Easily recognized by the shape of the patellar and tibial apophyses on the male palp and by the shape of the central concavity in the epigyne.

ETYMOLOGY: The species name simply repeats that of the genus.

DESCRIPTION: *Male:* Total length 6.83 (5.66–7.00), carapace 3.59 (3.08–3.41) long, 1.73 (1.73–2.00) wide.

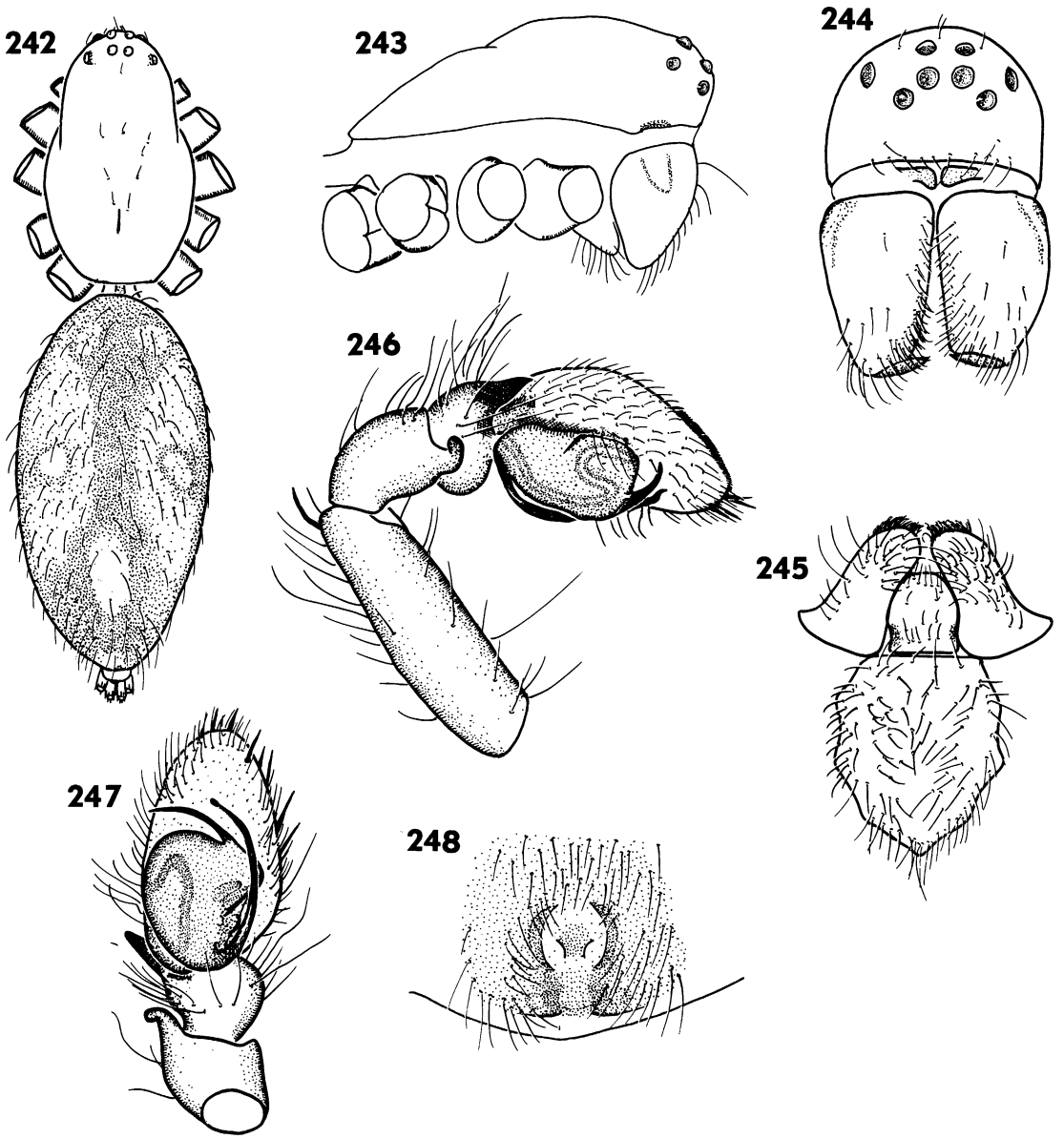
Color: Carapace and chelicerae uniform orange; sternum orange; legs orange with t and distal part of Mt darker. Abdomen pale gray (fig. 242) with longitudinal dark area, provided with five elongate pale spots: two in front, two in middle, one bright white on darker background in front of spinnerets. Sides and venter pale gray.

Eyes: a: 1.00 (0.17); b: 0.76; c: 0.73; d: 0.88; e: 0.53; f: 0.53; g: 0.71; h: 1.59. MOQ: AW = 1.08 PW; AW = 0.87 L. Clypeus: 0.32 or twice diameter of ALE.



Figs. 236–241. *Cicynethus floriumfontis*. **236.** Male carapace, dorsal view. **237.** Male carapace, frontal view. **238.** Sternum, labium, and endites. **239.** Male palp, lateral view. **240.** Male palp, ventral view. **241.** Epiandrum, ventral view.

Legs: Spination: femora I pl3*d4*rl4* II pl4*d4*rl4* III pl4*d4*rl3* IV pl4*d4*rl4*; patellae I pl1 II pl1 III rl1 IV pl1rl1; tibiae I pl3*rl3*v2-1-2-2 II pl2*rl3*v2-2-2 III pl2*d3*rl3*v2-2-2 IV pl2*d3*rl2*v2-2-2; metatarsi I pl3v1-2-1-2rl1 II pl3v1-1-1-2rl1 III pl3*d3*rl2*v2-2-2 IV pl4*d3*rl3*v2-2-2. Measurements:

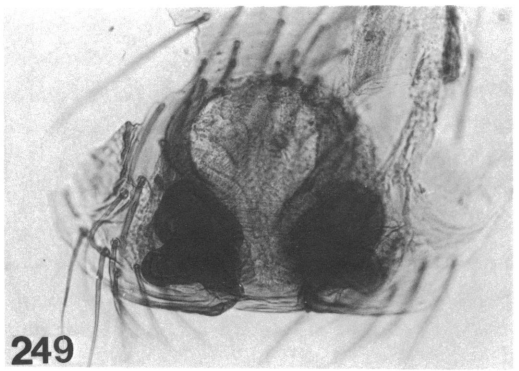


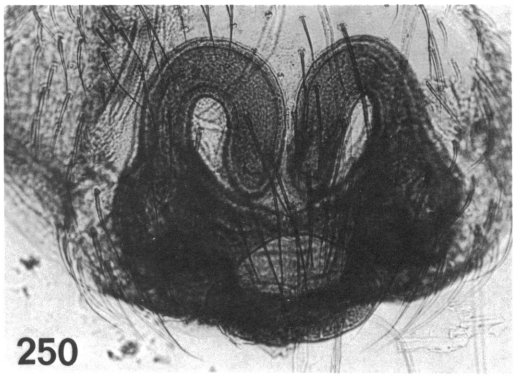
Figs. 242–248. *Madrela madrela*. **242.** Female habitus, dorsal view. **243.** Female carapace, lateral view. **244.** Female carapace, frontal view. **245.** Sternum, labium, and endites. **246.** Male palp, lateral view. **247.** Male palp, ventral view. **248.** Epigyne, ventral view.

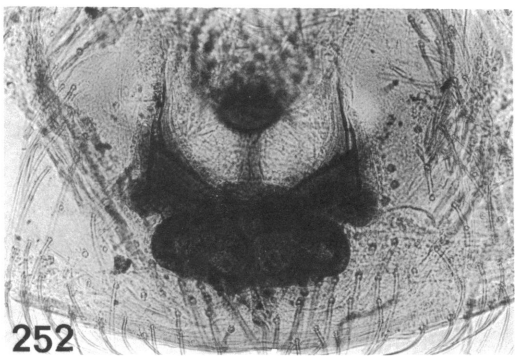
	I	II	III	IV
F	2.63	2.13	2.25	2.37
P	0.96	0.87	0.83	0.87
T	2.13	1.83	1.29	1.92
Mt	2.67	2.29	1.75	2.58
t	1.09	0.96	0.75	0.83
Tot	9.42	8.09	6.88	8.59

Male palp (figs. 246, 247): Patella with short, blunt, upturned apophysis. Tibia with short, sharp, dorsolateral apophysis. Embolus long, clearly standing free, ventrally of tegulum. End of embolus slightly widened. Tegular apophysis relatively long, pointing outward, sharp.

Female (values for second female paratype between parentheses): Total length 9.58 (6.16), carapace 3.59 (2.67) long, 2.08 (1.46) wide.







Figs. 249–252. Cleared epigynes, dorsal view. **249.** *Madrela madrela.* **250.** *Tenedos barronus.* **251.** *Caesetius schultzei.* **252.** *Psammoduon deserticola.*

Color and eye pattern as in male.

Legs: Spination: femora I d2pl II d2 III d3pl1 IV d3; patellae I-II-III-IV rl1; tibiae I v2-1 II v1-1 III d1-1rl1v1-1 IV d1-1rl1-1v1-1; metatarsi I v2-2-2-3 II v2-2-1-3 III v1-1-1-1-4 IV v1-1-1-1-4. Measurements:

	I	II	III	IV
F	2.50	2.08	1.67	2.13
P	1.00	0.96	1.04	1.00
T	1.87	1.58	1.12	1.58
Mt	1.92	1.79	1.38	2.08
t	0.92	0.87	0.71	0.79
Tot	8.21	7.29	5.92	7.59

Epigyne: Figures 248, 249.

Variation: Males from Perinet paler than those from Seranambe: basically yellow with only leg extremities orange. Abdomen pale yellow with one white spot surrounded with dark gray, in front of spinnerets. Tip of embolus slightly different from that of holotype.

OTHER MATERIAL EXAMINED: 2♂: Madagascar, Tamatave Province, Perinet, XI.1958, R. Legendre (MNHN and MRAC).

DISTRIBUTION: Madagascar.

STORENOMORPHA SIMON

For a revision of this genus see Jocqué and Bosmans (1989).

DIAGNOSIS: Representatives of this genus are Storenomorphinae of normal habitus (not strongly elongate) and with densely haired abdomen with longitudinal, sometimes interrupted, white lines. The embolus originates on the posterior end of tegulum and is partly covered by a membranous subtegulum.

DESCRIPTION: Given by Jocqué and Bosmans (1989). These authors did not mention that the cylindriform hairs are in fact canaliculate (figs. 39, 40), probably evacuating the product of a gland used to plug the epigyne following copulation.

TYPE SPECIES: *Storenomorpha comottoi* Simon (Ht in MCSG, examined).

OTHER SPECIES INCLUDED: *S. joyaus* (Tikader), *S. arboccoae* Jocqué and Bosmans, *S. nupta* Jocqué and Bosmans, and *S. reinholdae* Jocqué and Bosmans.

DISTRIBUTION: NE India (Sikkim), Burma, Thailand.

THAUMASTOCHILUS SIMON

Thaumastochilus Simon, 1897: 8 (descr. new genus); 1903: 987.
Thaumatochilus: Roewer, 1942: 355. Brignoli, 1983: 209.

TYPE SPECIES: *Thaumastochilus martini* Simon.

DIAGNOSIS: Representatives of this genus are unmistakable thanks to their extreme elongation. They differ with *Cicynethus* by the diamond-shaped labium and leg formula 1243.

Note: It is not impossible that these genera will be synonymized if intermediate forms are found or if males and females are discovered of both genera since so far only one sex is known of each.

DESCRIPTION: Medium-size spiders (9–10) with elongate carapace (2.3 times longer than wide). Maximum width between coxae II and III, narrowed in front to about 0.75 times maximum width. Profile low, highest point between eyes and fovea.

Color: Carapace and chelicerae dark brown to orange. Sternum reddish brown. Legs brown with broad yellow annulations and patches. Abdomen: dorsum with dark gray pattern on pale background; venter with longitudinal stripes. Carapace with some granulations and rows of short silvery hairs in cephalic area. Numerous longer and darker hairs in ocular area and in front of fovea.

Eyes in 2 strongly procurved rows. All circular, pale; subequal in diameter. AME less than their diameter apart and at same distance from ALE, which are larger; PME about 0.75 times diameter apart, twice that distance from PLE, which are the largest. MOQ longer than wide, slightly wider in front than behind. Clypeus with numerous long setae.

Chilum poorly developed; 2 crescent-shaped sclerites, each with 1 hair. Chelicerae short, strong; densely covered with hairs in anterior distal part; condyle strongly developed; no teeth; fangs short. Endites elongate; narrowest point in middle; anteromesal scopulae poorly developed. Labium almost three times longer than wide; diamond-shaped. Sternum a drawn-out hexagon; length almost twice width; without lateral extensions or intercoxal sclerites.

Legs: Formula 1243. Spination strong on palps and on prolateral side of legs I; poorly developed on remainder. Tarsal scopulae strongly developed; 3 claws; superior pair with about 12 small teeth. Hinged hairs present on T and Mt. Trichobothria in 2 rows on T, in 1 row on Mt and t.

Abdomen longly oval, twice as long as wide, in front with 2 short muscle points. Six spinnerets. AS the longest, biarticulate, broad at base, markedly tapering toward distal extremity. PS biarticulate, slightly shorter than AS, cylindrical. MS small, hidden between the former. Colulus represented by dense group of hairs. Transverse row of long hairs in front of spinnerets.

Female palp thick, with numerous prolateral spines. Tarsal claw toothless.

Epigynum with broad median plate in posterior half.

Male: Unknown.

OTHER SPECIES INCLUDED: None.

DISTRIBUTION: Only known from Natal, South Africa.

Thaumastochilus martini Simon
Figures 253–259

Thaumastochilus martini Simon, 1897: 8 (descr. ♀). Benoit, 1974: 436.

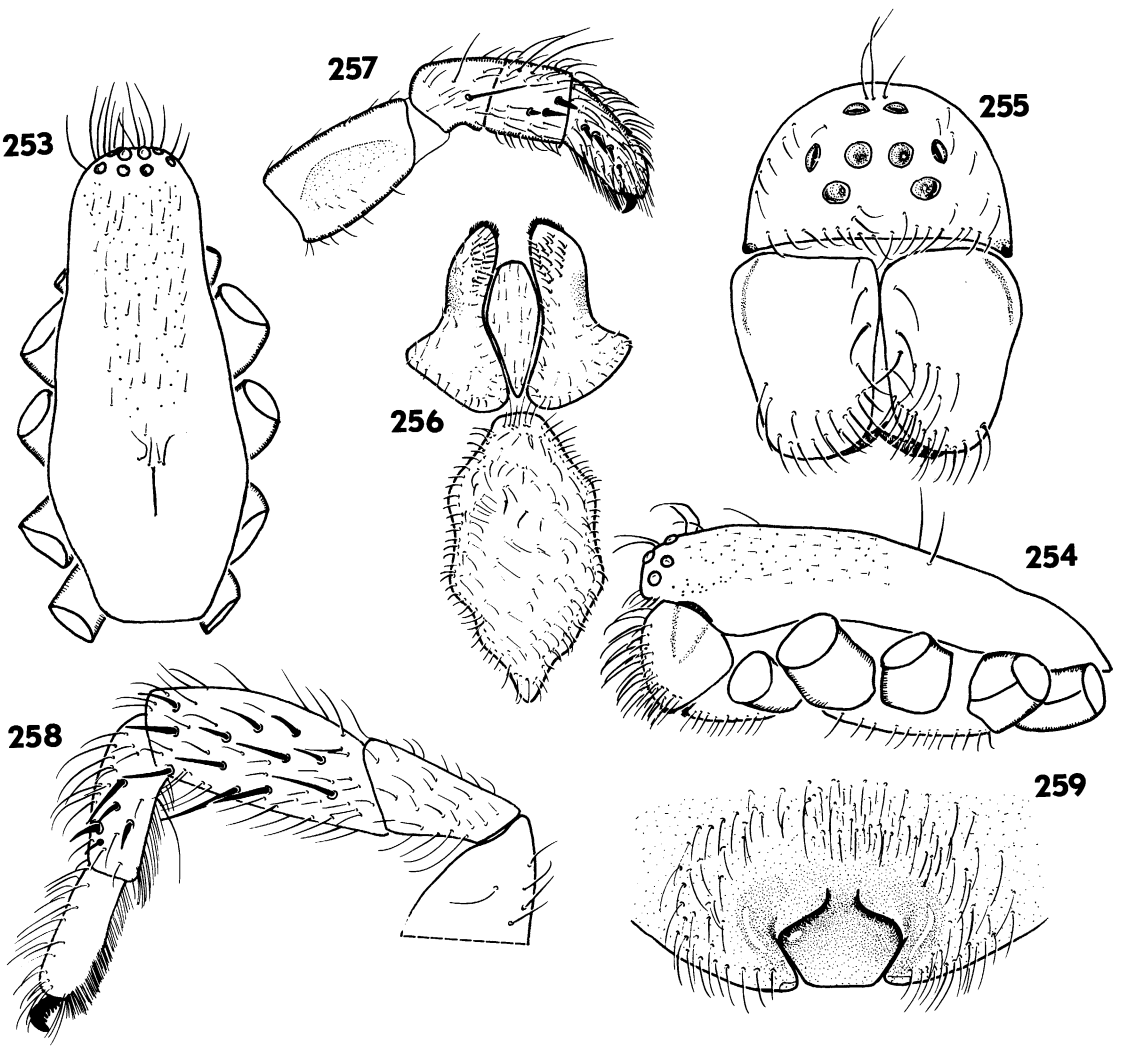
TYPE MATERIAL: Lectotype female (here designated): South Africa, Natal, C. Martin (MNHN 3292) (examined).

Paralectotype: One sa female, together with Lt.

DIAGNOSIS: This species is the only known representative of the genus and as such easily recognized.

DESCRIPTION: *Female:* Total length 9.60; carapace 4.33 long, 1.91 wide.

Color: Carapace dark reddish brown, with paler wedge-shaped mark between fovea and posterior margin. Chelicerae dark brown. Sternum orange brown; palps dark brown; anterior legs dark brown except F, of which only distal quarter brown. Other legs: F yellow with distal part brown with yellow distal



Figs. 253–259. *Thaumastochilus martini.* **253.** Female carapace, dorsal view. **254.** Female carapace, lateral view. **255.** Female carapace, frontal view. **256.** Sternum, labium, and endites. **257.** Left female palp, mesal view. **258.** Right leg I, mesal view. **259.** Epigyne, ventral view.

patch; P brown with dorsal yellow patch; T yellow with distal third brown; Mt yellow with distal quarter brown; t yellow with distal third brown. Abdomen with dark dorsal pattern on pale background; venter pale with 2 longitudinal pale gray stripes.

Eyes: a: 1.00 (0.11); b: 1.18; c: 0.95; d: 1.36; e: 0.72; f: 0.72; g: 0.63; h: 1.36; i: 0.36. MOQ: AW = 1.07 PW; AW = 0.86 L.

Legs: Spination: femora I d1 II d1 III d1 IV d1; patellae I-II-III-IV; tibiae I pl13 II v1-1 III v2° IV v2°; metatarsi I pl4 II-III v2°-2-3 IV v2°-2-3. (° = long flexible spiny setae whereas the others are rather short rigid spines). Measurements:

	I	II	III	IV
F	1.90	1.78	1.35	1.78
P	1.21	1.03	0.93	1.05
T	1.59	1.82	1.17	1.60
Mt	1.01	1.13	0.85	1.13
t	0.95	0.85	0.69	0.71
Tot	6.67	6.60	4.99	6.26

Epigyne: Figure 259.

Male: Unknown.

OTHER MATERIAL EXAMINED: 1 sa ♀: South Africa, Natal, Nongoma, G. Leblanc (MRAC).

DISTRIBUTION: South Africa, Natal.

CYDRELINAE SIMON 1893

TYPE GENUS: *Cydrela* Simon.

The Cydrelinae are recognized by the eye position (2-2-4). They share the basolateral extension of the endites with Lachesaninae and Storenomorphinae. Precoxal sclerites are restricted to this subfamily and occur only in three of the six genera. Three of the genera present a metatarsal swelling and hair tuft; the hairs of this tuft are not chisel-shaped but cylindrical with rows of short excrescences.

ASCHEMA, NEW GENUS

TYPE SPECIES: *Aschema pallida*, new species.

DIAGNOSIS: Males are recognized by the modified legs IV and the broad distal extremity of the tegulum combined with an elongate sternum with only a single precoxal sclerite in front of coxa II; females by the epigyne with a narrow median longitudinal cleft.

ETYMOLOGY: This generic name is derived from "a" (privative alpha) and "schema" (Greek: form, shape) which refers to the distorted fourth legs of the males. The gender is feminine.

DESCRIPTION: Medium-size spiders (5.5–7.0). Carapace oval, widest between coxae II and III, narrowed in front to 0.65 maximum width in females, to 0.45 times maximum width in males. In profile slightly raised in cephalic area, reaching highest point between fovea and PE. Tegument smooth or finely granulated. Color variable, ranging from entirely pale as in type species, to orange brown carapace with dark gray abdomen with pale dorsal spots in other species.

Eyes in 3 rows (2-2-4), AME dark, remainder pale; all eyes circular, subequal. ALE about ⅔, AME less than half their diameter apart; PME their diameter apart, about 4 times that distance from PLE. MOQ 1.5 times longer than wide. Clypeus straight or slightly concave; height ranging from 2 to 5 times diameter of ALE.

Chilum poorly delimited, with few hairs. Chelicerae strong, usually densely haired in front and on mesal sides. Condyle well developed. No marginal teeth. Fangs relatively long, not very thick at base. Endites broad, with broadened base, anteromesal scopula, and few dispersed hairs. Labium more strongly narrowed in front than at base. Sternum more or less strongly narrowed in front; 1.2 to 1.3 times longer than wide. One precoxal sclerite at coxae II and narrow intercoxal ones.

Legs: Formula 4132. Legs much more slender and more densely spinulated in males. Tarsi tapering from tip to base or fusiform. Mt and t IV modified in males; with unusual curvature, swelling or curved and truncated spines. Spination: relatively few, long slender spines on legs I and II, more short, strong spines on legs III and IV. Hinged hairs present. Trichobothria in 2 rows on T and Mt, in 1 row on t. Scopulae, if present, usually poorly developed or spiniform. Three claws. Paired claws of normal curvature, with 7 to 10 teeth.

Abdomen oval; with 4 muscle points. Tracheal spiracle very narrow. Colulus represented by field of hairs, sometimes double. Six spinnerets; AS long and cylindrical, sometimes slightly conical; PS and MS much shorter, in row.

Male palpus with 1, sometimes 2, lateral tibial apophyses; cymbium with mediolateral boss; embolus originating in posterior part of tegulum, which is broad over its entire length, lacks an apophysis.

Female palp conical, with finely dentate claw and numerous short spines on ventral and mesal sides.

Epigynum with narrow median longitudinal furrow.

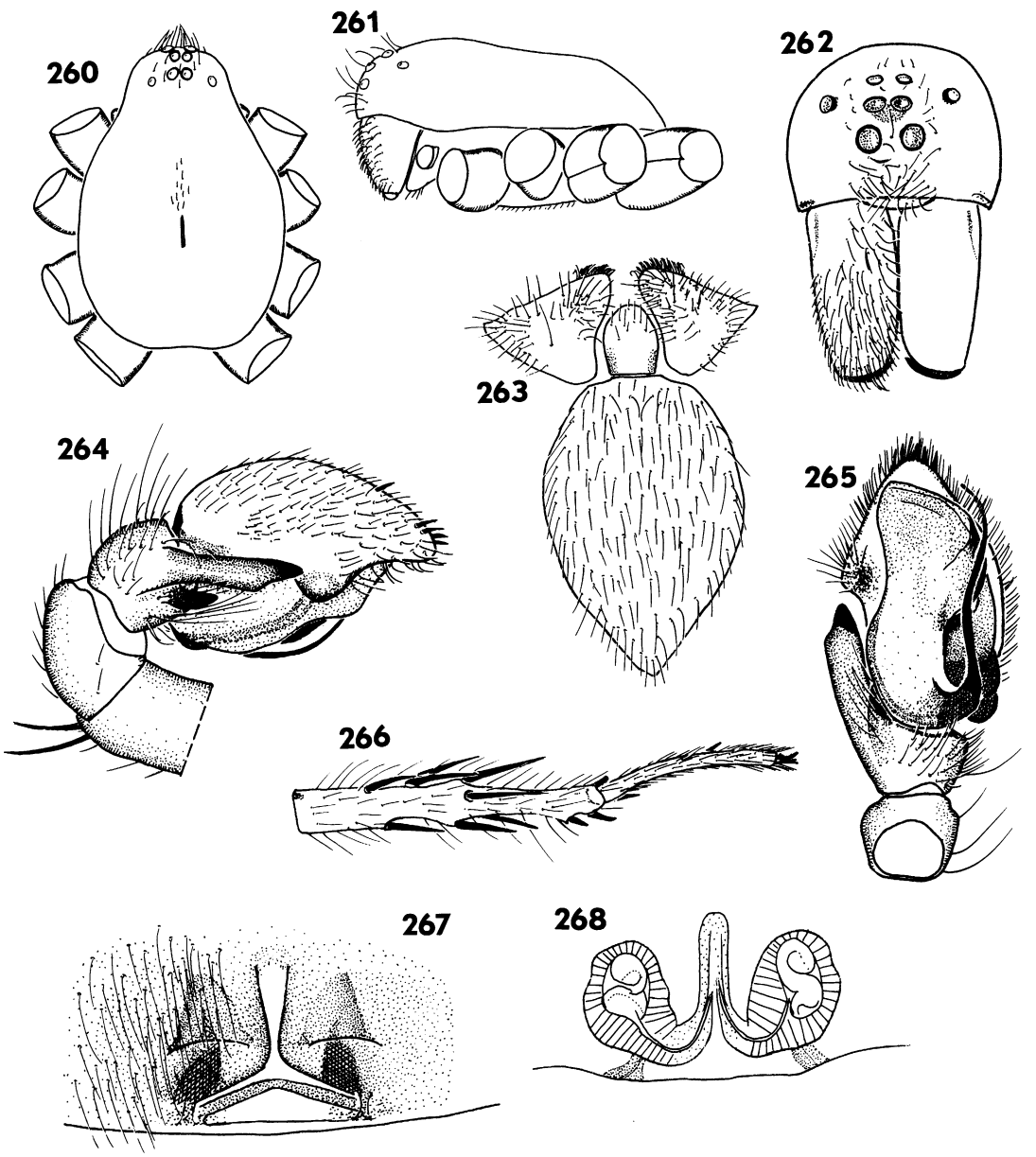
OTHER SPECIES INCLUDED: *Capheris madagascariensis* Strand (Ht examined).

Note: Cydrelichus giltayi Lessert, also has modified legs IV but that species has a very different palp and obviously belongs in *Capheris*.

DISTRIBUTION: Madagascar.

Aschema pallida, new species
Figures 260–268

TYPE MATERIAL: Holotype male: Madagascar, Belalanda, 13.V.1965, L. Bigot (MRAC 131 538).



Figs. 260–268. *Aschema pallida.* **260.** Female carapace, dorsal view. **261.** Female carapace, lateral view. **262.** Female carapace, frontal view (hairs omitted on left chelicera). **263.** Sternum, labium, and endites. **264.** Male palp, lateral view. **265.** Male palp, ventral view. **266.** Male leg IV, Mt and t. **267.** Epigyne, ventral view (hairs omitted on left side). **268.** Epigyne, cleared dorsal view.

Paratypes: 2♀: together with Ht; 1♀: Madagascar, Tuléar, 6.V.1965, L. Bigot (MRAC); 1♀: Madagascar, Tuléar, S. O. Batterie, VII.1967, J. Picard (MRAC).

DIAGNOSIS: This species is closely related to *A. madagascariensis* (Strand) (new combination) but differs by the completely uniform pale color and the more numerous spines on legs III and IV. In the male palp the insertion of the embolus on the tegulum is much

more to the mesal side in *A. pallida*. The epigyne of *A. madagascariensis* lacks the transversal furrow, which in *A. pallida* forms an inverted T with the longitudinal cleft.

ETYMOLOGY: *pallida* (Latin: *pallidus* = pale) obviously refers to the color of this species.

DESCRIPTION: *Male:* Total length 5.71; carapace 3.00 long, 2.13 wide.

Color: Carapace and chelicerae pale yellowish orange; legs yellow, except distal half of Mt IV brown. Sternum yellow. Abdomen entirely uniform pale.

Eyes: a: 1.00 (0.09); b: 1.11; c: 1.06; d: 1.11; e: 0.44; f: 1.06; g: 0.44; h: 2.22. MOQ: AW = PW; AW = 0.73 L. Clypeus 0.24 high or about 2.5 times diameter of ALE; with group of hairs.

Sternum 1.45 long, 1.01 wide. Chelicerae densely haired in front (fig. 262).

Legs: Mt IV narrowed in posterior half, swollen at extremity with whorl of short, truncated spines; t IV strongly curved as seen from above (fig. 266). Spination: femora I d2* II d2* III d1-1-2rl1 IV d1-1-2rl1; patellae I-II rl1v1vpl2 III pl6d4rl1 IV pl5d4rl2; tibiae I v19 II plrl1 III pl1-2-2d1-2rl2*v2-2-2 IV pl2-1-2d1-2rl2*v1-1-2; metatarsi I v2-1-1-2 II v2-2-2 III w4-5-6 IV w6-5-6. Measurements:

	I	II	III	IV
F	2.16	1.92	1.97	2.22
P	0.91	0.81	0.79	0.89
T	1.51	1.11	0.95	1.37
Mt	1.39	1.25	1.53	2.06
t	0.85	0.82	1.09	1.33
Tot	6.83	5.92	6.34	7.88

Palp (figs. 264, 265): Tibia with long, straight, pointed mediolateral apophysis and shorter ventrolateral one. Embolus originating on posterior mediolateral extremity of tegulum; tegulum broad at extremity, obliquely truncated.

Abdomen: AS very long and cylindrical; PS short, in a row.

Female: Total length 6.00 (5.83–6.58); carapace 2.83 (2.63–3.33) long, 1.75 (1.75–2.21) wide.

Color as in male, but carapace paler, Mt IV not darkened in distal half.

Eyes: a: 1.00 (0.08); b: 1.18; c: 0.87; d: 0.87; e: 0.37; f: 0.87; g: 2.87; h: 0.23. MOQ: AW = PW; AW = 0.61 L. Clypeus 0.22 high, with cluster of hairs.

Chilum single, broad, short sclerite, with about 8 hairs. Sternum 1.25 long, 0.95 wide.

Legs: Spination: femora I d2* II d2* III d1-1-2 IV d1-1-2; patellae I-II-III pl5d4rl1 IV pl4d4rl1; tibiae I-II-III pl5d4rl2v2* IV pl5d2rl2v3*; metatarsi I-II-III w3-4-5 IV w4-5-5. Measurements:

	I	II	III	IV
F	1.62	1.41	1.44	1.82
P	0.83	0.68	0.67	0.81
T	1.11	0.73	0.67	0.95
Mt	0.85	0.81	1.01	1.55
t	0.65	0.63	0.75	1.05
Tot	5.05	4.26	4.58	6.18

Epigyne: Figures 267, 268. Central longitudinal furrow ending in transverse furrow, thus forming inverted T.

Further as in male.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Southwestern Madagascar.

CAESETIUS SIMON

Caesetius Simon, 1893b: 419.
Cydrelichus Pocock, 1900: 325 (NEW SYNONYMY).
Tryssoclitus Simon, 1910: 185 (NEW SYNONYMY).

TYPE SPECIES: *Caesetius murinus* Simon, 1893b, by original designation.

DIAGNOSIS: Recognized by the following combination of characters: a field of spinules on the mesal side of the chelicerae and a strongly recurved posterior row of eyes—2 features it has in common with *Psammodu-on*—but with precoxal sclerites, domed carapace, without extra digging claws and with normal trichobothria.

DESCRIPTION: Medium-size to large spiders (6.4–12.0). Carapace with smooth teguments clothed with fine hairs, with some long ones between fovea and eyes; longly oval with widest point between fovea and eyes, narrowed in front to about 0.65 times maximum width in females, to about 0.60 times maximum width in males. Highest point of profile just before fovea. Clypeus relatively low.

Eyes in two rows; AER strongly procurved as seen from in front, much narrower than PER, which is strongly recurved. All eyes circular. AME dark, remainder pale. ALE or PLE the largest. AME and PME close together. ALE at 1 to 2 diameters from AME;

ALE at 5 to 6 diameters from PLE. MOQ rectangular, 1.5 to 2.0 times as long as broad. Height of clypeus 1.5 to 3.0 times diameter of ALE.

Chilum one broad triangle with several hairs. Chelicerae long, with large condyle, densely covered with spines in front and mesally forming dense brush. Without marginal teeth. Fangs short, broad. Endites short, broad; with terminal scopulae and field of spinules behind it. Labium roughly quadrangular, with rounded anterior margin. Sternum triangular, slightly longer than wide in females, 1.2 to 1.4 times longer than wide in males; 1 or 3 pairs of precoxal sclerites, between sternum and coxae III or between sternum and coxae II, III, and IV, partly or entirely lacking in males.

Legs: Formula 4132 or 4312 (the subadult female of *C. spenceri* has 4123). Spination: few dorsal spines on femur I, no further spines on leg I; leg II with some dorsal spines on F and prolateral and ventral spines on T and Mt. F III and IV with some mediodorsal spines and distal, dorsal transverse row. Numerous dispersed spines on P, T, Mt, and t III and IV. Tarsi flattened laterally; with more or less dense scopulae, sometimes extending on metatarsi and tibiae; sometimes with spiniform scopulae. Metatarsi III and IV slightly swollen at tip, with ventral cluster of hairs, chisel-shaped hairs absent. Two tarsal claws with about 8 teeth; unhooked sclerotized swelling at place of third claw. Trichobothria in 2 rows on T, in 1 row on Mt and t. Hinged hair present on I and II.

Male palp: Tibia with lateral apophysis; cymbium with numerous spines; strongly swollen bulbus showing subtegulum; embolus short, relatively broad; tegular apophysis small, inconspicuous, partly membranous. Female palp not swollen, tarsus short, not flattened but tapering toward tip, bearing claw with few teeth, surrounded by numerous spines. Abdomen oval, densely coated with hairs. Four muscle points dorsally. Six spinnerets: AS longer and larger than PS and MS, which are the smallest.

Epigyne with central concavity in front, with overhanging lip. Spermathecae situated near posterior margin of epigyne, touching; broad copulatory ducts starting near anterior margin.

Epiandrum present.

OTHER SPECIES INCLUDED: *Caesetius flavoplagiatus* Simon, *Caesetius politus* Simon, *Cydrelichus spenceri* Pocock, *Tryssoclitus bevisi* Hewitt, *Caesetius schultzei* Simon, one undescribed species (all holotypes examined; detailed descriptions of these taxa will be given in a forthcoming paper).

DISTRIBUTION: South Africa, Namibia, Mozambique.

Caesetius murinus Simon
Figures 269–276

Caesetius murinus Simon, 1893a: 316 (descr. ♀); 1893b: 417 (fig. 385, 386); 1910: 182 (descr. ♀).

TYPE MATERIAL: Holotype female: South Africa, Cape (MNHN 15233) (examined).

DIAGNOSIS: Females can be recognized by the relatively short and broad central concavity of the epigyne with procurved anterior and posterior margins. The male is recognized by the strongly curved embolus, touching the tegular apophysis and by the thick dorsolateral apophysis situated in the middle of the anterior lateral margin.

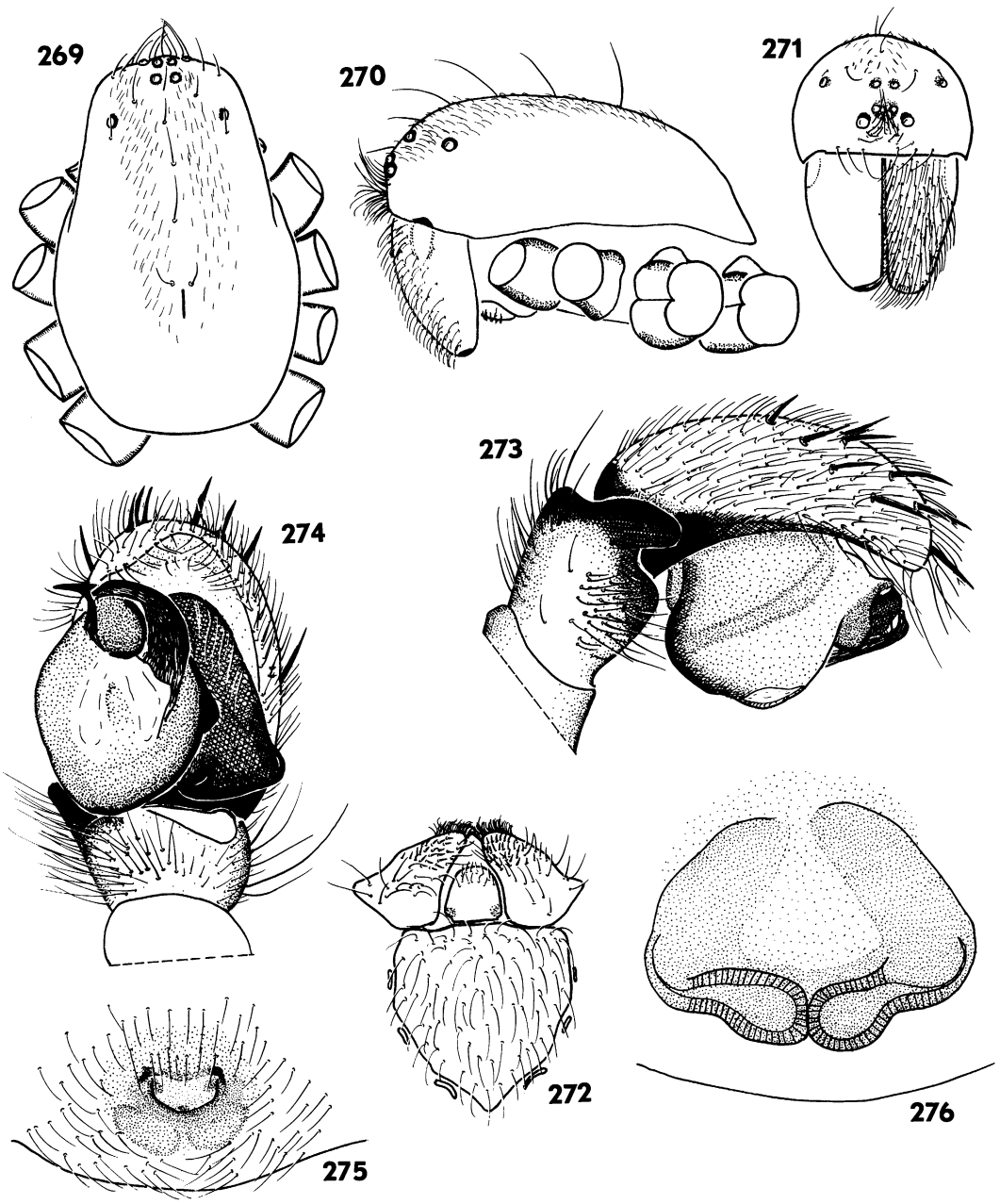
DESCRIPTION: *Female:* Total length 9.25, carapace 4.00 long, 2.67 wide.

Color: Carapace medium brown, slightly paler in cephalic area, with numerous fine silvery hairs, some stronger, darker ones between fovea and eyes. Clypeus with dense cluster of hairs. Chelicerae and legs medium to dark brown. Sternum pale brown. Abdomen mottled with gray and white. With pale marks on dorsum.

Eyes: a: 1.00 (0.10); b: 1.24; c: 1.09; d: 1.14; e: 0.95; f: 0.57; g: 0.95; h: 3.33. MOQ: AW = 0.94 PW; AW = 0.77 L. Clypeus 0.26 high or 2.7 times diameter of ALE.

Legs: Spination: femora I d4*pl1 II d4*pl1 III d4*df5rl1 IV d4*df5rl1; patellae I-II pl1 III pl5d3rl2 IV pl4d3rl2; tibiae I; v1 II pl3*v1-2-2 III 20 disp. IV 20 disp.; metatarsi I-II v2-2-2 III 24 disp. IV 24 disp. Measurements:

	I	II	III	IV
F	2.04	1.75	1.83	2.85
P	0.83	0.83	0.91	1.33
T	1.42	1.13	1.21	1.75
Mt	1.46	1.29	1.67	2.62
t	1.04	0.87	0.96	1.12
Tot	6.80	5.88	6.59	9.42



Figs. 269–276. 269–275. *Caesetius murinus.* **269.** Male carapace, dorsal view. **270.** Male carapace, lateral view. **271.** Male carapace, frontal view (hairs omitted on right chelicera). **272.** Sternum, labium, and endites. **273.** Male palp, lateral view. **274.** Male palp, ventral view. **275.** Epigyne, ventral view. **276.** *Caesetius schultzei.* Epigyne, cleared dorsal view.

Epigyne (fig. 275): Central concavity rather short, with procurved posterior and anterior margin; spermathecae shining through behind posterior margin of central hole.

Male: Total length 8.71; carapace 3.92 long, 2.71 wide.

Color: Carapace uniform reddish brown, sparsely beset with fine recumbent silvery

hairs, some stronger erect dark ones in middle and dense cluster on clypeus. Chelicerae and legs medium brown, sternum pale brown. Abdomen densely covered with short recumbent silvery hairs hiding faint pattern of black and white mottlings.

Eyes: AME (0.10) slightly more than their diameter apart and at 0.6 times that distance from the ALE which are 1.2 times as large. PME slightly less than their diameter apart and at 3 times their diameter from PLE which are 1.1 times as large. MOQ: AW = 0.9 PW; AW = 0.1.3 L. Clypeus 0.45 high or 3.5 times the diameter of an ALE; with a dense cluster of hairs.

Sternum: 1.29 wide; 1.5 long.

Legs: Spination: femora I d4*pl1rl1 II d3*pl1rl1 III d2*rl1df5 IV d5*rl1df; patellae I-II-III 17 disp. IV 17 disp.; tibiae I v2-2-2pl2* II v2-2-2pl2* III 21 disp. IV 22 disp.; metatarsi I v2-2-2pl2* II v2-2-2pl3* III 22 disp. IV 25 disp. Measurements:

	I	II	III	IV
F	2.12	1.92	2.13	2.63
P	0.93	0.92	1.04	1.21
T	1.38	1.13	1.29	1.79
Mt	1.42	1.38	1.96	1.13
t	1.08	1.04	1.13	1.29
Tot	6.92	6.38	7.55	9.72

Palp (figs. 273, 274): Tibia with broad dorsolateral apophysis; embolus very strongly curved outward, touching hook-shaped tegular apophysis.

Remark: The attribution of this male to *C. murinus* is speculative since it was taken alone and because several other species are known only from the female sex. It could well belong to *C. schultzei* but in that species the spines are much shorter and there are no distal fans of spines on femora III and IV.

OTHER MATERIAL EXAMINED: 1♂: South Africa, Clanwilliam, 11.IX.1949, B. Malkin (CAS).

DISTRIBUTION: South Africa: Cape Peninsula and Clanwilliam.

CAPHERIS SIMON

Cydrela (part): Simon, 1887a: 371.
Capheris Simon, 1893b: 419 (descr. new genus).
Systenoplacis Simon, 1907: 247 (descr. new genus) (NEW SYNONYMY).

TYPE SPECIES: *Cydrela crassimana* Simon.

DIAGNOSIS: Recognized by the palpal adaptations for digging: the tarsus is provided with large spines and triangular and flattened in the female; the strongly developed endites are lying in concavities of the anterior margin of the sternum which, as a result, has a very typical shape; it is provided with large precoxal sclerites.

DESCRIPTION: Medium-size to large spiders (6.0–17.0). Carapace shortly oval, widest between coxae II and III, narrowed in front to 0.60 maximum width in both sexes. Profile domed with highest point between fovea and PME. Fovea deep. Teguments finely to coarsely granulated, often with short silvery hairs.

Color variable, usually dark brown but sometimes paler, reddish orange; abdomen usually dark sepia or gray with sometimes very simple dorsal pattern often consisting of single or double pale patch in front.

Eyes in three rows (2-2-4); in some species ALE may be regarded as part of strongly procurved row. PER row almost straight. AME dark, remainder pale; all eyes circular. Relative size variable, but AME usually the largest, remainder subequal. Clypeus straight; height ranging from 3 to 5 times diameter of ALE.

Chilum double; both triangular sclerites slightly wider than high. Chelicerae strong; with large lateral condyle; anterior surface in middle with many long hairs; no teeth; fangs very short with thick base. Endites swollen at base, elongate in distal part; strongly converging; with anteromesal scopulae and some short spines or spinules near distal tip. Labium roughly diamond-shaped, longer than wide. Sternum triangular with typical anterior margin with three concavities lodging endites and labium. Length/width proportion variable. Precoxal sclerites strongly developed: posterior 3 with sharp, median point fitting in coxal concavity; the 4 sclerites may be united.

Legs: Formula 4123. Spination: relatively few long, slender spines on legs I and II, more short, strong spines on legs III and IV. Hinged hairs present. Trichobothria in 2 rows on T and Mt, in 1 row on t. Scopulae usually strongly developed, more or less spiniform,

more markedly so in posterior legs. Paired tarsal claws with 8 to 10 teeth. Mt swollen at extremity; with dense ventral cluster of hairs. Hairs cylindriform with rows of small excrescences, not chisel-shaped.

Abdomen oval; with 4 muscle points. Tracheal spiracle narrow, just in front of spinnerets. Colulus represented by small group of hairs. Six spinnerets; AS relatively long and cylindrical, sometimes slightly conical; PS and MS much shorter, in recurved row.

Male palp: Tibia usually with long lateral apophysis; cymbium sometimes dorsally excavated in middle; with numerous strong spines; subtegulum strongly developed; tegulum simple: with distal or proximal apophysis. Embolus originating on frontal extremity of tegulum, strong, short, but shape very variable, ranging from short straight prong to short corkscrew.

Female palp strongly swollen, much heavier than legs; tarsus triangular and ventrally flattened; with large untoothed terminal claw, turned inward over approximately 45°; numerous short spines on pro- and retrolateral sides; prolateral field of spines extending on palpal tibia; dorsally sometimes densely haired.

Epigynum with central depression, very variable in size. Copulatory ducts strongly sclerotized, often S-shaped, ending in widely separated spherical spermathecae near posterior margin of epigyne.

OTHER SPECIES INCLUDED: *Systenoplacis septemguttatus* Simon (type in MNHN, examined), *Cydrela falconeri* Caporiacco (type in MCSV, examined); *Caphaeris langi* Lawrence (type in TM, examined); *Caphaeris fitzsimonsi* Lawrence (type in TM, examined), *Cydrelichus giltayi* Lessert (type in AMNH, examined), *Cydrelichus vandami* Hewitt (type in TM, examined), and others; many undescribed species.

DISTRIBUTION: Entire tropical Africa and subtropical areas in the south.

NATURAL HISTORY: Representatives of this genus live mainly in savannas although some species are known from forested areas (e.g., *C. maculata* Marx). It is obvious that the palps are used for digging, although no observations on the digging behavior of *Capheris* are available. However, Henschel (in litt.) observed a number of *Capheris* males searching for burrows of female congenerics in the Namib Desert. I was sent some of the burrows and their trap doors. The inside of these doors is indeed waferlike, as has been reported for *Antillorena*; the outside is thoroughly enmeshed with sand which makes these trap doors quite difficult to see. The burrow is silk-lined, the silk enmeshed with plant debris. Burrows with trap doors have also been mentioned in Australian and Neotropical Zodariidae: those of *Neostorena* (Storeninae) and *Antillorena* (Luticinae). It is remarkable that this character, which supposes quite a complex behavior, is scattered over three different subfamilies in three continents. What appears to be common is living on sandy substrata in arid or semiarid circumstances.

Capheris crassimana Simon
Figures 277–284

Cydrela crassimana Simon, 1887a: 371 (descr. juv.).

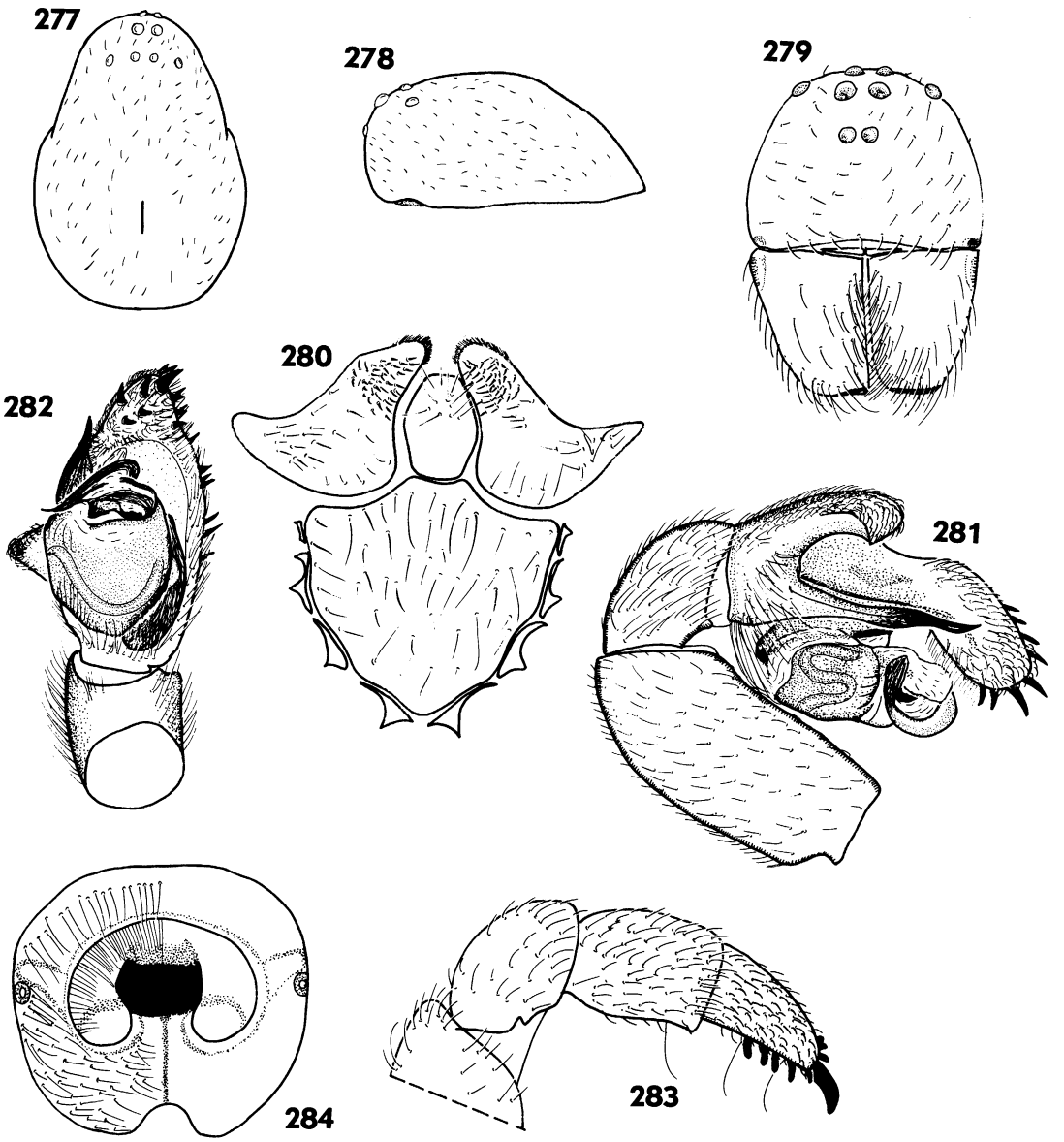
Capheris crassimana: Simon, 1893b: 419 (descr. gen. nov.).

Caphaeris oncka (sic) Lawrence, 1928: 24 (descr. ♂♀) (NEW SYNONYMY).

TYPE MATERIAL: Holotype juvenile: South West Africa, probably Namaland, 1884–1886, H. Schinz (MNHN 9853) (examined).

Note: In his original description Simon (1887a) clearly mentioned that the type of this species is a juvenile (pullus). Besides this specimen, the tube contains an adult female the origin of which is unknown. As mentioned elsewhere, Simon used to put together specimens he assumed to be conspecific, without altering the labels or adding data on the additional specimens. For the sake of stability we will consider the adult female as conspecific with the type of *C. crassimana,* although there is no objective evidence to provide the conspecificity.

DIAGNOSIS: Females are recognized by the shape of the epigyne with large central depression, which is transversely oval and opens into the copulatory ducts near its posterior margin. Males are recognized by the shape of the tibial apophyses: a long, pointed lateral one and a strong, curved dorsal one.



Figs. 277–284. *Capheris crassimana.* **277.** Female carapace, dorsal view. **278.** Female carapace, lateral view. **279.** Female carapace, frontal view. **280.** Sternum, labium, and endites. **281.** Male palp, lateral view. **282.** Male palp, ventral view. **283.** Female palp, lateral view. **284.** Epigyne, ventral view (hairs omitted on left side).

DESCRIPTION: *Female:* Total length 11.5; carapace 4.13 long, 3.13 wide.

Color: Carapace dark chestnut brown with many short silvery hairs; chelicerae and sternum reddish brown; legs medium brown; abdomen dark gray, sparsely covered with silvery and brown hairs; muscle points orange; dorsum with white patch in front; 3 faint pale chevrons and longitudinal pale bar in posterior part.

Carapace finely granulated, more strongly so in thoracic part.

Eyes: ALE touching! a: 1.00 (0.17); b: 0.76; c: 0.76; d: 0.88; e: 0.29; f: 0.33; g: 0.53; h:

1.40. MOQ: AW = 1.10 PW; AW = 0.79 L. AOQ: AW = 0.77 PW; AW = 0.58 L. Clypeus 0.63 high or 4.2 times diameter of ALE.

Chilum: Each sclerite 0.36 wide, 0.16 high. Sternum: 1.40 wide, 1.34 long.

Legs: Spination: femora I d3*pl1 II d3*pl1 III d3*rl2* IV d3*rl1; patellae I-II-III pl2d2rl1 IV pl2d2rl1; tibiae I pl1v2-2-2 II pl1v2-2-2 III pl3*d3*rl3*v2-2-1-2 IV pl3*d3*rl3*v2-1-2-1-2 IV; metatarsi I pl1v1-2-2 II pl1v1-2-2 III 14 disp. IV 16 disp. Measurements:

	I	II	III	IV
F	2.29	1.87	1.96	2.29
P	0.87	0.88	0.96	1.08
T	2.08	1.38	1.25	1.83
Mt	1.48	1.87	1.67	2.37
t	1.25	1.04	1.00	1.21
Tot	7.97	7.04	6.83	8.80

Epigyne: Figure 284. Central depression broadly oval with dark, sclerotized area in middle; copulatory openings near posterior margin.

Palp strongly developed with about 25 pl and 8 rl spines on tarsus and 25 pl spines on tibia.

Male (from Namibia, Okahandja, the identity of these males is doubtful; no females were found with them): Total length 9.58 (8.33–9.66); carapace 5.08 long (4.58–5.08), 3.33 (3.16–3.33) wide.

Color as in the female but dorsum of abdomen with dense cover of pale hairs; anterior pale patch bifid.

Carapace granulated.

Eyes: ALE touching! a: 1.00 (0.26); b: 0.96; c: 0.64; d: 0.95; e: 0.26; f: 0.38; g: 0.53; h: 1.09. MOQ: AW = 1.25 PW; AW = 0.92 L. AOQ: AW = 0.84 PW; AW = 0.82 L. Clypeus 1.10 high or 4.2 times the diameter of an ALE.

Legs: Coxae IV with 2 dorsal bosses: 1 prolateral, well delimited, 1 retrolateral, much less well circumscribed. Spination: femora I d3*pl1 II d3*pl1 III d2*rl2* IV d3*rl1; patellae I-II-III pl2d2rl1 IV pl1d2rl1; tibiae I v2-2-2 II v2-2-2 III pl3*d3*rl2*v2-2-2 IV pl3*d3*rl3*v9 disp.; metatarsi I v7 disp. II pl1rl1v6** III 14 disp. IV 16 disp. Measurements:

	I	II	III	IV
F	3.38	3.04	2.83	3.50
P	1.08	1.08	1.25	1.46
T	2.96	2.29	1.96	2.71
Mt	3.00	2.58	2.58	3.71
t	1.58	1.46	1.58	1.58
Tot	12.01	10.47	10.22	12.97

Male palp (figs. 281, 282): Tibia with two apophyses: one ventrolateral, long, slightly sinuous, slender, sharply tipped; one dorsolateral, strong, downcurved. Cymbium deeply bent in middle, with about 18 short spines on ventral and prolateral sides. Embolus short, describing ⅔ of loop. Tegulum with short membranous apophysis, lying in concavity of embolic loop.

OTHER MATERIAL EXAMINED: *Namibia*: 1♀ (type of *C. oncka* Lawrence): Namaland, Brukkaros Mts., 25°52'S, 17°47'E (TM 7802); 1♀: Keetmanshoop, Samehaling 277, 22.IV.1972 (SMN 35408); 3♂: Okahandja, SE 2117 Cc, 4–11.IV.1976 (SMN 36201, 1♂ in MRAC); 1♂: Keetmanshoop, Noachabeb 97, 22–28.IV.1972 (SMN 35411).

CYDRELA THORELL

Cydippe O. P.-Cambridge, 1870: 731 (descr. gen. nov.) (preoccupied in Coelenterata and Mollusca).

Cydrela Thorell, 1873: 598 (nomen novum for *Cydippe*).

Cydilla: Simon, 1874: 237 (lapsus).

TYPE SPECIES: *Cydippe unguiculata* O. P.-Cambridge.

DIAGNOSIS: Recognized by the shape of the carapace with raised cephalic area, the sternum with slightly indented anterior margin and without precoxal sclerites; males by the palpus with short embolus (in many species very short, pin-shaped); females have a very simple epigyne with two large, strongly sclerotized spermathecae; the copulatory ducts are very short.

DESCRIPTION: Medium-size to large spiders (6.0–14.5). Carapace longly oval, widest between coxae II and III, narrowed in front to 0.60 maximum width in males, slightly less narrowed in females. Profile with raised cephalic part and slight dip near fovea. Highest point between PME and fovea. Fovea deep. Teguments finely to coarsely granulated.

Color variable, ranging from dark brown to pale brown; some species spectacularly metallic blue with contrasting orange legs,

dark abdomen with white pattern. Abdomen usually pale gray with few pale patches.

Eyes in three rows (2-2-4); ALE may be regarded as part of strongly procurved row in some species. PER row pro- or recurved. AME dark, remainder pale; all eyes circular. Relative size variable, but AME usually the smallest, rarely larger than other six, which are subequal. Clypeus straight; height ranging from 5 to 8 times diameter of ALE; most often with dense cluster of hairs.

Chilum poorly developed, represented by 2 small widely separated sclerites. Chelicerae strong; with large lateral condyle, sometimes drawn out into short lateral ridge; anterior surface densely haired, with pale promesal patch; no teeth; fangs very short with thick base. Endites slightly swollen at base; rather broad, sometimes almost quadrangular; with anteromesal scopula and some relatively long hairs in distal half. Labium roughly triangular, with narrowed base. Sternum roughly triangular with rounded sides, almost straight anterior margin with small indentation on either side of center; usually slightly longer than wide. No precoxal sclerites.

Legs: Formula 4312. Spination: usually relatively few, long, slender, spines on legs I and II, more numerous short, strong spines on legs III and IV. Hinged hairs present. Trichobothria in 2 or 3 rows on T, in 1 row on Mt and t. Scopulae rarely present, mostly absent or spiniform. Paired tarsal claws with 8 to 10 teeth. Metatarsi at tip with dense, ventral cluster of cylindriform hairs, provided with rows of small excrescences. Tarsi fusiform in most species.

Abdomen oval; with 2 or 4 muscle points. Tracheal spiracle narrow, advanced, at 0.7–0.8 distance between epigastric furrow and spinnerets. Colulus represented by 2 groups of hairs. Six spinnerets; AS relatively long, cylindrical, sometimes slightly conical; PS much shorter, MS tiny. Epiandrum well developed with two strongly sclerotized depressions on either side of center.

Male palp: Patella rarely with short lateral apophysis; tibia usually with short, sometimes bifid, lateral apophysis; cymbium with numerous slender, curved spines in distal part. Subtegulum strongly developed; tegulum simple: with short distal apophysis, often with proximal ventral swelling or excrescence. Embolus originating on frontal extremity of tegulum, usually very small, pinlike, hidden by tegular apophysis, which is often membranous.

Female palp with conical tarsus, with large untoothed terminal claw; turned inward over approximately 30°; several spines on pro- and retrolateral sides.

Epigynum very simple: with strongly sclerotized area in middle near posterior margin, covering large, strongly sclerotized spermathecae. Copulatory ducts very short.

OTHER SPECIES INCLUDED: *Capheris insularis* Pocock (type in BMNH, examined), *Cydrela schoemanae,* new species, several described and many undescribed species.

DISTRIBUTION: Central, eastern, and southern Africa; Thailand.

NATURAL HISTORY: *Cydrela friedlanderae* has been reported to live in burrows with trap doors (Hewitt, 1914). The species probably belongs in *Capheris.* This observation is corroborated by the findings of Henschel (in litt.) which have been mentioned above. No observations on similar burrows of real *Cydrela* have been made.

Cydrela unguiculata (O. P.-Cambridge)
Figures 285–288

Cydippe unguiculata O. P.-Cambridge, 1870: 31 (descr. ♂).

Cydrela unguiculata: Pavesi, 1881: 545. Simon, 1893b: 41.

TYPE MATERIAL: Holotype male: South Africa, Natal (UMO) (examined).

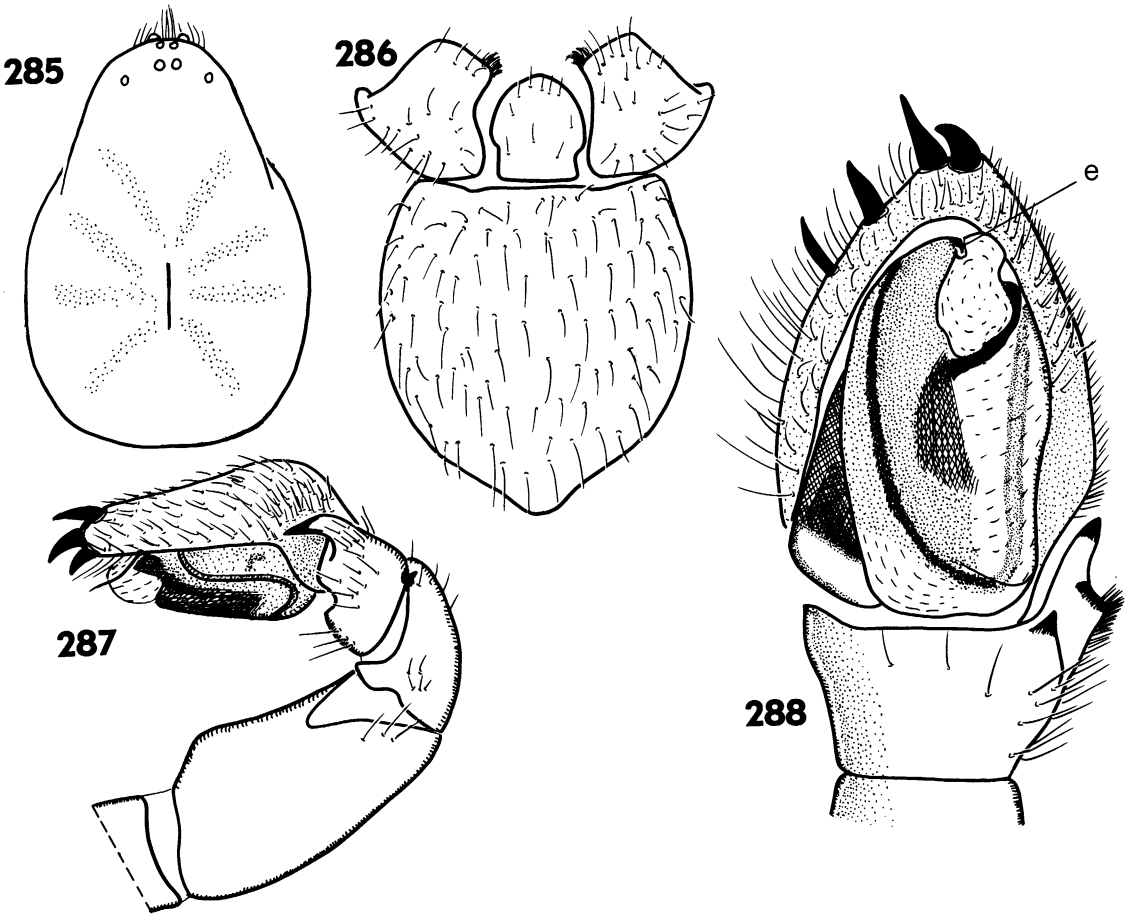
DIAGNOSIS: *C. unguiculata* males are recognized by the characters of the male palp, mainly the shape of the tibial apophysis and the simple tegulum, without proximal swelling and with a membranous terminal apophysis.

DESCRIPTION: *Male:* Total length unknown (abdomen shrunk); 10.1 according to Cambridge (1870); carapace 6.36 long, 4.29 wide.

Color: Carapace and chelicerae orange; sternum and legs yellowish orange; abdomen almost white on dorsum, sides pale gray, venter cream.

Carapace (fig. 285): slightly rugose; without hairs in thoracic area but a few in cephalic area.

Eyes: a: 1.00 (0.11); b: 1.09; c: 1.09; d: 1.82;



Figs. 285–288. *Cydrela unguiculata.* **285.** Male carapace, dorsal view. **286.** Sternum, labium, and endites. **287.** Male palp, lateral view. **288.** Male palp, ventral view.

e: 0.73; f: 1.20; g: 1.09; h: 3.18. AOQ: AW = 0.60 PW; AW = 1.33 L; MOQ: AW = 0.83 PW; AW = 0.70 L. Clypeus: 0.75 high, with group of hairs under ALE.

Legs: Spination: femora I pl1d3* II pl2d3*rl1 III pl1d3*rl2 IV pl1d3*rl1; patellae I-II pl3 III pl3*d1rl1 IV pl3*d2rl1; tibiae I pl-1-1v2-2-2 II pl3*v2-2 III pl3*d4*rl3*v2-2-2 IV pl3*d4*rl3*v2-2-2; metatarsi I v2-2-2-2 II v3 III 15 disp. IV 15 disp. Measurements:

	I	II	III	IV
F	3.97	3.66	3.29	4.13
P	1.38	1.70	1.70	1.59
T	2.91	2.54	2.28	2.91
Mt	3.02	3.18	3.87	4.98
t	2.12	2.07	2.23	2.65
Tot	13.40	13.15	13.37	16.26

Male palp (figs. 287, 288): Tibial dorsolateral apophysis short, slightly curved down; tegulum simple, without ventral proximal swelling; embolus very small, pinlike, partly hidden by subcircular tegular membrane which is the only apophysis.

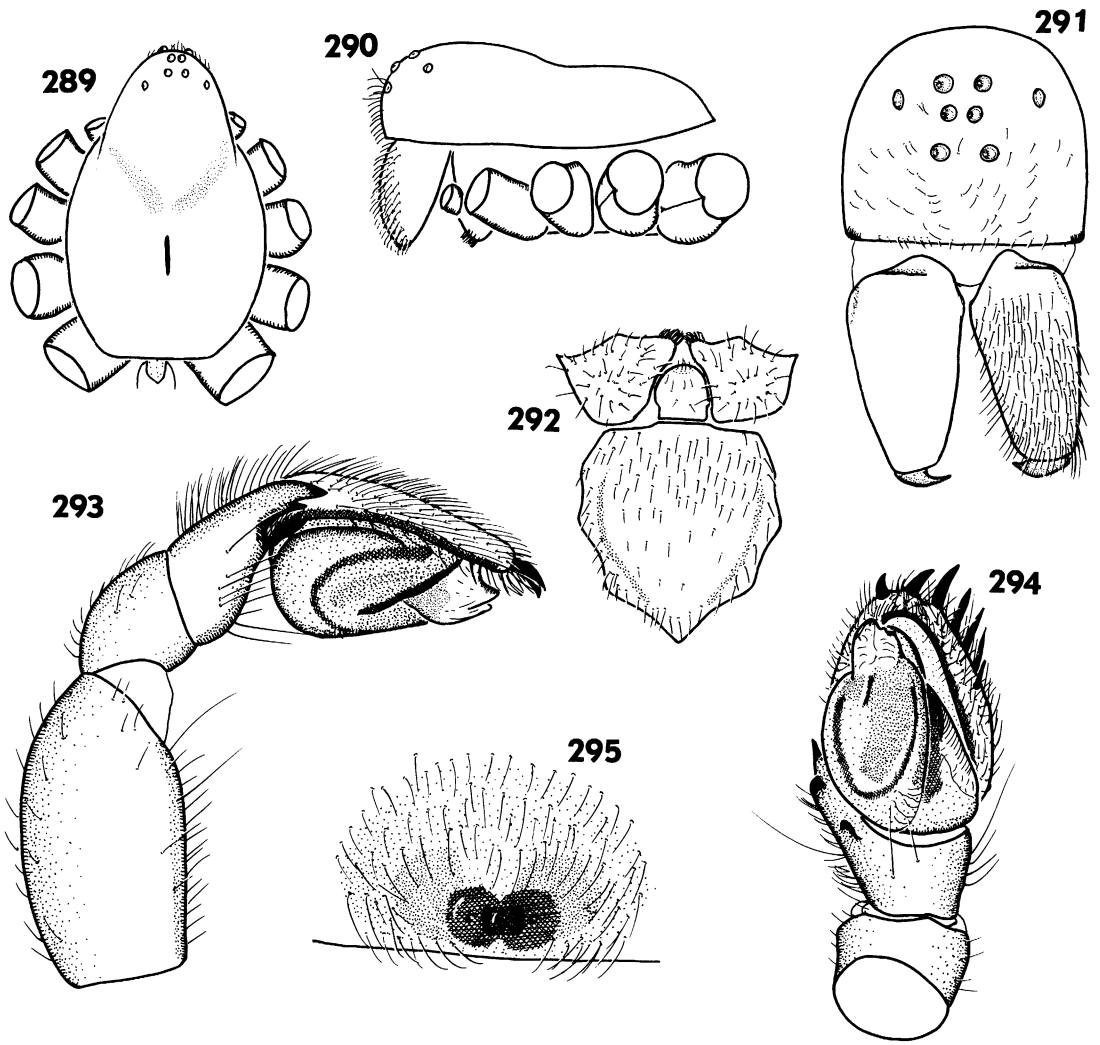
FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

Cydrela schoemanae, new species
Figures 289–295

TYPE MATERIAL: Holotype male: South Africa, Transvaal, Sabie, 20.XII.1984, pine plantation, pitfalls, A. van den Berg (NCP 86/97).



Figs. 289–295. *Cydrela schoemanae.* **289.** Female carapace, dorsal view. **290.** Female carapace, lateral view. **291.** Female carapace, frontal view (hairs omitted on right chelicera). **292.** Sternum, labium, and endites. **293.** Male palp, lateral view. **294.** Male palp, ventral view. **295.** Epigyne, ventral view.

Paratypes: 1♀, 1 juv. together with Ht; 3♀: same data as previous, 27.I.1984 (NCP 86/96); 2♀, 2 juv.: same data as previous, 23.X.1984 (NCP 86/106, 1♀ in MRAC).

DIAGNOSIS: Males of *C. schoemanae* are recognized by the thick lateral tibial apophysis, which is bifid at its extremity; females by the epigyne with dark central area near posterior margin with 2 small depressions and a slightly bulging area in the middle.

ETYMOLOGY: The species name is a patronym in honor of Dr. A. Dippenaar-Schoeman as an esteem for her work on African spiders.

DESCRIPTION: *Male:* Total length 7.90; carapace 4.33 long, 2.75 wide.

Color: Carapace uniform dark brown; chelicerae and sternum medium brown; legs medium brown with darker femora. Abdomen: dorsum dark gray, with 5 white spots: 2 in front, 2 in the middle, 1 longitudinal interrupted bar in front of spinnerets.

Carapace rugose. Endites strongly swollen at base, slightly wider than long, anteromesal scopula on sort of mesal flange. Sternum on either side laterally rebordered; with quite deep concavities for coxae II to IV.

Eyes: PER recurved. a: 1.00 (0.7); b: 1.47; c: 1.47; d: 1.47; e: 1.33; f: 1.33; g: 1.60; h: 4.00. AOQ: AW = 1.23 PW; AW = 1.26 L. MOQ: AW = 1.03 PW; AW = 0.90 L. Clypeus 0.50; high or 4.5 times diameter of ALE.

Legs: Spination: femora I pl1d2* II d3* III d3*rl1 IV d3*rl1; patellae I-II-III pl3*d3*rl1 IV pl3*d3*rl1; tibiae I v2-2-2 II v1-2 III pl3*d*4rl2v1-2-2 IV pl3*d4*rl2v1-2-2; metatarsi I pl1v1-2-2 II pl1-1d1v2-2-2 III 17 disp. IV 15 disp. Measurements:

	I	II	III	IV
F	2.50	2.29	2.34	3.00
P	0.96	0.96	1.13	1.13
T	1.88	1.67	1.54	1.92
Mt	2.08	2.25	2.75	3.46
t	1.50	1.50	1.75	2.08
Tot	8.92	8.67	9.51	11.59

Male palp (figs. 293, 294): Lateral tibial apophysis strong, relatively long, bifid at tip, dorsal prong slightly longer than ventral one. Subtegulum with mesal membranous part. Tegulum simple, without proximal swelling. Embolus invisible on unexpanded palp, hidden by membranous tegular apophysis.

Epiandrum with broad, dark, recurved posterior margin and impressed circular spot on either side.

Female: Total length 8.21 (7.83–10.41); carapace 4.88 (3.75–4.88) long, 2.63 (2.29–2.63) wide.

Color as in male, but carapace with butterfly-shaped patch in front of fovea.

Carapace with numerous hairs in cephalic area and cluster of hairs on clypeus. Eyes as in male. Endites much more elongate than in male. Sternum without lateral ridges nor concavities.

Legs: Spination: femora I pl1d3* II d3* III pl1d3*rl1 IV d3*rl1; patellae I d1 II pl3d1 III pl3*d3*rl1 IV pl3*d3*rl1; tibiae I pl1d1v1-2-2 II pl3v2-2-2 III pl3*d*4rl2v1-2-2 IV pl3*d4*rl3v1-1-2; metatarsi I pl1v2-2-2 II pl1d1v2-2-2 III 17 disp. IV 17 disp. Measurements:

	I	II	III	IV
F	2.50	2.29	2.50	3.00
P	1.12	1.12	1.16	1.25
T	1.75	1.42	1.50	1.92
Mt	1.92	2.00	2.71	3.88
t	1.42	1.37	1.63	2.04
Tot	8.71	8.21	9.51	12.09

Epigyne (fig. 295): With dark, strongly sclerotized oval area near posterior margin, with small depression on either side of slight central swelling.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

PSAMMODUON, NEW GENUS

Caesetius (*sectio* 2): Simon, 1910: 182.

TYPE SPECIES: *Caesetius deserticola* Simon 1910.

DIAGNOSIS: Recognized by the following combination of characters: chelicerae with a median field of spinules, carapace with a dip in the dorsal profile; legs I and II with 2 tarsal claws and an extra pair of digging claws; posterior legs with fans of long, supple hairs.

ETYMOLOGY: The combination of *Psammon* (Greek: sand) and *duoo* (Gr.: to dive), *Psammoduon,* refers to the habit of these spiders to dig into the sand. The gender is neuter. Because of their strange habit of flipping over to their back when burrowing they have been called back-flip spiders (E. Griffin, personal commun.).

DESCRIPTION: Medium-size (5.0–13.0) densely haired spiders. Carapace (figs. 296, 297) widest between coxae III and IV, strongly narrowed in front to half maximum width in males, to 0.55 times maximum width in females. Profile (fig. 296) with marked dip between high cephalic part and lower thoracic part; fovea well marked.

Color quite variable: carapace and chelicerae pale yellow to medium brown; sternum yellow to orange; legs pale yellow to dark brown; abdominal pattern composed of tegument colors and hair colors, simple (*P. deserticola*) or complex (*P. arenicola*).

Eyes small, in 2 rows: AER procurved, PER strongly recurved, much wider than anterior row; all eyes circular; AME dark, remainder pale; AME their diameter apart, as far from ALE, which have similar size; PME about their diameter apart, at about 5 times that distance from PLE, which are slightly larger. MOQ: AW about equal to PW but length approximately 1.3 times anterior width. Clypeus high, 3 to 9 times diameter of ALE; in some species with dense cluster of hairs, usually denser in females.

Chilum single, variable in shape, densely haired. Chelicerae rather long; densely haired in front, with median field of dense spinules; no teeth; fangs almost as long as thick at base. Endites triangular, strongly tapering, with narrow anteromesal scopula. Labium triangular; sternum longer than wide, slightly narrowed in front; without additional sclerites between it and coxae.

Legs: Formula 4321; anterior pairs short and thick, strongly tapering; with few ventral spines on T and Mt, but t, Mt, T, and P densely covered with short, sometimes club-shaped hairs. Femora sometimes with fine dorsal spine but always with long, fine hairs; posterior pairs with numerous long flattened hairs arranged in fans, on F, P, and T. Hinged hairs sometimes present. Two claws; third claw lost, but replaced by two thick upturned spines which can be considered as accessory digging claws. Vestige of the third claw present in *P. arenicola.* No claw tufts. Scopulae only in male of *P. arenicola.* No trichobothria on T and Mt, but few short plumiform ones on t.

Abdomen globular or oval. Spinnerets as usual in Zodariidae but possibly retractable. Colulus represented by group of hairs. Tracheal spiracle narrow. Tracheal system reduced to 2 short stems not reaching further than half length of abdomen. Booklungs strongly developed, filling base of anterior half of abdomen.

Male palpus: Tibia with lateral apophysis. Cymbium with numerous small spines; bulbus strongly bulging; embolus short, originating on mesal side of tegulum, broad, truncated at tip; tegular apophysis broad, situated at terminal end of tegulum; subtegulum strongly swollen.

Female palp with conical, densely spined short tarsus and mesally spined metatarsus. Claw finely dentate.

Epigynum rather flat, with central concavity. Spermathecae near posterior margin, touching; copulatory ducts broad, starting in front.

OTHER SPECIES INCLUDED: *Caesetius canosus* Simon; *Caesetius arenicola* Simon (holotypes examined; a detailed study of these taxa is in preparation).

DISTRIBUTION: Dunes and sandy areas in southwestern Africa.

Psammoduon deserticola (Simon), new combination
Figures 296–301

Caesetius deserticola Simon, 1910: 183 (descr. ♀). Lawrence, 1965: 10 (fig. 4 c, d) (descr. ♂). Benoit, 1974: 88. Newlands and De Meillon, 1986: 44.

TYPE MATERIAL: Holotype female, South Africa, Walvisbaai Rooibank, V. 1905, L. Schultze (MNHN 13465) (examined).

Paratype: 1♀: same data as Ht (ZMB 29585) (examined).

DIAGNOSIS: Recognized by the pale dorsum of the abdomen; the male has a slightly bifid tibial apophysis; the epigyne has a short overhanging lip in front and a sharply marked rim in the back of the central concavity.

DESCRIPTION: *Male* (range between parentheses): Total length 5.84 (5.00–6.00); carapace 3.29 (2.58–3.58) long, 2.46 (2.08–3.00) wide.

Color: Carapace yellowish orange, paler in cephalic area, with dark margin. Sternum yellow. Chelicerae, femora and sides of other leg segments orange; dorsal and ventral sides yellow. Abdomen white on dorsum, dark gray on sides; venter pale gray in middle, with large reniform patch on either side.

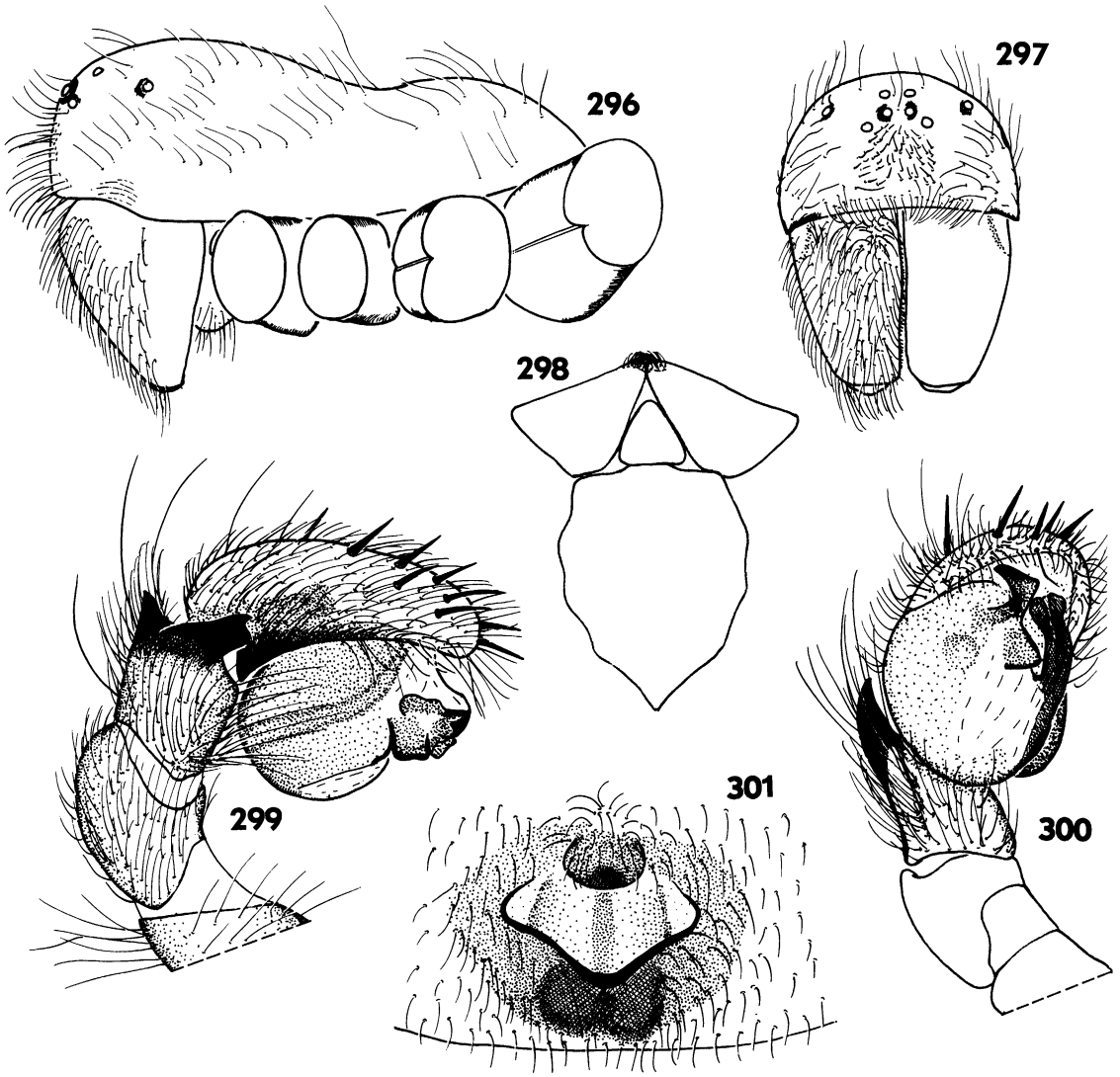
Carapace sparsely beset with long hairs.

Eyes: a: 1.00 (0.06); b: 1.00; c: 0.83; d: 1.00; e: 1.33; f: 0.83; g: 2.00; h: 4.67. MOQ: AW = 0.91 PW; AW = 0.77 L. Clypeus 0.54 high or 9.0 times the diameter of an ALE. AME (0.06) 1.25 times their diameter apart, at 0.8 times their diameter from ALE, which are as large. PME (0.05) 2.5 times their diameter apart, at 5 times their diameter from PLE, which are slightly larger (0.06) MOQ: AW = 0.91 PW; AW = 0.77 L.

Chilum poorly delimited; broadly triangular with some hairs.

Legs: Spination: femora I-II-III dfl1 IV dfl1; patellae I-II-III pf9mf3 IV pf8mf7; tibiae I v2*pl3* II v2-1-2 III pf7mfl3df7 IV pf5mf9df5; metatarsi I v3* II v1-1-4 III pf8mf9df6 IV pf8mf7df6; tarsi I-II-III 12 disp. IV 12 disp. Measurements:

	I	II	III	IV
F	1.75	1.58	1.79	2.29
P	0.87	0.83	1.08	0.88
T	0.83	0.79	1.08	1.29
Mt	0.83	0.83	1.46	1.75
t	0.68	0.67	1.00	0.96
Tot	4.96	4.71	6.42	7.17



Figs. 296–301. *Psammoduon deserticola.* **296.** Female carapace, lateral view. **297.** Female carapace, frontal view (hairs omitted on left chelicera). **298.** Sternum, labium, and endites. **299.** Male palp, lateral view. **300.** Male palp, ventral view. **301.** Epigyne, ventral view.

Palp (figs. 299, 300): Lateral apophysis broad; tip slightly bifid, both prongs rounded; dorsal apophysis short, blunt at tip; embolus short, broad, slightly indented and grooved at tip. Tegular apophysis broad, curved outward, with sharp tip.

Female (range between parentheses): Total length 7.49 (7.41–9.57); carapace 3.75 (3.16–4.08) long, 2.68 (2.16–3.00) wide.

Color as in male; dorsum sometimes with faint gray pattern of 2 short longitudinal stripes in middle followed by small transversal patch.

Further as male.

Epigyne (fig. 301): With central concavity; relatively narrow lip in front; posterior rim usually procurved, but sometimes sinuous, rarely recurved.

OTHER MATERIAL EXAMINED: Data in Jocqué (in prep.).

DISTRIBUTION: West coast of South Africa and Namibia.

PSAMMORYGMA, NEW GENUS

TYPE SPECIES: *Psammorygma caligata,* new species.

DIAGNOSIS: Recognized by the knoblike proximal extension of the cheliceral fang and by the double row of dorsal spines on P III and IV (in females sometimes also on T III and IV); males have a distally, dorsoventrally widened tegulum with membranous edge.

ETYMOLOGY: *psammon* (gr.: sand) and *orugma* (gr.: mine) refer to the habit of living in tunnels in sand; the gender is feminine.

DESCRIPTION: Large spiders (9.00–21.00) with smooth teguments, roughened in thoracic area in males. Carapace widest between coxae II and III, narrowed to 0.75 maximum width in females, to about 0.60 maximum width in males. Profile strongly raised in cephalic area, highest point just behind PME. Fovea in deep impression.

Color: Carapace, chelicerae, and sternum brightly colored, red or orange; legs dark, sometimes with colored ring on femora. Abdomen dark gray with pale pattern on dorsum.

Eyes in three rows. PER slightly procurved. All eyes circular, only AME dark. AME slightly less than their diameter apart, about 1 diameter from ALE, which are almost as large. PME twice their diameter apart, at 3.5 diameters from PLE, of same size. MOQ an elongate quadrangle about 1.3 times longer than wide. Clypeus slightly convex; height up to 7 times width of ALE; with many hairs.

Chilum double: 2 sclerites about 3 times as wide as high, each with 4 to 8 hairs. Chelicerae rather short; densely haired in front; without marginal teeth; fangs short, straight or slightly recurved, proximally with external toothlike knob. Labium strongly narrowed at base; haired. Endites short, broad, with broadened base, haired and with anteromesal scopula. Sternum rounded; thinly haired; with 4 pairs of narrow precoxal sclerites.

Legs: Formula 4312; t I and II slightly widened toward extremity t III and IV fusiform. Spination: with long spiniform bristles on T and Mt I and II; with more numerous but shorter spines on T and Mt III and IV. T and P of posterior pairs with double row of short dorsal spines, in males similar double row on P only. Tarsal scopula spiniform, more strongly developed on III and IV. Three tarsal claws. Paired claws blunt; with approximately 8 teeth. Trichobothria in 2 rows on T and Mt, in 1 row on t.

Abdomen oval; muscle points faint, gray. Tracheal spiracle narrow, rather far from spinnerets: about ¼ to ⅓ the distance between spinnerets and epigastric furrow. AS conical, long; PS much shorter; in females with one large spigot, without spigots in males; MS very short, with 3 large spigots in females, without in males. Colulus represented by broad, haired field.

Male palp: Tibia with short lateral apophysis; tegulum with proximal knob; distally strongly enlarged in dorsoventral direction, distal edge of this extension membranous. Embolus slender, originating on posterior part of tegulum, running on ventral side of that sclerite, ending against tegular extension, which serves as conductor.

Epigyne: Wide, slightly bulging, sclerotized field with membranous central area near posterior margin.

Female palp with relatively long, conical, ventrally slightly flattened tarsus. Spines on mesal and ventral sides.

OTHER SPECIES INCLUDED: *Cydrela rutilans* Simon (holotype female in MNHN, examined), *Tristichops aculeatus* Karsch (type series, 3♀ in ZMB, examined).

Note: The type species of *Tristichops* Taczanowski is *T. coerulescens* Taczanowski from Guyana. As the types are not available it is impossible to check whether *Psammorygma* and *Tristichops* are synonyms. None of the important characters are mentioned in the original description (Taczanowski, 1873).

DISTRIBUTION: Cape region, Namib desert, Kalahari desert.

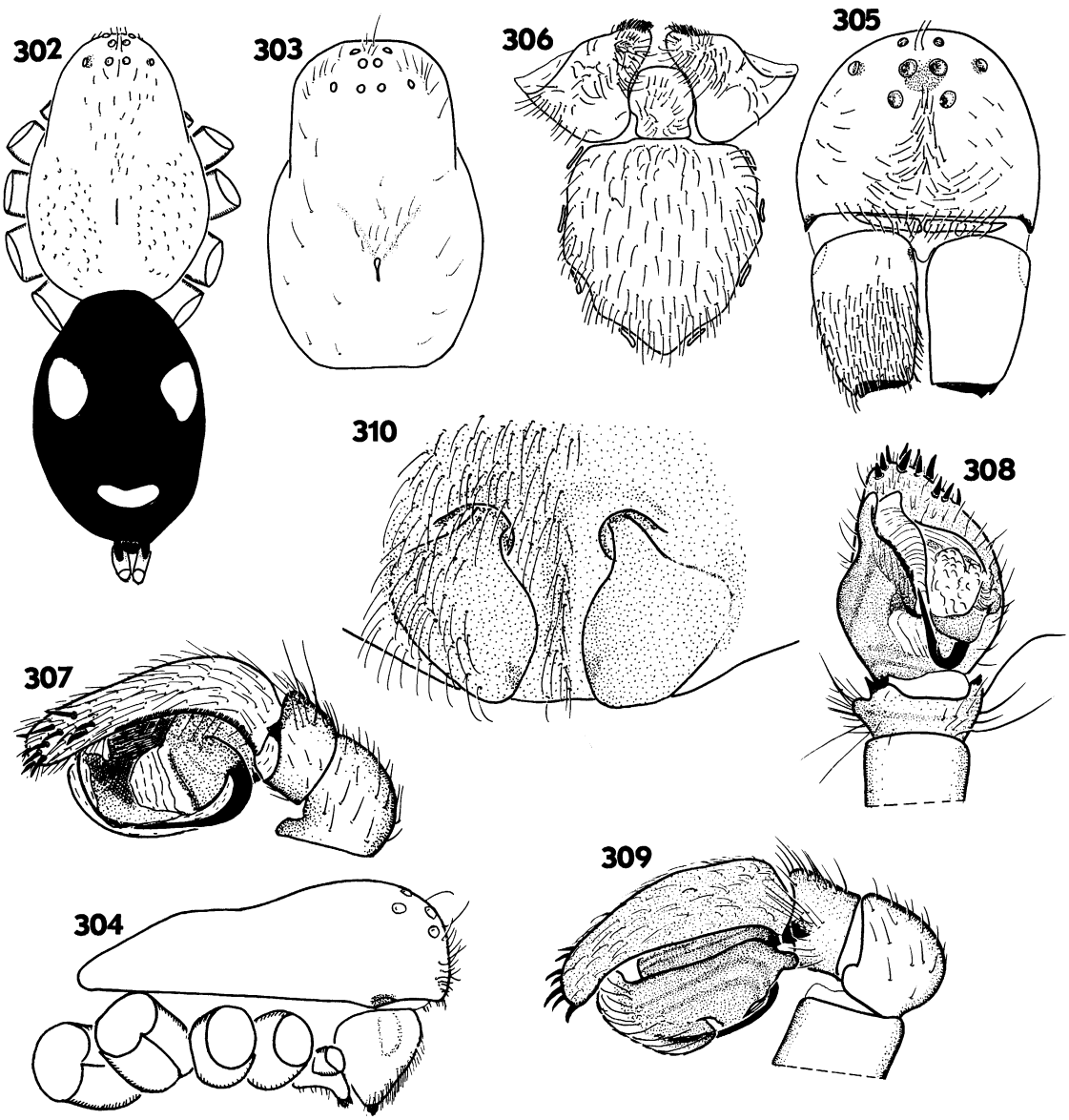
Psammorygma caligata, new species
Figures 302–310

TYPE MATERIAL: Male holotype: Namibia, Namib desert, 6 mi SSE Gobabeb, dug from tunnels in sand near gravel; 24.VI.1977, R. Buskirk (MCZ).

Paratypes: 1♀, 2 juv.: together with Ht.

ETYMOLOGY: *caligata* (Latin for booted) refers to the black extremities of the legs.

DIAGNOSIS: Males of this species are easily recognized by the three large white spots on



Figs. 302–310. *Psammorygma caligata.* **302.** Male habitus, dorsal view. **303.** Female carapace, dorsal view. **304.** Male carapace, lateral view. **305.** Male carapace, frontal view (hairs omitted on left chelicera). **306.** Sternum, labium, and endites. **307.** Male palp, lateral view. **308.** Male palp, ventral view. **309.** Right male palp, mesal view. **310.** Epigyne, ventral view.

the dorsum of the abdomen; the female has an epigyne with a large "wing" on either side.

DESCRIPTION: *Male:* Total length 9.66; carapace 5.16 long, 3.50 wide.

Color: Carapace and sternum uniform bright orange; chelicerae orange; legs: coxae yellowish orange with dark brown patch near extremity; trochanters dark brown; femora I dark brown with small lateral orange patch near base; femora II with one-third, III with half, IV with two-thirds of length from base orange; remainder dark brown. Tarsi medium brown; abdomen dark gray with 3 white patches on dorsum: 1 on each side in middle,

1 median in posterior half. AS pale orange, PS black.

Carapace smooth in cephalic area, which is raised in respect to thoracic area; with some short black dispersed hairs.

Eyes: a: 1.00 (0.17); b: 1.06; c: 0.87; d: 1.06; e: 0.87; f: 1.00; g: 1.31; h: 2.37. MOQ: AW = PW; AW = 0.75 L. Clypeus 1.02 high, slightly convex; with many hairs in middle and along inferior margin, but not in dense cluster.

Chilum double: each sclerite 0.52 wide; 0.17 high.

Legs: Tarsi I and II strongly tapering from tip to base; t I and II with poorly, t III and IV with strongly developed scopulae interspersed with short spines on t III and IV, which are fusiform. Spination: femora I d4*pl1 II d4*pl1 III d4*rl1 IV d4*rl1; patellae I pl2 II pl3 III d8,14** IV d6,14**rl1; tibiae I pl3*v6rl3* II pl3*v7rl3* III pl5*d*rl3* IV pl*d6*rl3*; metatarsi I pl3*v6 II pl5v10 III pl4d4rl3v12 IV pl4d2rl4v10. Measurements:

	I	II	III	IV
F	3.17	3.12	3.29	4.04
P	1.21	1.29	1.42	1.54
T	2.46	2.25	2.29	2.83
Mt	2.83	2.96	3.38	4.25
t	1.67	1.62	1.63	2.00
Tot	11.34	11.26	12.01	14.67

Male palp (figs. 307–309): Lateral tibial apophysis small and pointed, directed downward. Median apophysis small, pointing forward. Tegulum strongly widened in front.

Female: Total length 13.74; carapace 6.33 long, 4.23 wide.

Color as in male, but less orange on femora, abdomen uniform dark gray; posterior spinnerets brown.

Eyes as in male.

Legs: Spination: femora I d4*pl1 II d4* III d4*rl1 IV d4*rl1; patellae I pl2 II pl9 III pl19d13**rl2 IV pl22d15**rl2; tibiae I pl4v1-1-2 II pl4v1-1-2 III pl6d7, 7**v2-2 IV pl6d7, 7**v2-2; metatarsi I v14 II v13 III pl5d6v12 IV pl5d2rl5v14. Measurements:

	I	II	III	IV
F	3.83	3.87	3.96	5.13
P	1.58	1.75	1.71	1.88
T	2.92	2.54	2.21	3.04
Mt	3.12	3.04	3.75	4.87
t	1.75	1.75	1.88	2.29
Tot	13.22	12.97	13.51	17.22

Epigyne: Figure 310.

Juveniles: Both juveniles in type material have same abdominal pattern of male.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

ZODARIINAE SIMON

TYPE GENUS: *Zodarion* Walckenaer.

The Zodariinae are recognized by the presence of a femoral gland (lacking in a few *Zodarion* spp.), the reduction of the leg spination and the absence of hinged hairs, the presence of flattened indented hairs on the legs, the absence of a chilum and the fused chelicerae (except *Suffasia*), and the AS on a common base (except *Trygetus* and *Heradida*).

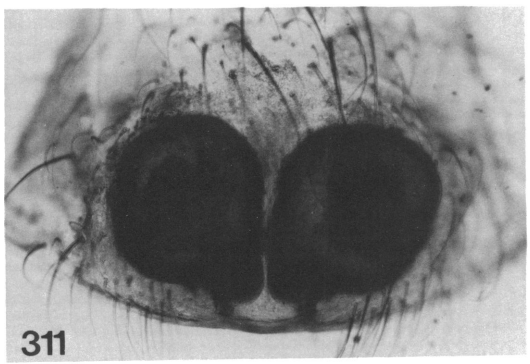
They are the most apomorphic members of the family. Most are compulsory ant-eaters. They do not burrow, but construct an igloo-shaped retreat. However, I observed *Zodarion nigriceps,* which normally constructs a pebble-covered retreat, digging into loose sand and constructing a silk-lined retreat there.

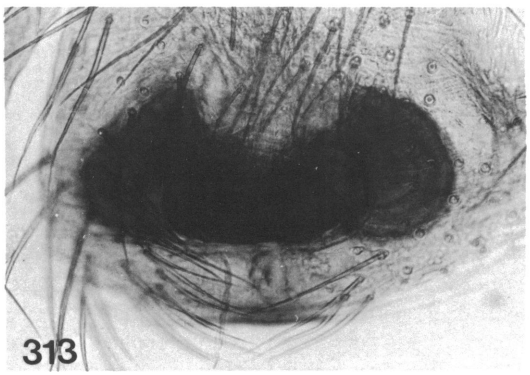
ACANTHINOZODIUM DENIS

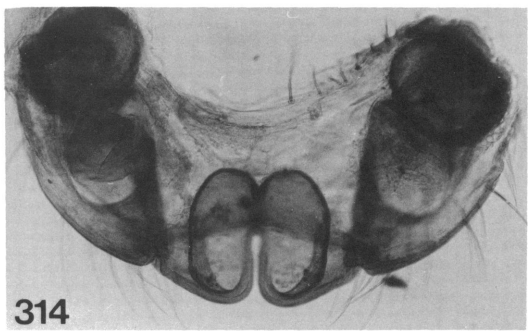
Acanthinozodium Denis, 1952: 58 (descr. new genus); 1966: 120. Brignoli, 1983: 209. Ono and Jocqué, 1986: 8. Jocqué, 1987a: 143. Bosmans, 1988: 4.

Zodariellum Andreeva and Tyschchenko, 1968: 88 (descr. new genus) (NEW SYNONYMY) (type specimen of *Zodariellum surprisum* not available; in personal collection of Andreeva [Proszynski, personal commun.]).

TYPE SPECIES: *A. cirrisulcatum* Denis, 1952, here designated (not *A. spinulosum* as erroneously mentioned by Brignoli, 1983, and Ono and Jocqué, 1986). *Acanthinozodium cirrisulcatum* has page priority over the other species of the genus described in the paper that diagnoses the genus for the first time. However, the "original" description Denis intended to give was published in 1966, a paper which actually was dated 1964; Brignoli (1983), and with him Ono and Jocqué (1986), were wrong in stating that this description was never published. Denis (1952: 58) clearly stated that it was "une araignée du Fezzan," he intended to describe as the type of *Acanthinozodium.* In his paper "Les araignées du Fezzan," which is clearly the







Figs. 311–314. Cleared epigynes, dorsal view. **311.** *Psammorygma aculeata.* **312.** *Capheris maculata.* **313.** *Cydrela schoemanae.* **314.** *Zodarion kabylianum.*

study that was greatly delayed (Denis, 1966: 119), it is apparent that he realized that *A. spinulosum* cannot be the type of the genus as intended. Unfortunately he did not state which one of the initial three, described in his paper of 1952, he preferred. *Acanthinozodium cirrisulcatum* seems the logical choice. The whereabouts of the Ht are unknown, but possibly still in MNHN.

DIAGNOSIS: Representatives of this genus are very similar to those of *Zodarion,* but can be recognized by the absence of a dense cover of flattened incised hairs on the femora, the presence of more than one dorsal spine on F I and II, and the strongly narrowed cephalic part of the carapace (narrowed to less than 0.58 times maximum width in females, less than 0.55 maximum width in males; measured at the posterior tangent of the PLE).

Note: The diagnostic characters of this genus are in fact plesiomorphies. *Acanthinozodium* might be regarded as paraphyletic with *Zodarion* and could be synonymized with that genus. The generic revision of these genera, which is underway (Bosmans, in prep.) might clear this situation.

DESCRIPTION: Medium-size spiders (3.5–6.5 total length). Carapace yellowish brown to dark brown with darker pattern. Chelicerae yellow, orange, or dark brown with darker margins. Legs uniform yellowish brown or femora darker, then sometimes with longitudinal stripes. Abdomen uniform dark gray with faint paler pattern; sides and venter paler; males with narrow brown dorsal scutum in anterior half.

Carapace smooth, oval, short, widest between coxae II and III; strongly narrowed in front to less than 0.58 times maximum width in females, to less than 0.55 maximum width in males (cephalic width measured on posterior tangent of PME).

Eyes in 2 rows; posterior one strongly procurved; anterior row only slightly so. AME large, dark, circular; remainder small, light; PME oval. AME less than their radius apart, close to ALE. PME 2 to 3 times their diameter apart, at about 1 diameter from PLE.

MOQ wider than long; anterior width almost equal to posterior width. Clypeus strongly convex; about as high as 1.5 times diameter of AME.

Chilum absent. Chelicerae fused at base on ventral side, with strong setae on dorsal side; with distal cusp bearing tooth; intercheliceral triangle small or absent. Fang shorter than wide at base. Endites strongly convergent, roughly rectangular. Labium triangular with narrowed base. Sternum slightly longer than wide; basically triangular with rounded sides, provided with triangular extensions fitting in coxal concavities.

Legs slender. Formula 4123 or 4132. Spination: F I and II with 2 or 3 dorsal spines, F III and IV with fewer spines. Some ventral spines on T and Mt difficult to distinguish from coarse hairs. Incised hairs not dense or almost absent; usually denser on posterior legs; sometimes few on distal part of femora. Tarsi with 2 or 3 claws; paired ones with lateral teeth. Trichobothria in 2 rows on T, in 1 row on Mt and t. Femoral organ with barbed hairs, poorly developed.

Abdomen oval; in male with narrow dorsal scutum in anterior half. Tracheal spiracle wide (0.3 to 0.5 times width of abdomen), procurved; anterior margin strongly sclerotized, provided with 1 to 3 rows of spiniform setae. Female with 6 spinnerets, male with 2. AS long, conical, biarticulate, on broad base. PS and MS small. Colulus represented by broad, haired field.

Male palp: Rather variable but always with retinaculum (= tegular apophysis attached to tegulum with membrane and hence moveable). Embolus long, thin, describing half loop (*A. buettikeri* Ono and Jocqué, *A. sungar,* new species) or short, straight (*A. sericeum* Denis, *A. sahariense* Denis).

Female palp: Tarsus conical; finely toothed claw turned inward over 90° so that teeth point inward.

Epigyne: Rather variable, relatively complex; females, corresponding with males with long embolus, assumed to have wound spermathecae.

OTHER SPECIES INCLUDED: *A. sericeum* Denis (Ht examined); *A. sahariense* Denis (Ht examined); *A. buettikeri* Ono and Jocqué; *A. sungar,* new species, *A. tibesti,* new species.

NOT EXAMINED: *A. cirrisulcatum, A. c. longispina* Denis, *A. spinulosum* Denis, *A. subclavatum* Denis.

MISPLACED SPECIES: *A. bicoloripes* Denis (Ht examined) (belongs in *Zodarion*).

DISTRIBUTION: Arid and semiarid areas of the Palearctic and Paleotropic regions, furthest eastern locality from Mongolia (undescribed species).

Acanthinozodium tibesti, new species
Figures 315–318

TYPE MATERIAL: Holotype female: Tchad, massif du Tibesti, VII–X.1956, Y. Brandily (MRAC 133011).

DIAGNOSIS: The female is easily recognized by the shape of the epigyne and by the contrasting U-shaped pale posterior part of the thoracic area.

ETYMOLOGY: The name is a noun in apposition taken from the type locality.

DESCRIPTION: *Female:* Total length 3.74, carapace 3.33 long, 2.71 wide; ocular area 1.21 wide.

Color: Carapace medium brown in cephalic area and anterior half of thoracic area, suffused with black reticulations; posterior part of thoracic area forming broad "U", yellow. Chelicerae pale brown, sternum and legs uniform yellow. Abdomen dark gray on dorsum and sides.

Carapace: Figures 315–317.

Eyes: a: 1.00 (0.17); b: 0.57; c: 0.51; d: 0.34; e: 0.44; f: 0.00; g: 0.77; h: 0.11. MOQ: AW = 1.02 PW; AW = 1.28 L.

Legs: Spination: femora I d1-1-1pl1 II d1-1 III d1-1 IV d1. Incised hairs quite dense, also on distal parts of femora. Tarsi with only 2 claws. Measurements:

	I	II	III	IV
F	1.73	1.69	1.69	2.24
P	0.52	0.52	0.56	0.58
T	1.41	1.27	1.31	1.92
Mt	1.78	1.82	1.94	2.34
t	1.07	0.99	0.81	0.83
Tot	6.52	6.30	6.32	7.92

Epigyne: Figure 319.

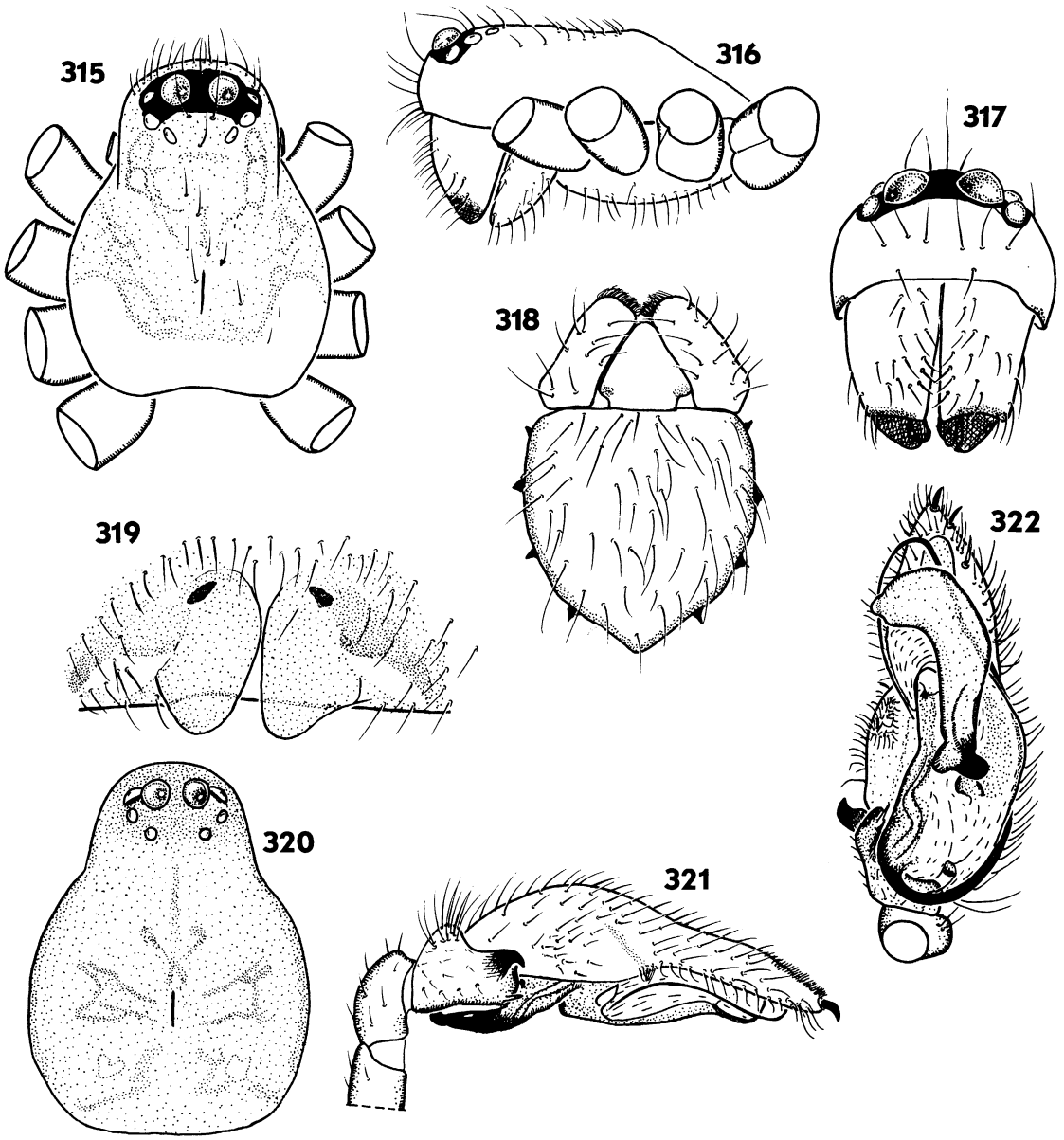
Male: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only know from the type locality.

Acanthinozodium sungar, new species
Figures 320–322

TYPE MATERIAL: Holotype male: Iraq, Sungar, VIII.1986 (NHRB 26).



Figs. 315–322. 315–319. *Acanthinozodium tibesti.* **315.** Female carapace, dorsal view. **316.** Female carapace, lateral view. **317.** Female carapace, frontal view. **318.** Sternum, labium, and endites. **319.** Epigyne, ventral view. 320–322. *Acanthinozodium sungar.* **320.** Male carapace, dorsal view. **321.** Male palp, lateral view. **322.** Male palp, ventral view.

DIAGNOSIS: The male is easily recognized by the long retinaculum and the details of the apophyses on the palpal tibia, especially the hook-shaped dorsolateral one without the small inferior tooth, as in *A. buettikeri* Ono and Jocqué.

ETYMOLOGY: The name is a noun in apposition taken from the type locality.

DESCRIPTION: *Male:* Total length 3.75; carapace 1.87 long, 1.42 wide; ocular area 0.50 wide.

Color: Carapace dark brown suffused with darker pattern (fig. 320). Chelicerae and sternum brown; legs yellow, except F brown. Abdomen dark gray on dorsum with narrow dark brown scutum in anterior half.

Carapace strongly narrowed in front to 0.52 maximum width.

Eyes: a: 1.00 (0.15); b: 0.64; c: 0.42; d: 0.45; e: 0.32; f: 0.00; g: 1.35; h: 0.32. MOQ: AW = 1.06 PW; AW = 1.20 L.

Legs: Spination: femora I d1-1-1pl1 II d1-1 III d1-1 IV d1. Legs with numerous long hairs; incised hairs scarce, mainly on T, Mt, and P III and IV. 3 tarsal claws. Femoral gland with 5 modified hairs on I and II. Measurements:

	I	II	III	IV
F	2.00	1.76	1.82	2.34
P	0.61	0.50	0.61	0.64
T	1.86	1.47	1.41	2.14
Mt	2.32	2.00	2.24	2.82
t	1.23	0.97	0.97	0.99
Tot	8.02	6.70	7.05	8.95

Male palp: Figures 321, 322. With remarkably long retinaculum.

Female: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

AKYTTARA JOCQUÉ

Akyttara Jocqué, 1987a: 150 (descr. new genus); 1988a: 110. Jocqué and Billen, 1987: 166, fig. 11.

DIAGNOSIS: Small Zodariinae with abdomen higher in back than in front; femoral organ with canaliculated-barbed hairs.

DESCRIPTION: See Jocqué, 1987a: 150.

TYPE SPECIES: *Akyttara akagera* Jocqué, 1987.

OTHER SPECIES INCLUDED: *A. mahnerti* Jocqué, *A. ritchiei* Jocqué, and *A. homunculus,* new species.

DISTRIBUTION: Africa, south of central forest block.

Akyttara homunculus, new species
Figures 323–325

TYPE MATERIAL: Holotype: Botswana, Okavango, Boro River, ILB B47, 1–9.XI.1977 (BMNH).

DIAGNOSIS: The female of this species is recognized by the large eyes, the abdominal pattern, and the presence of a stridulating organ between abdomen and carapace.

ETYMOLOGY: The species name is a noun in apposition referring to the dorsal abdominal pattern.

DESCRIPTION: *Female:* Total length 2.04; carapace 0.80 long, 0.59 wide.

Color: Carapace brownish yellow with heart-shaped darker pattern in thoracic area; chelicerae, sternum, and legs yellow. Abdomen with pale sepia dorsal scutum with dark pattern in shape of "little man"; sides and venter pale gray; area in front of epigyne, booklung opercula, narrow band behind the epigastric furrow, and broader band in front of spinnerets, all slightly sclerotized, brownish yellow.

Carapace: Figures 323, 324. Posteriorly with some transverse ridges, corresponding with warts on anterior part of abdomen thus forming possible stridulating organ.

Eyes: a: 1.00 (0.08); b: 0.62; c: 0.69; d: 0.62; e: 0.50; f: 0.25; g: 1.25; h: 0.37; i: 0.12. MOQ: AW = 0.95 PW; AW = 1.18 L.

Legs: Femur markedly dilated in proximal half. Long trichobothria present but difficult to see.

Epigyne: Figure 325.

Male: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

DIORES SIMON

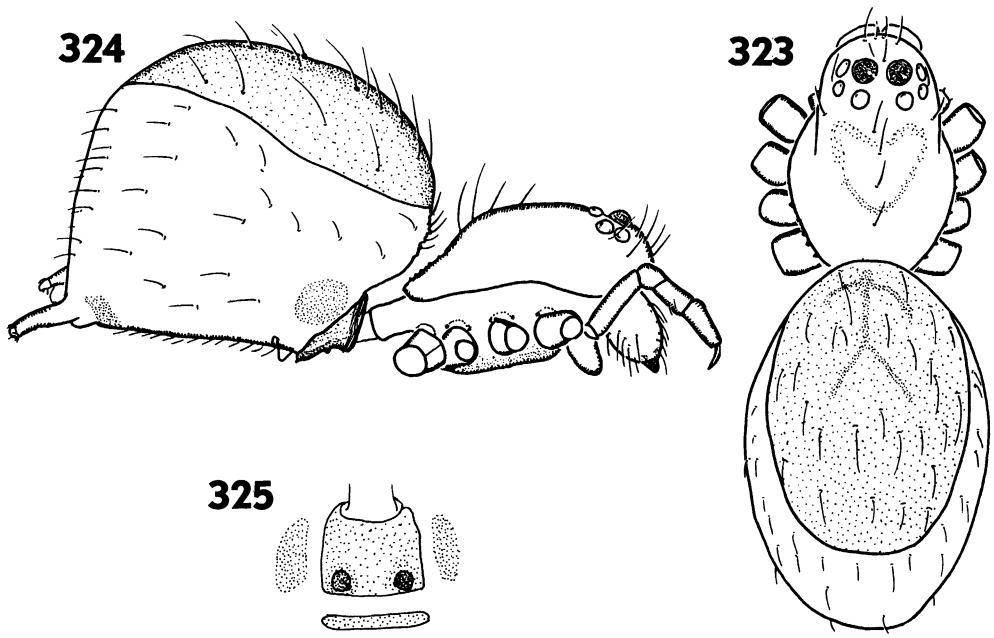
Diores Simon, 1893b: 436 (descr. new genus). Jocqué, 1986a 307; 1987a: 143.

TYPE SPECIES: *Diores bivittatus* Simon 1893b, by original designation.

DIAGNOSIS: Recognized by the sternum, which is longer than wide and by the legs provided with spines and spinules; the male palp has a rigidly attached tegular apophysis, consisting of a main piece and a pointer.

DESCRIPTION: Medium-size spiders (3.0–8.0) with oval carapace, widest between coxae II and III; narrowed in front to about 0.65 times maximum width in females, to 0.5 times maximum width in males. Tegument smooth, fovea obvious.

Color: Carapace yellow to pale brown; chelicerae, legs, and sternum yellowish; abdomen with pale pattern on pale to dark sepia background or the reverse; male usually with pale brown to dark sepia dorsal scutum in anterior half, overlying the dorsal pattern.



Figs. 323–325. *Akyttara homunculus*. **323.** Female habitus, dorsal view. **324.** Female habitus, lateral view. **325.** Epigyne, ventral view.

Eyes in two procurved rows. AME dark, circular, always the largest, although relative size may vary considerably. Other eyes circular, pale. PLE usually 0.65 times diameter of ALE. MOQ approximately as wide in front as behind; wider than long. Clypeus almost straight, about 3 times as high as diameter of ALE; with few tiny setae.

Chilum absent. Chelicerae short, broad, fused at base; with lateral condyle; usually with dense cover of setae in distal part, setae stronger toward mesal side; with distomesal cusp bearing tooth and 2 strong setae; fangs very short, thick. Endites converging; with distomesal scopula. Labium broadly rounded in front. Sternum longer than wide (L/W = ±0.8), with sharp, triangular lateral extensions corresponding with coxal concavities.

Legs: Formula 4123. Provided with some spines and spinules (difference between these types of setae often difficult to see). Legs I and II with fewer spines and spinules than legs III and IV. No claw tufts, no scopulae, no hinged hairs. Usually 3 tarsal claws, some species have only 2; paired claws with 4 to 8 teeth. Trichobothria in 2 rows on T, in 1 row on Mt and t. Femoral organ well developed: with a patch of up to 15 barbed hairs (Jocqué and Billen, 1987; Jocqué, 1988a).

Abdomen oval. In males with narrow dorsal scutum in anterior half. Six spinnerets in females; AS well developed, biarticulate; PS and MS very small, lacking in males. Tracheal spiracle narrow, fairly close to spinnerets or relatively wide; then further away from spinnerets.

Male palp: Cymbium with mesal row of modified hairs and dorsal patch of chemoreceptors. Tibia with lateral apophysis; in some species patella and/or femur with apophysis. Embolus originating on posterior end of tegulum; clearly composed of 2 parts: proximal main piece and lateral pointer, which is very variable in shape.

Epigynes very variable; usually with wound spermathecae; relatively simple copulatory ducts. Members of *triarmatus* group with pair of large glandular organs between spermathecae.

OTHER SPECIES INCLUDED: 28 nominal species and some 25 new to be described (Jocqué, in prep.).

DISTRIBUTION: Africa south of the central forest area.

Diores bivittatus Simon
Figures 326–330

Diores bivittatus Simon, 1893b: 436 (descr. ♀); 910: 186 (key). Hewitt, 1919: 105 (descr. ♀) (identification suspect, specimen not available).

TYPE MATERIAL: Holotype female: South Africa, Cape Province, Stellenbosch (MNHN 3283) (examined).

DIAGNOSIS: Females of this species are recognized by the high number of patellar spinules, a character shared with *D. spinulosus,* and the shape of the epigyne, in which the posterior margin of the central concavity is procurved (not recurved as in *D. spinulosus*). Female palp with numerous (12) mesal spines.

Female: Total length 4.92; carapace 2.29 long, 1.41 wide.

Color: Carapace and chelicerae yellowish orange; sternum and legs pale yellow. Abdomen pale cream with 2 longitudinal black bands on dorsum (fig. 326); remainder pale.

Eyes: a: 1.00 (0.14); b: 0.83; c: 0.62; d: 0.69; e: 0.69; f: 0.21; g: 1.38; h: 1.62; i: 0.24. MOQ: AW = 1.02 PW; AW = 1.30 L.

Legs: Spination: femora I d1-1 II d1-1+2spul III d1-1+4spul IV d1-1+3spul; patellae I-II 6spul III 16spul IV 13spul; tibiae I v1-2 II v1-1-2 III pl1d7spulv1-2-2 IV 12 disp.; metatarsi I dw5 II dw5 III 13 disp. IV 15 disp. Measurements:

	I	II	III	IV
F	2.17	2.04	1.83	2.87
P	1.88	0.62	0.71	0.87
T	0.67	1.37	1.33	2.29
Mt	2.21	2.00	2.04	2.92
t	1.46	1.17	0.96	1.17
Tot	8.38	7.21	6.88	10.13

2 tarsal claws only.

Palp with numerous mesal spines: F: 1, P: 1, T: 2, t: 8.

Epigyne: Figure 330.

Male: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: South Africa, southern Cape Province.

Diores cognatus O. P.-Cambridge
Figures 331, 332

Diores cognatus: O. P.-Cambridge, 1903: 149 (descr. ♀); Simon, 1910: 185 (key).

TYPE MATERIAL: Lectotype male (here designated): South Africa, Cape Peninsula (UMO 1715) (examined).

DIAGNOSIS: Males of this species are recognized by the tibial apophyses of the palp which are equal in length, the superior one pointed, the inferior one rounded.

DESCRIPTION: *Male:* Total length 3.38; carapace 1.61 long, 1.22 wide.

Color: Carapace and chelicerae grayish yellow; sternum and legs pale yellow; abdomen with pale brown scutum on darkened dorsum; remainder of abdomen cream.

Eyes: a: 1.00 (0.09); b: 0.88; c: 0.72; d: 0.66; e: 0.55; f: 0.22; g: 0.77; h: 0.55. MOQ: AW = PW; AW = 1.10 L. Clypeus 0.27 high or 2.3 times diameter of ALE.

Chelicerae 0.52 long; with few mesofrontal bristles (±5).

Legs: Spination: femora I d1-1 II d1-1 III d1-1 IV d1-1; patellae I-II-III d3spul IV d1spul; tibiae I v2-1-2-2 II v2-2-1-2-2 III d4spulv2-2-2 IV d3spulv2-1-2-2-1; metatarsi I-II v2-2-2 III 12 disp. IV 12 disp. Measurements:

	I	II	III	IV
F	1.30	1.22	1.09	1.59
P	0.52	0.48	0.55	0.52
T	1.14	0.94	0.81	1.30
Mt	1.20	1.09	1.11	1.74
t	0.88	0.71	0.58	0.86
Tot	5.04	4.44	4.14	6.01

Male palp (figs. 331, 332): Tibia with 2 long lateral apophyses of equal length; dorsal one pointed, base of dorsal margin swollen; ventral one rounded at tip; pointer of tegular apophysis with 2 excrescences, both distal and proximal ones pointing laterad, with sharp tip.

Abdomen: Length of dorsal scutum 0.75 times length of abdomen, width of scutum 0.66 times width of abdomen; without sclerified areas on venter.

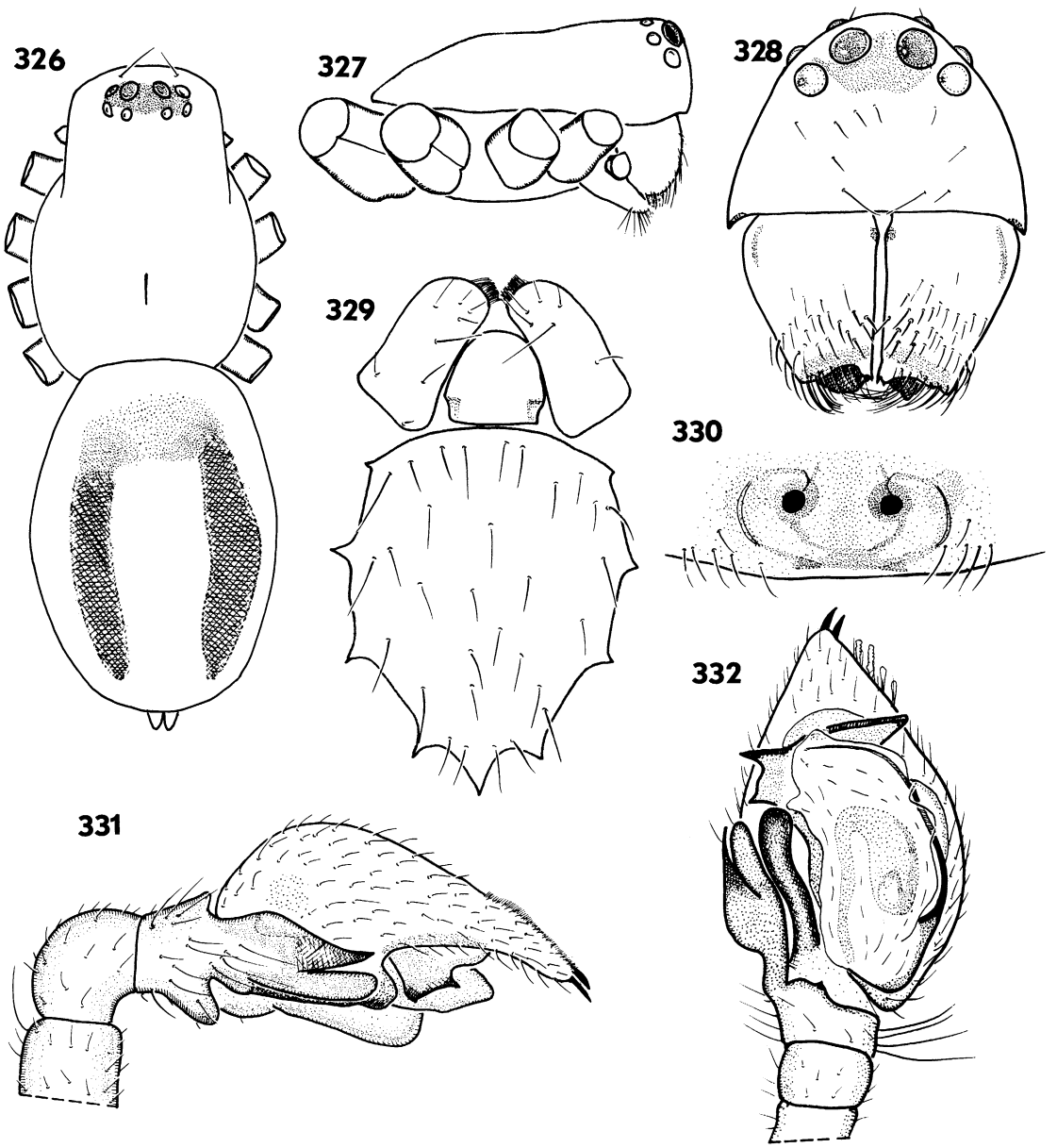
Female: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

DUSMADIORES JOCQUÉ

This genus was described by Jocqué (1987a) following a format that is comparable to that used here.



Figs. 326–332. 326–330. *Diores bivittatus*. **326.** Female habitus, dorsal view. **327.** Female carapace, lateral view. **328.** Female carapace, frontal view. **329.** Sternum, labium, and endites. **330.** Epigyne, ventral view. 331–332. *Diores cognatus*. **331.** Male palp, lateral view. **332.** Male palp, ventral view.

TYPE SPECIES: *Dusmadiores katelijnae* Jocqué.

DIAGNOSIS: Recognized by the femoral organ with grooved hairs in a shallow alveolus, and the conformation of the male palpus with strongly converging lateral tibial apophysis and tegular apophysis. Females have widely separated spermathecae.

OTHER SPECIES INCLUDED: *Dusmadiores robanja* Jocqué, *D. doubeni* Jocqué; many undescribed species.

DISTRIBUTION: Tropical Africa.

HERADIDA SIMON

Heradida Simon, 1893b: 438 (descr. new genus). Jocqué, 1987a: 144; 1988a: 110, fig. 11. Jocqué and Billen, 1987: 166, fig. 12.

TYPE SPECIES: *Heradida loricata* Simon.

DIAGNOSIS: Easily recognized by the femoral organ with one club-shaped hair in a deep alveolus and the peculiar cymbial structure in the male.

DESCRIPTION: See Jocqué, 1987a: 144.

OTHER SPECIES INCLUDED: See Jocqué, 1987a: 145.

DISTRIBUTION: South Africa, Namibia, Botswana.

In Jocqué's revision of 1987, the types of *H. bicincta* Simon had not been examined. In the mean time they have been traced and the description is given hereunder.

Heradida bicincta Simon
Figure 333

Heradida bicincta Simon, 1910: 187 (descr. ♀). Jocqué, 1987a: 145.

TYPE MATERIAL: Holotype female: South Africa, Little Namaqualand, Steinkopf, 1906, L. Schulze (ZMB, examined).

DIAGNOSIS: *Heradida bicincta* is the smallest representative of the genus so far known; it has very closely set eyes and a short MOQ (AW = 0.92 L). The dorsal scutum has 2 light transverse bands. By these features it is clearly different from *H. griffinae* Jocqué, with which it was supposed to be closely related.

DESCRIPTION: *Female:* Total length 1.37; carapace 0.60 long, 0.44 wide.

Color: Carapace, chelicerae, and sternum pale orange brown; legs yellow; abdomen: dorsum sepia with transverse pale band in middle, second band just in front of spinnerets. Sides and venter pale.

Eyes: a: 1.00 (0.05); b, c, d: 0.70; e: 0.40; f: 0.00; g: 1.00; h: 0.00; i: 0.00. MOQ: AW = PW; AW = 0.92 L.

Legs: No spines. Measurements:

	I	II	III	IV
F	0.38	0.34	0.30	0.40
P	0.16	0.18	0.12	0.18
T	0.28	0.24	0.24	lost
Mt	0.24	0.22	0.20	lost
t	0.28	0.24	0.24	lost
Tot	1.35	1.23	1.11	?

Epigyne: Figure 333.

Male: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

MALLINUS SIMON

Mallinus Simon, 1893b: 436 (descr. new genus).

TYPE SPECIES: *Mallinus nitidiventris* Simon.

DIAGNOSIS: Recognized by the very high, globular abdomen and by the broad cephalic area.

DESCRIPTION: Small spiders (±2.5 mm) with broadly oval carapace, widest between coxae II and III, hardly narrowed in front (to 0.9 times maximum width). Thoracic area raised, profile reaching highest point just in front of fovea.

Color of carapace and chelicerae brownish; sternum paler; legs yellow to brown. Abdomen sepia.

Eyes in two procurved rows. All eyes circular; AME dark; remainder light; all small, subequal. AME slightly less than their diameter apart, at that distance from ALE. PME about 1.5 diameter apart, at that distance from PLE. MOQ slightly wider behind than in front, slightly longer than anterior width. Clypeus convex; about 5 times as high as diameter of ALE.

Sternum as long as wide, with one long hair in anterior corners.

Chelicerae sturdy; reticulated; with mesoproximal swelling; distal cusp apparently without tooth.

Legs: Formula 4123. No spines. Two tarsal claws with minute teeth. Femoral organ with barbed hairs.

Abdomen higher than long. With some modified hairs in front of tracheal spiracle.

OTHER SPECIES INCLUDED: None.

DISTRIBUTION: South Africa.

Mallinus nitidiventris Simon
Figures 334, 335

Mallinus nitidiventris Simon, 1893b: 436 (descr. sa ♂ and sa ♀, not ♂ and ♀ as mentioned in Roewer, 1942).

TYPE MATERIAL: Lectotype sa ♂ (here designated): South Africa, Cape Province, Matjiesfontein (33°15'S, 20°40'E) (label reads Matjerfontein) (MNHN AR 3280) (examined).

Paralectotype: 1 sa ♀, together with Lt.

DIAGNOSIS: See diagnosis of genus.

DESCRIPTION: *Subadult male:* Total length 2.10; carapace 1.04 long, 0.73 wide, narrowed to 0.65 in front.

Color: Carapace uniform orange brown, sternum yellow, chelicerae orange. Legs: femora, distal part of patellae, and proximal half of tibiae brown, remainder pale yellow. Abdomen sepia, darker on dorsum, with large white patch on sides; spinnerets pale.

Carapace rough, deeply but finely reticulated.

Eyes: a: 1.00 (0.04); b: 0.89; c: 0.78; d: 1.00; e: 0.89; f: 0.89; g: 1.55; h: 1.55; i: 0.67. MOQ: AW = 0.93 PW; AW = 0.81 L.

Legs: Measurements:

	I	IV
F	0.62	0.75
P	0.26	0.26
T	0.49	0.57
Mt	0.55	0.96
t	0.42	0.44
Tot	2.34	2.98

Hairs on legs broadly pectinate.

Palpus: Tarsus swollen, with pectinated claw.

Abdomen: 1.40 high, 1.14 long, 7 modified hairs in front of tracheal spiracle.

Subadult female: Total length 2.13; carapace 1.14 long, 0.73 wide, 0.65 in front.

Male and female unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

MASTIDIORES JOCQUÉ

This genus was described by Jocqué (1987a) following a format that is comparable to that used here.

TYPE SPECIES: *Mastidiores kora* Jocqué.

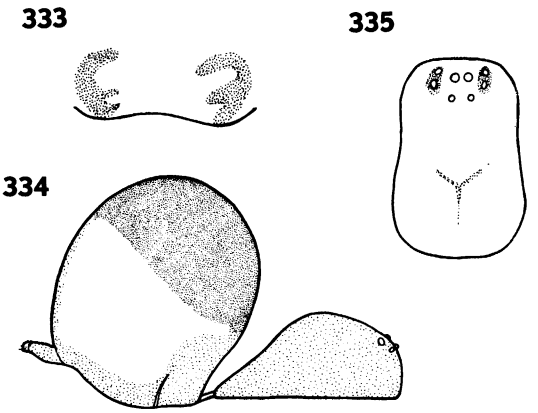
DIAGNOSIS: Recognized by the femoral organ with grooved hairs in a shallow alveolus, which it shares with *Dusmadiores,* and by the elongate male palp with very long embolus and tegular apophysis.

Remark: According to the cladistic analysis, *Mastidiores* must be regarded a paraphyletic taxon as no autapomorphy has been found for its sister group, *Dusmadiores.* These genera will probably be synonymized at the occasion of the description of the many species that wait to be studied.

DESCRIPTION: See Jocqué, 1987a.

OTHER SPECIES INCLUDED: See Remark above.

DISTRIBUTION: Tropical Africa.



Figs. 333–335. **333.** *Heradida bicincta.* Epigyne, ventral view. 334–335. *Mallinus nitidiventris.* **334.** Juvenile habitus, lateral view. **335.** Juvenile carapace, dorsal view.

MICRODIORES JOCQUÉ

This genus was described by Jocqué (1987a) following a format that is comparable to that used here.

TYPE SPECIES: *Microdiores chowo* Jocqué.

DIAGNOSIS: Recognized by the femoral organ with barbed hairs; females have an epigyne in which the spermathecae are close together; the copulatory ducts are thick-walled, large, and might be regarded as atria.

DESCRIPTION: see Jocqué 1987a.

OTHER SPECIES INCLUDED: Several undescribed.

DISTRIBUTION: East Africa.

PALAESTINA O. P.-CAMBRIDGE

Palaestina O. P.-Cambridge, 1872: 268 (descr. new genus). Simon, 1893b: 439. Jocqué, 1987a: 143.

TYPE SPECIES: *Palaestina expolita* O. P.-Cambridge.

DIAGNOSIS: Recognized by the presence of 2 to 5 coarse teeth on the anterior surface of the chelicerae.

DESCRIPTION: Small spiders (1.9–3.0). Carapace finely granulated, each granule with short pale hair; elongate, flat; widest at coxae II; narrowed in front to about 0.75 maximum width in males, to about 0.85 times maximum width in females. Fovea small, faint.

Color: Carapace and chelicerae medium to yellowish brown. Legs and sternum pale yellow. Abdomen with sepia dorsal scutum in males, pale to dark gray in females.

Eyes in 2 rows, both procurved. Eyes of AER larger than those of PER. AME circular, dark; other eyes circular, pale. PME the smallest. AME less than their diameter apart, at similar distance from ALE. PME 2 to 3 times their distance apart, about 1 diameter from PLE. MOQ: as long as frontal width, slightly wider behind than in front. Clypeus almost straight; height 2 to 3 times diameter of ALE.

Chilum absent. Chelicerae short, slightly longer than wide; anterior surface near distomesal margin with 2 to 5 coarse teeth. No marginal teeth but distal tubercle with 2 teeth. Fang very short and thick. Labium roughly triangular, distally wider in female than in male. Endites roughly rectangular, converging, with distomesal scopula. Sternum elongate (1.2 to 1.5 times longer than wide), with small triangular extensions corresponding with coxal concavities; not rebordered.

Legs: Formula 4123. No spines. Tarsi I and II slightly fusiform. Flattened incised hairs from femora onward. Femoral organ with 3 barbed hairs; without alveolus. No claw tufts or scopulae. Three claws; paired ones with 6 to 8 teeth.

Abdomen elongate (1.5 times to twice longer than wide): in males with dorsal scutum, more or less sclerified on venter but without tubular extension on petiolus. Two spinnerets on common base in male; 6 spinnerets in female: anterior pair biarticulate, on common base; posterior pairs in a recurved row. Colulus absent.

Male palp: Tibia with 2 lateral apophyses; distal spine on cymbium barbed; embolus implanted on anterior end of tegulum, short, corkscrew-shaped; tegular apophysis broad; membranous conductor present.

Female palp with finely dentate claw. Epigyne simple, with 2 widely separated spermathecae connected by copulatory ducts with communal opening.

OTHER SPECIES INCLUDED: *Palaestina dentifera* O. P.-Cambridge; *Palaestina smyrna,* new species.

DISTRIBUTION: Eastern Mediterranean.

Palaestina expolita O. P.-Cambridge
Figures 336–342

Palaestina expolita O. P.-Cambridge, 1872: 269 (descr. ♂♀). Simon, 1893b: 439. Roewer, 1928: 119.

TYPE MATERIAL: Lectotype male (here designated): Lebanon (UMO, T. 14).

Paralectotypes: 7♂, 2♀: together with lectotype.

DIAGNOSIS: Males are recognized by the shape of the palpal tibial apophyses: the dorsal one is not longer than the lateral one; the upper tip of the lateral one is strongly curved down and clearly longer than the lower tip. Females differ with those of *P. dentifera* mainly by the dorsal color pattern of the abdomen, which is here almost uniform and contrasted in the other species.

DESCRIPTION: *Male:* Total length 2.65; carapace 1.25 long, 0.75 wide.

Color: Carapace medium brown with darker pattern of fine lines. Chelicerae and sternum medium brown; legs brownish yellow; abdomen with dark sepia dorsal scutum; venter sclerified; brownish yellow in front, cream in posterior third.

Carapace (figs. 336–338): Elongate; roughened granules each with short pale hair; fovea short, faint.

Eyes: a: 1.00 (0.05); b: 1.20; c: 0.60; d: 1.00; e: 0.40; f: 0.20; g: 1.20; h: 0.80. MOQ: AW = 0.92 PW; AW = 1.05 L. Clypeus 0.11 high or 2.2 times diameter of ALE.

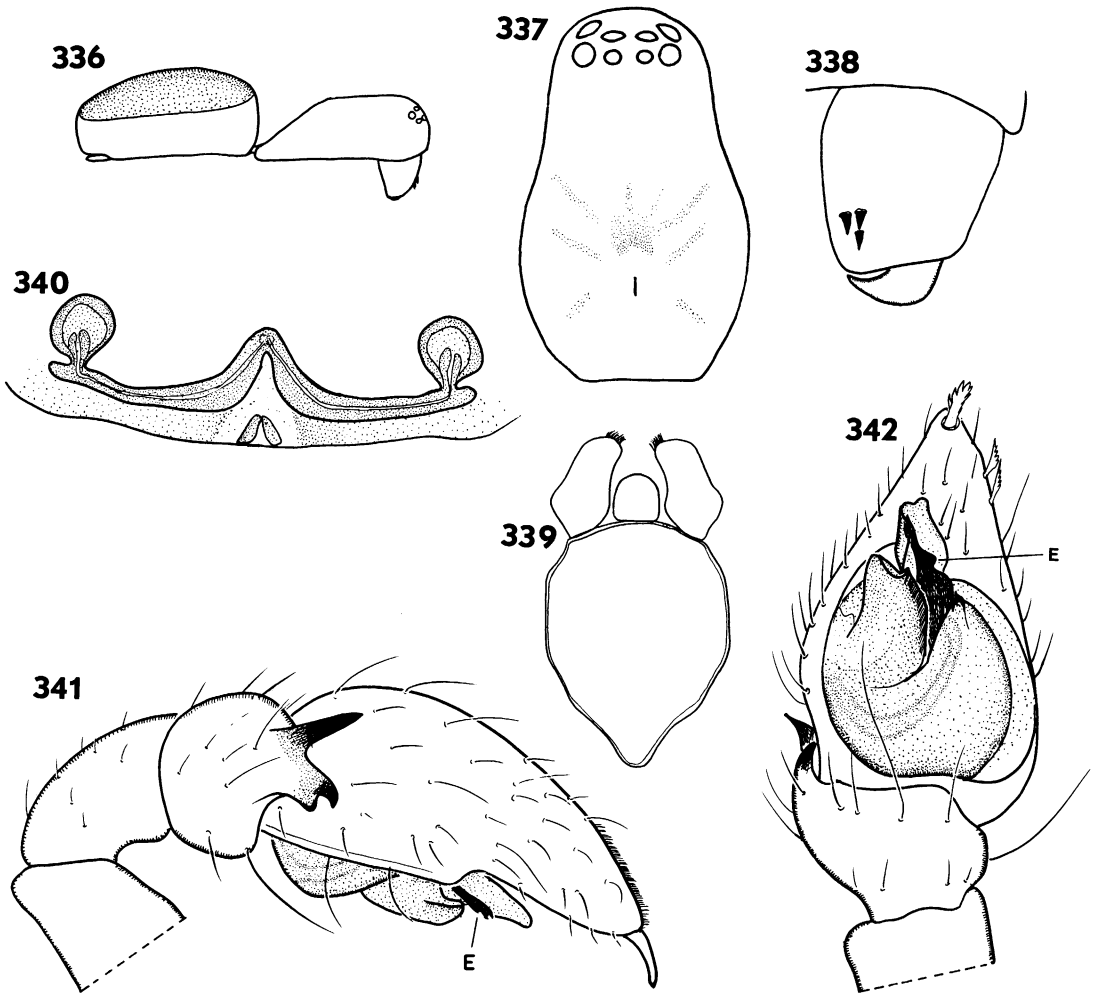
Sternum 0.50 wide, 0.74 long; L/W = 1.48. Chelicerae short, massive, 0.34 long, 0.26 wide at base; with 4 denticles in front.

Legs: Spineless. Measurements:

	I	II	III	IV
F	1.59	1.25	1.30	1.56
P	0.65	0.57	0.46	0.52
T	1.30	1.09	0.99	1.35
Mt	1.22	1.12	1.09	1.66
t	1.17	0.93	1.04	1.25
Tot	5.92	4.97	4.88	6.34

Male palp (figs. 341, 342): Tibia with 2 apophyses; the dorsolateral one pointed, slightly curved out- and upward; the ventrolateral one bifid, curved outward; the upper tip curved down, longer than inferior tip. Cymbium with terminal spine, serrated at both sides; mesally with 2 unilaterally serrated setae. Bulbus with broad tegular apophysis and terminal embolus; conductor large, folded around embolus in rest.

Abdomen rather elongate: 1.35 long, 0.91 wide; with large shiny scutum covering entire dorsum and upper part of sides, further membranous; venter sclerified, but not with real scutum.



Figs. 336–342. *Palaestina expolita.* **336.** Female habitus, lateral view. **337.** Female carapace, dorsal view. **338.** Left chelicera, frontal view. **339.** Sternum, labium, and endites. **340.** Epigyne, ventral view. **341.** Male palp, lateral view. **342.** Male palp, ventral view.

Two spinnerets, rather long, situated before extremity of abdomen (fig. 336); anterior lip of tracheal spiracle with rectangular sclerotized plate.

Female: Total length 2.99; carapace 1.35 long, 0.83 wide.

Chelicerae with 5 frontal teeth; scutum less strongly sclerified than in male, venter entirely membranous. Six spinnerets: 4 short ones hidden behind AS; plate on lip of tracheal spiracle membranous, with row of thick hairs.

Epigyne: Figure 340.

OTHER MATERIAL EXAMINED: 1♀: no locality label (BMNH 19.9.18.6001); 1♂: Crete, Kefalinia, Castle Hill, V.1987, J. Murphy et al. (MC).

DISTRIBUTION: Lebanon, Crete.

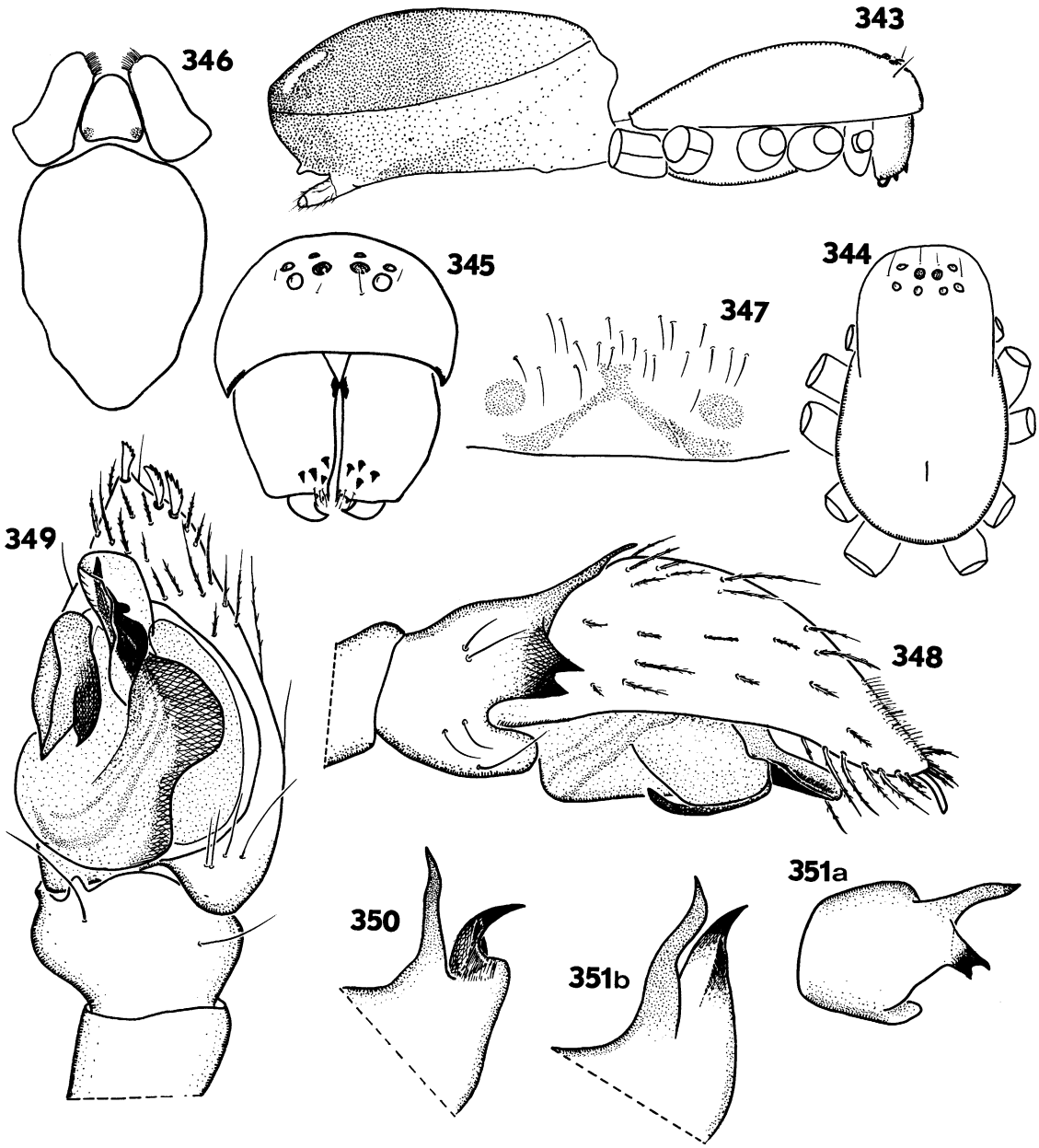
Palaestina dentifera O. P.-Cambridge
Figures 343–350

Palaestina dentifera O. P.-Cambridge, 1872: 268 (descr. ♂♀).

TYPE MATERIAL: Lectotype male (here designated): Jordan, Jericho (UMO B439, T12).

Paralectotype: 1♀: together with Lt.

DIAGNOSIS: Both sexes of this species are recognized by the white anterior part of the abdominal dorsum, contrasting with the dark



Figs. 343–351. 343–350. *Palaestina dentifera.* **343.** Male habitus, lateral view. **344.** Male carapace, dorsal view. **345.** Male carapace, frontal view. **346.** Sternum, labium, and endites. **347.** Epigyne, ventral view. **348.** Male palp, lateral view. **349.** Male palp, ventral view. **350.** Prolateral part of tibia, dorsal view. 351. *Palaestina smyrna.* **351a.** Male palpal tibia, lateral view. **351b.** Prolateral part of palpal tibia, dorsal view.

posterior area. In males, the dorsolateral tibial apophysis is much longer than the ventrolateral one; both the tips of the latter are straight, sharp, and of similar length.

DESCRIPTION: *Male:* Total length 2.36; carapace 1.10 long, 0.61 wide.

Color: Carapace uniform yellowish brown; sternum yellow; legs pale yellow; abdomen:

dorsal scutum dark brown at back, gradually paler toward front, where it is white; sides pale except near spinnerets; venter slightly sclerotized, pale, darker toward lateral margin.

Eyes: a: 1.00 (0.04); b: 1.00; c: 0.62; d: 0.75; e: 0.50; f: 1.20; g: 0.75; h: 0.75. MOQ: AW = 0.91 PW; AW = 1.00 L.

Sternum 0.61 long, 0.43 wide; L/W = 1.42.

Male palp: Figures 348–350.

Female: Total length 2.85; carapace 1.22 long, 0.68 wide. Color as in male except longer white frontal area on dorsum of abdomen.

EPIGYNE: Figure 347.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Jordan.

Palaestina smyrna, new species
Figures 351, 352

TYPE MATERIAL: Holotype male: Turkey, Smyrna (actual Izmir) (UMO B439 t16).

DIAGNOSIS: The male of *P. smyrna* differs from both other species in the genus by the relatively wide sternum (L/W = 1.25) whereas in both the other ones L/W > 1.40.

ETYMOLOGY: The species name is a noun in apposition taken from the type locality.

DESCRIPTION: *Male:* Total length 1.92; carapace 0.93 long, 0.60 wide.

Color: Carapace and chelicerae uniform medium brown; sternum pale brown; legs yellow; abdomen: dorsal scutum sepia; sides gray, ventral scutum medium brown.

Eyes: a: 1.00 (0.03); b: 1.43; c: 0.71; d: 1.14; e: 0.86; f: 0.28; g: 1.71; h: 0.86. MOQ: AW = 0.91 PW; AW = 1.00 L.

Sternum: 0.54 long, 0.43 wide; L/W = 1.25.

Male palp: Figures 351a, b. Cymbium and bulbus very similar to those of *P. dentifera*; slight differences in shape of tibial apophyses.

Female: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

PALFURIA SIMON

Palfuria Simon, 1910: 188 (descr. new genus). Jocqué, 1987a: 143.

Hermippella Lessert, 1936: 226 (descr. new genus); 1938: 432 (formerly included in the Palpimanidae) (NEW SYNONYMY).

Note: The synonymy of *Palfuria* and *Hermipella* is not entirely sure since the former is based on a juvenile female only. In that specimen one of the diagnostic characters of the genus is not fully developed. However, it is supposed that the slanting back cephalic lobe is only present in the adults, as is the case in many erigonine Linyphiidae. All other characters match, and it is therefore decided to synonymize the genera.

TYPE SPECIES: *Palfuria retusa* Simon.

DIAGNOSIS: Easily recognized by the strongly elevated cephalic part of the carapace, slanting back in adults; the abdomen is provided with dorsal circumferential folds.

DESCRIPTION: Small spiders (1.8–3.4) with slightly to strongly granulated teguments. Carapace with strongly raised cephalic lobe, slanting back over the thoracic area in adults; widest between coxae III and IV; narrowed in front to about 0.75 times maximum width in females, to about 0.65 times maximum width in males.

Color: Carapace and chelicerae pale to dark brown. Sternum pale. Legs medium brown to pale yellow; sometimes with darker stripes. Abdomen pale to dark sepia on dorsum, pale on sides and venter.

Eyes in 2 strongly procurved rows (anterior one as seen from in front, posterior one as seen from above). AME by far the largest (up to 1.7 times diameter of other eyes), dark, circular. Other eyes pale, circular, though PME sometimes slightly ovoid. AME about half their diameter apart; PME about twice their diameter apart, about one diameter from PLE; these almost contiguous with ALE and AME. MOQ almost quadrangular. Clypeus convex, 3 times as high as diameter of ALE.

Chilum absent. Chelicerae short, fused; without lateral condyle; without teeth. Endites roughly rectangular, strongly converging; with anteromesal scopula. Labium triangular. Sternum as wide as long in females, longer than wide, slightly rebordered in males.

Legs: Formula 4123. More slender in males than in females. Two claws on onychium; few teeth; no claw tufts nor scopulae but spiniform scopulae present. Spination: 1 dorsal spine in proximal half of F. Femoral organ with 1 or 2 barbed hairs.

Abdomen rounded, hardly longer than wide; slightly sclerotized on dorsum in females, more strongly so in males; anterior part of abdomen strongly sclerotized, forming tube around petiolus; with a number of

parallel shallow, circumferential folds. Two spinnerets in males, 4 spinnerets in females, PS minute. Colulus represented by broad field with short setae; a number of modified hairs in front of tracheal spiracle; spiracle wide, with anterior rim sclerotized.

Male palp: Tibia with long, slender, lateral apophysis. Cymbium with distal concavity with short hairs and 2 dorsolateral modified hairs. Embolus originating on posterior part of tegulum, curved, relatively short. Tegular apophysis long, slender.

Female palpus with finely pectinated claw.

Epigyne very simple, poorly sclerotized.

OTHER SPECIES INCLUDED: *Hermippella gibbosa* Lessert; *Palfuria panner,* new species; a few undescribed species.

DISTRIBUTION: Africa south of 12°S: found in Namibia, Malawi, Mozambique, South Africa.

Palfuria retusa Simon
Figures 352, 353

Palfuria retusa Simon, 1910: 188 (descr. juv. ♀).

TYPE MATERIAL: Holotype juvenile ♀: South Africa, Namaqualand, Steinkopf, Schultze (MNHN 1573) (examined).

DIAGNOSIS: Recognized by the dark stripes on the femora.

DESCRIPTION: *Subadult female:* Total length 1.98; carapace 1.00 long, 0.72 wide.

Color: Carapace pale brown with dark margin; chelicerae pale brown; sternum pale yellow; legs pale yellow, femora with dark stripes. Abdomen: dorsum pale sepia with pale stripes in back, remainder cream.

Carapace finely granulated; cephalic area raised.

Abdomen almost globular; parallel circumferential folds poorly marked.

Adults: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

Palfuria gibbosa (Lessert), new combination
Figures 354–358

Hermippella gibbosa Lessert, 1936: 226 (descr. ♀); 1938: 432.

TYPE MATERIAL: Holotype female: Mozambique, Nova Choupanga (near Chupanga 18°05′S, 35°35′E?) (MHNG) (examined).

DIAGNOSIS: So far the only female known in the genus.

DESCRIPTION: *Female:* Total length 2.30, carapace 1.10 long, 0.64 wide.

Color: Carapace medium brown in cephalic area, pale brown in thoracic area; chelicerae medium brown. Sternum yellow. Legs pale yellow. Abdomen grayish brown on dorsum, pale yellow on sides and venter.

Carapace: Figures 354–356. With raised cephalic area slanting back over thoracic area.

Eyes: a: 1.00 (0.10); b: 0.80; c: 0.65; d: 0.60; e: 0.60; f: 0.30; g: 1.20; h: 0.70; i: 0.40. MOQ: AW = 1.04 PW; AW = 1.00 L.

Legs: Most legs missing, only leg II complete. Measurements: II F: 0.73, P: 0.30, T: 0.50, Mt: 0.63, t: 0.24, Tot: 2.40.

Epigyne: Figure 358.

Male: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

Palfuria panner, new species
Figures 359–363

TYPE MATERIAL: Holotype male: Namibia, Panner Gorge, 22°19′S, 15°01′E, 11.III–9.IV.1985, J. Irish and H. Rust (SMN 38730).

DIAGNOSIS: So far the only male known in the genus; probably characterized by the male palp.

ETYMOLOGY: The species name is a noun in apposition taken from the type locality.

DESCRIPTION: *Male:* Total length 1.82; carapace 0.90 long, 0.64 wide.

Color: Carapace dark brown in cephalic area, medium brown with darker striae in thoracic area. Chelicerae medium brown; sternum pale brown; legs yellowish brown. Abdomen sepia on dorsum and sides, pale yellow on venter. Epiandrum medium brown.

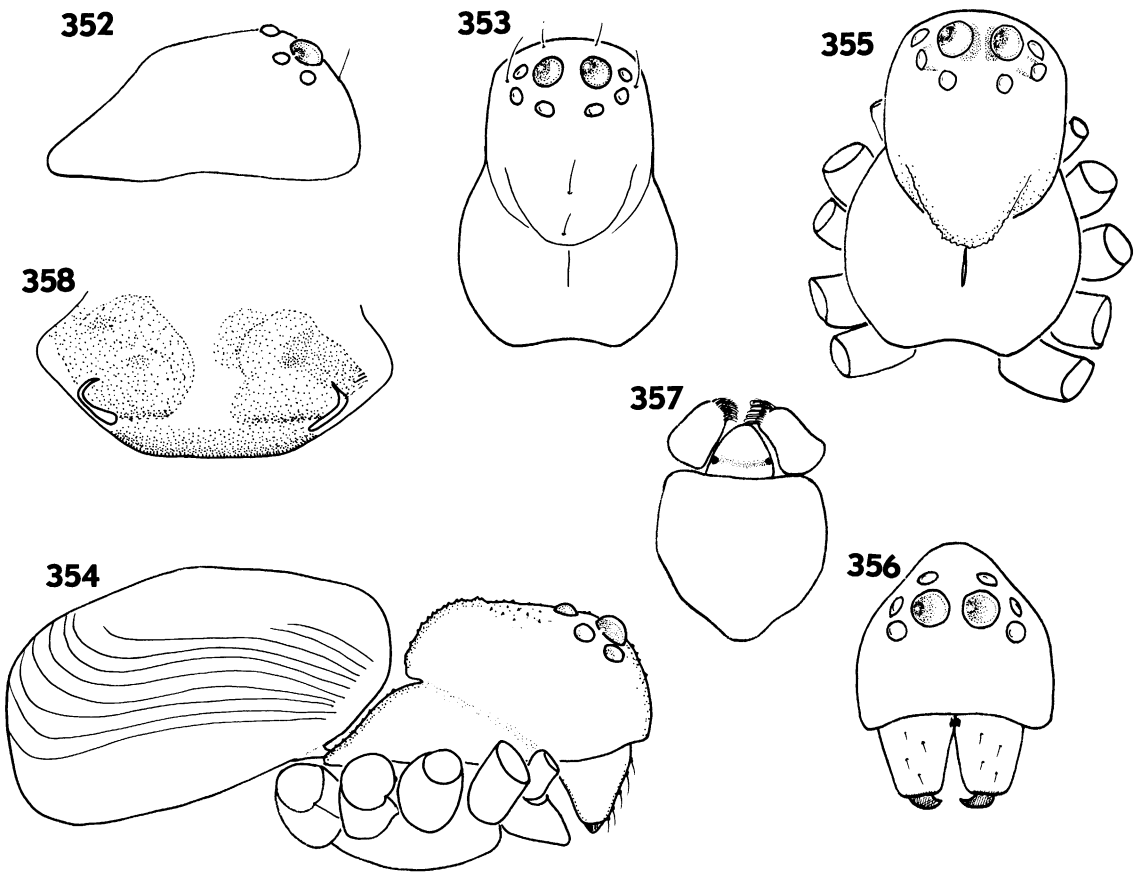
Carapace: Figures 359, 360.

Eyes: a: 1.00 (0.09); b: 0.63; c: 0.58; d: 0.68; e: 0.52; f: 0.11; g: 1.16; h: 0.42; i: 0.21. MOQ: AW = 1.09 PW; AW = 1.00 L.

Legs: Measurements:

	I	II	III	IV
F	0.72	0.68	0.71	0.85
P	0.26	0.26	0.28	0.26
T	0.56	0.52	0.44	0.69
Mt	0.61	0.62	0.64	0.83
t	0.48	0.48	0.46	0.48
Tot	2.64	2.56	2.54	3.11

Male palp (figs. 361–363): Tibial apophysis



Figs. 352–358. 352–353. *Palfuria retusa.* **352.** Juvenile carapace, dorsal view. **353.** Juvenile carapace, lateral view. 354–358. *Palfuria gibbosa.* **354.** Female habitus, lateral view. **355.** Female carapace, dorsal view. **356.** Female carapace, frontal view. **357.** Sternum, labium, and endites. **358.** Epigyne, ventral view.

curved upward. Tegular apophysis pointing inward, hook shaped.

Female: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Only known from type locality.

RANOPS, NEW GENUS

TYPE SPECIES: *Ranops caprivi,* new species.

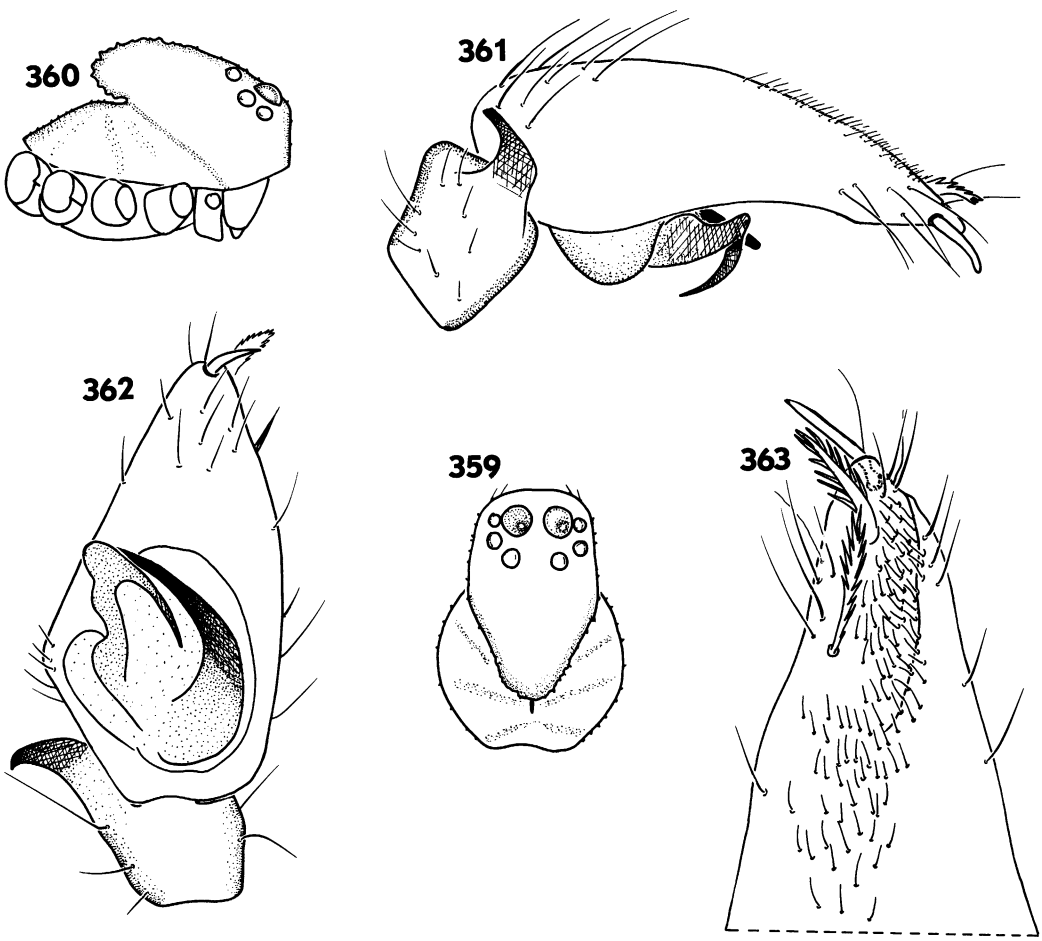
DIAGNOSIS: Representatives of the genus *Ranops* closely resemble those of *Zodarion* and *Acanthinozodium*; they differ by the broad sternum which is at least as wide as long, usually wider than long, by the hairs along the thoracic margin, and by the leg formula 4321.

ETYMOLOGY: *Ranops* is a contraction of *Rana* (Latin for frog) and *ops* (Greek: eye) in view of the froglike look of these spiders; the gender is neuter.

DESCRIPTION: Small spiders (2.0–3.0) with flat, broad carapace, widest between coxae II and III; narrowed in front to about 0.65 times maximum width in males and 0.7 times maximum width in females.

Color: Carapace, chelicerae, and sternum pale brown; carapace with some silvery flattened hairs and some longer hairs along margin of thoracic area. Legs pale yellow. Abdomen gray to sepia with some paler spots on dorsum, which is slightly sclerotized in males.

Eyes in two rows, AER slightly, PER strongly procurved. AME circular, dark, much larger than other eyes, these circular, light. AME less than their radius from PLE. MOQ slightly wider in front than behind, wider than long. Clypeus about as high as diameter of AME, slightly convex, with some long hairs in middle and on lower margin.



Figs. 359–363. *Palfuria panner*. **359.** Male carapace, dorsal view. **360.** Male carapace, lateral view. **361.** Male palp, lateral view. **362.** Male palp, ventral view. **363.** Distal extremity of cymbium, dorsal view.

Chilum absent. Chelicerae with distal cusp bearing tooth and curved seta; fused in distal half. Endites slightly tapering toward apex, strongly converging, with anteromesal scopula. Labium triangular. Sternum wide (1.0 to 1.2 times wider than long) and with straight anterior margin and long hairs all around.

Legs: Formula 4321; long, very slender; spination reduced to a few dorsal spines on F and a pair of short distoventral ones on Mt; entirely covered by flattened indented hairs. Trichobothria few: in one row on T, Mt, and t. Three tarsal claws; superior pair with about 10 teeth. Femoral organ with 3 barbed hairs in shallow alveolus.

Abdomen oval; in male slightly sclerotized on dorsum. Tracheal spiracle wide (0.3 to 0.5 times width of abdomen) with slightly sclerotized area beset with short cylindrical hairs behind it. Spinnerets: 4 in females, 2 in males, MS possibly overlooked. AS biarticulate, conical; PS (in female) minute.

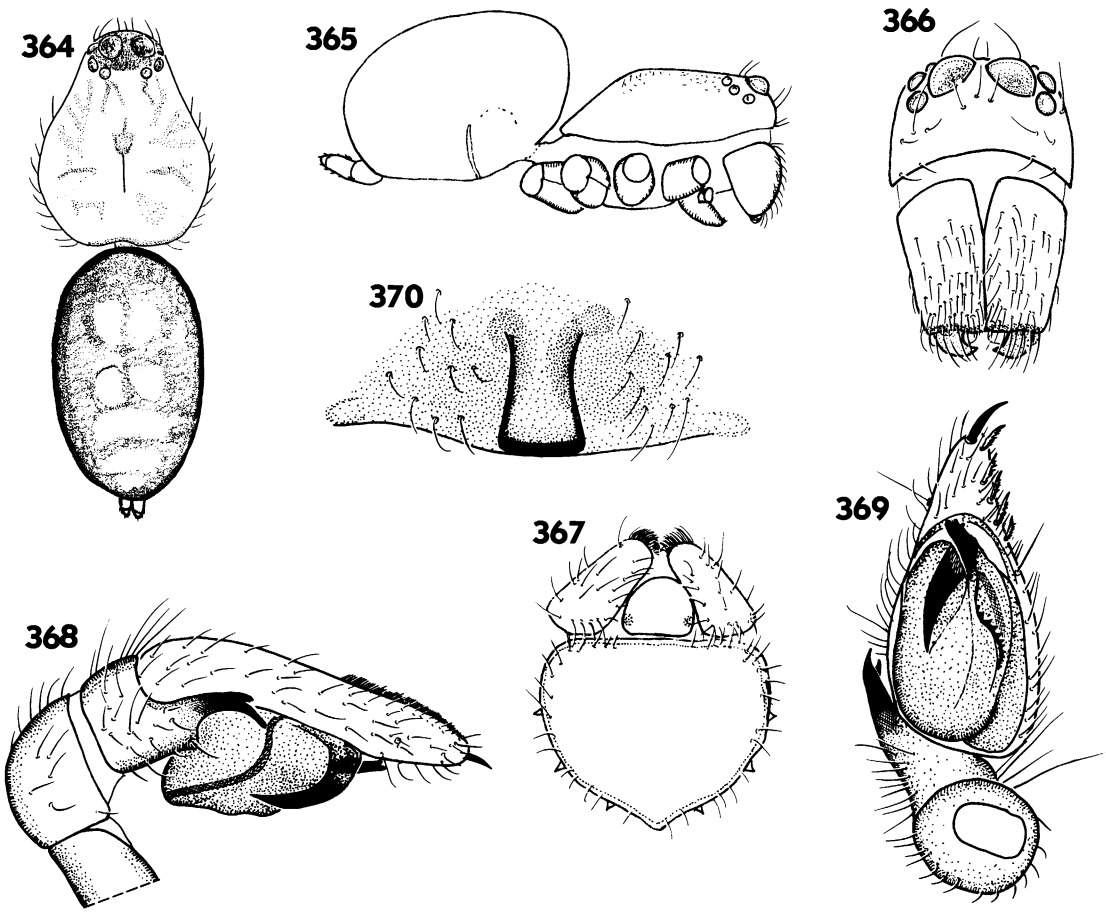
Male palp with lateral tibial apophysis; embolus short, originating on anterior part of tegulum, which sometimes has serrated ridge; tegular apophysis rather large, falciform, pointing backward.

Female palp with finely dentated tarsal claw, turned inward over almost 90°.

Epigyne with central rectangular plate.

OTHER SPECIES INCLUDED: A few undescribed.

DISTRIBUTION: eastern (semiarid) part of southern Africa.



Figs. 364–370. *Ranops caprivi.* **364.** Female habitus, lateral view. **365.** Female habitus, dorsal view. **366.** Female carapace, frontal view. **367.** Sternum, labium, and endites. **368.** Male palp, lateral view. **369.** Male palp, ventral view. **370.** Epigyne, ventral view.

Ranops caprivi, new species
Figures 364–370

TYPE MATERIAL: Holotype male: Namibia, Eastern Caprivi, Sitwa near Choy, 10 km S Kongola, 22.X.1987, wooded savanna, by night at ant's nest entrance, R. Jocqué (MRAC 168 634).

Paratypes: 4♂, 1♀: locality as Ht: 17–18.X.1987, at light; 1♂: as previous, under bark; 3♂: as previous, at ant's nest (1♂ in SMN).

DIAGNOSIS: *Ranops caprivi* is so far the only described representative of the genus; it is recognized by the details of the male palp and the female epigyne.

ETYMOLOGY: The species name is a noun in apposition taken from the type locality.

DESCRIPTION: *Male:* Total length 2.91, carapace 1.37 long, 1.11 wide.

Color: Carapace pale brown, with darker pattern of fine stripes and reticulations; with many white incised hairs. Sternum pale brown with faint darker radiating striae and dark margin. Legs yellow. Abdomen (fig. 365) with dense cover of silvery incised hairs; dorsum dark gray with paler patches: 2 rounded ones, touching in front, 1 similar pair in middle, and 1 transverse bar behind these. Venter pale gray; epiandrum slightly sclerotized, pale brown.

Eyes: a: 1.00 (0.16); b: 0.56; c: 0.44; d: 0.44; e: 0.37; f: 0.19; g: 0.31; h: 0.12. MOQ: AW = 1.05 PW; AW = 1.23 L. Clypeus 0.17 high or almost twice diameter of ALE.

Legs: Spination: one small proximal spine on F I–III. One pair of distoventral spines on Mt. Measurements:

	I	II	III	IV
F	1.54	1.88	2.08	2.46
P	0.46	0.50	0.58	0.58
T	1.83	1.67	1.88	2.33
Mt	1.83	2.25	2.50	2.67
t	1.00	1.08	0.92	1.38
Tot	6.67	7.38	7.96	9.42

Male palp (figs. 368, 369): Tibia with downcurved bifid lateral apophysis; embolus short, truncated; tegulum with sinuous dentate ridge and long, recurved, terminal apophysis.

Female: Total length 2.79; carapace 1.33 long, 1.00 wide.

Color as in male, but with 3, instead of 1, transverse pale bars in front of spinnerets.

Legs: Spination as in male. Measurements:

	I	II	III	IV
F	1.17	1.38	1.54	1.79
P	0.42	0.46	0.50	0.54
T	0.96	1.08	1.25	1.67
Mt	1.25	1.63	1.67	1.93
t	0.79	0.83	0.83	1.04
Tot	4.59	5.38	3.79	6.97

Epigyne (fig. 370) with elongate central plate, narrowed in front.

OTHER MATERIAL EXAMINED: 1♂: Zimbabwe, Hunters Camp, Umzingwane River, Doddieburn Ranch, 14.XII.1985, J. Minshull (NMZ A4319); 2♂: Zimbabwe, Store Camp, Humani Ranch, Falcon College, 2032C2, 6.IV.1987 (NMZ A5870).

DISTRIBUTION: Namibia: Caprivi Strip; southern Zimbabwe.

SUFFASIA, NEW GENUS

Suffucia (part) Simon, 1893d: 78 (descr. new genus); 1893b: 408, 423, 430, 431 (the type species *Suffucia heliophila* belongs in *Asceua* Thorell, 1887). Not Brignoli, 1982: 344 (*Suffucia hingstoni* belongs in *Mallinella*).

TYPE SPECIES: *Suffucia tigrina* Simon.

DIAGNOSIS: Representatives of *Suffasia* are the only Zodariinae with a chilum and a long palpal tarsus in the female, with a single or double tooth on the promargin of the chelicerae, the AER slightly procurved, and the femoral organ with simple setae.

ETYMOLOGY: *Suffasia* is a contraction of *Suffucia* and Asia. The gender is feminine.

DESCRIPTION: Medium-size zodariinae (4.0–7.0) with short oval carapace; cervical grooves hardly indicated; widest between coxae II and III, narrowed in front to about 0.65 times maximum width in females.

Color: Carapace yellow with medium to dark brown pattern. Sternum pale yellow; legs pale yellow with brown rings and patches. Abdomen pale gray with dark gray pattern on dorsum, almost white on venter.

Eyes: AER only slightly procurved as seen from in front; posterior row strongly procurved (as seen from above). All eyes circular, AME dark, remainder pale. AME less than their diameter apart, at about the same distance from ALE. PME slightly more than their diameter apart, at about 1.5 times that distance from PLE. MOQ slightly wider behind than in front, almost twice as long as wide in front. Clypeus as high as 5 times diameter of ALE, slightly convex.

Chilum single, higher than broad. Chelicerae not fused, slender; twice as long as wide at base, with poorly developed lateral condyle; single or double tooth on promargin; fangs relatively long. Endites slender, strongly tapering. Labium triangular, slightly longer than wide. Sternum roughly triangular, with short, sharp triangular extensions corresponding with coxal concavities. Coxae IV well separated.

Legs: Long, slender. Leg formula 4123. Leg spines short; relatively numerous as compared to other members of Zodariinae. Legs covered with serrated hairs. Tarsi short, slightly curved. Three claws, unpaired one on onychium. Paired ones with about 10 teeth. Trichobothria in 2 rows on T, in one row on Mt and t. Femoral organ with small, smooth hairs. No spiniform scopulae or metatarsal tufts of hair. Hinged hairs absent.

Abdomen oval, with dark pattern on pale background. Six spinnerets; AS biarticulate; on common base; distal segment short; twice as long as PS, also biarticulate. MS tiny. Colulus represented by small group of hairs. Tracheal spiracle very small, just in front of spinnerets.

Female palp with long, slender, tapering tarsus bearing toothed claw, turned inward over ±30°, with strong ventral spines.

Epigynum simple: strongly sclerotized copulatory ducts with dead end on one side, other side leading forward to anterior thick-walled spermathecae.

Males: Unknown.

OTHER SPECIES INCLUDED: One undescribed from the same type locality as the type species.

DISTRIBUTION: India.

Suffasia tigrina (Simon), new combination
Figures 371–377

Suffucia tigrina Simon, 1893d: 79 (descr. ♀); 1893b: 431; 1905: 174. Jocqué, 1987a: 143.

TYPE MATERIAL: Lectotype female (here designated): India, Hindustan, Palni Hills, Kodaikanal (10°15'N, 77°31'E) (MNHN 9779) (examined).

Note: In his original description Simon (1983d) mentioned as locality: "Montes Kodeikanel." I have not been able to trace mountains with this name in southern India or elsewhere. It is likely that the exact locality should read as above since later specimens have been reported from the same area (see under "other material examined").

Female: Total length 4.25 (3.96–5.00); carapace 2.04 (1.92–2.08) long, 1.67 (1.46–1.71) wide.

Color: Carapace pale yellow overlaid with 2 longitudinal dark brown mottled bands leaving broad pale yellow band in middle; the latter is pale brown in cephalic area; clypeus medium brown with typical dark brown reticulations. Chelicerae medium brown. Sternum pale yellow. Legs pale yellow with medium brown rings. Abdomen pale gray with dark sepia dorsal pattern (fig. 371); sides pale with two small circular sepia spots; venter uniform pale or with two short longitudinal streaks.

Eyes: a: 1.00 (0.10); b: 0.90; c: 0.90; d: 1.10; e: 0.70; f: 0.80; g: 1.20; h: 1.60. MOQ: AW = 0.87 PW; AW = 0.79 L.

Legs: Spination: femora I d3* II d3* III d3* IV d3*; patellae I pl1 II pl1 III pl1 IV pl1; tibiae I pl2*d1rl2*v2 II pl3*d2*rl2v1-2 III pl2*d2*rl2*v1-2 IV pl2*d2*rl2*v1-2; metatarsi I pl1rl1v2 II pl1d1rl2*v2-2-2 III pl2*d2rl2*v1-2-2 IV pl2*d2rl2*v1-2-2. Measurements:

	I	II	III	IV
F	2.33	2.12	2.04	2.29
P	0.54	0.75	0.75	0.75
T	2.16	1.67	1.62	1.92
Mt	2.46	2.17	2.17	2.71
t	1.04	0.79	0.71	0.87
Tot	8.54	7.50	7.29	8.55

Epigyne: Figures 376, 377.

Male: Unknown.

OTHER MATERIAL EXAMINED: 1♀, 5 imm.: India, Tamil Nadu state, Coonoor (11°21'N, 76°46'E), M. Maindron (MNHN, without number); 5♀: India, Trichinopoly (=Tiruchirapalli) (10°50'N, 78°43'S) (MNHN 16381).

DISTRIBUTION: India, Tamil Nadu state.

TRYGETUS SIMON

Palaestina (part): O. P.-Cambridge, 1872: 270.
Trygetus Simon, 1882: 228 (descr. new genus); 1893b: 408, 409, 437–439. Denis, 1952: 63. Ono and Jocqué, 1986: 9. Jocqué, 1987a: 143.

TYPE SPECIES: *Palaestina sexoculata* O. P.-Cambridge.

DIAGNOSIS: Representatives of *Trygetus* are easily recognized by the presence of 6 eyes only (PME lacking).

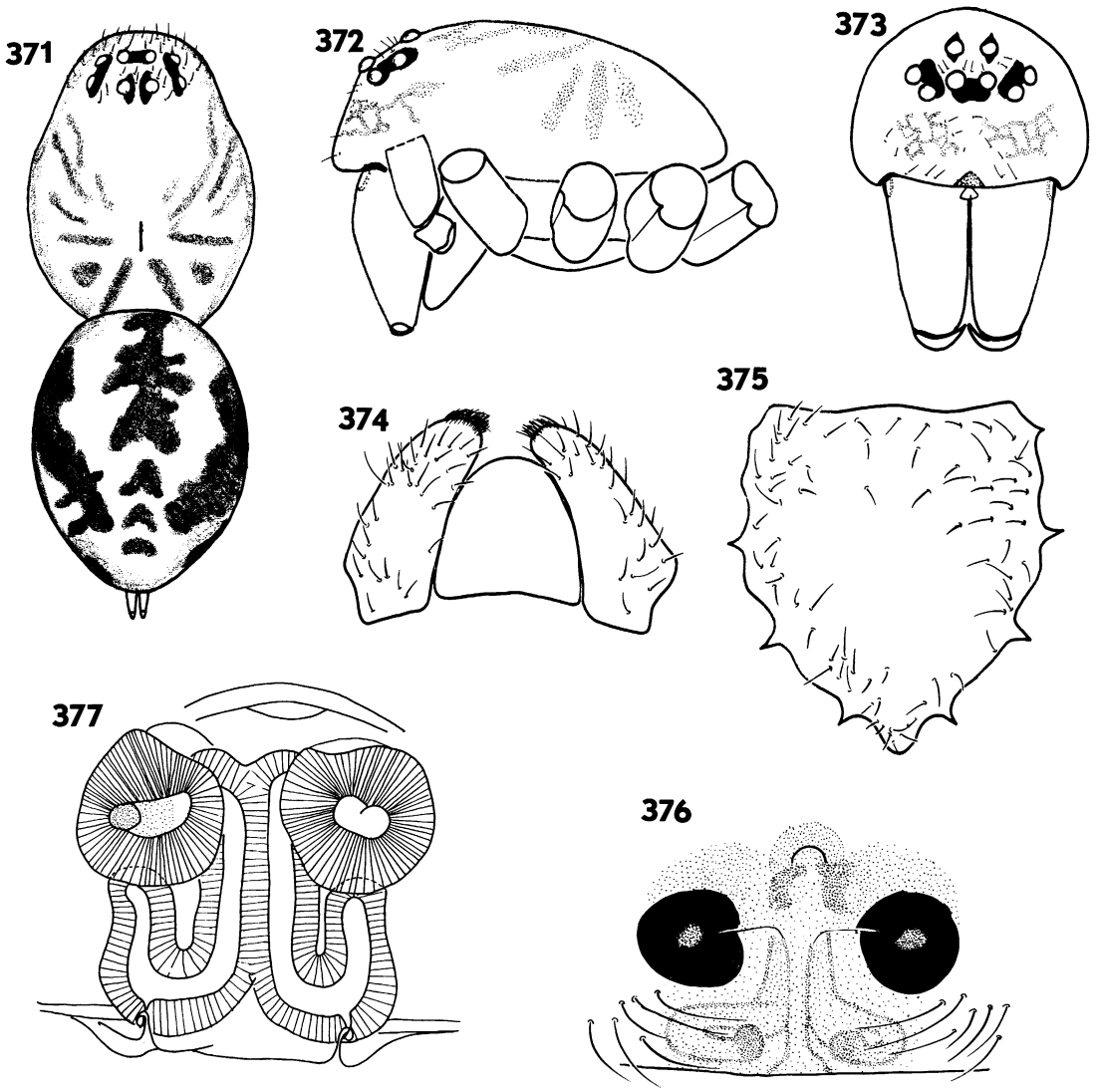
DESCRIPTION: Small spiders (1.5–3.0) with oval carapace, widest at level of coxae II; strongly narrowed to 0.55–0.65 times maximum carapace width in males, to 0.65–0.75 times maximum carapace width in females. Fovea absent or faint. Tegument roughened.

Color: Carapace and chelicerae pale brown; legs and sternum yellow; abdomen uniform sepia.

Six eyes in 2 rows: AME dark and circular, about twice as large as ALE or PLE; PLE light, slightly oval. AME about half to one diameter apart, close to lateral eyes. Clypeus about twice as high as diameter of AME, slightly convex.

Chilum absent. Chelicerae short, strongly tapering toward extremity; fused at base; no teeth on distal margins, no lateral condyle. Fangs very short, thick at base. Labium triangular. Sternum slightly longer than wide, with triangular extensions between coxae and shorter ones corresponding with coxal concavities.

Legs: Formula 4123. No spines, no scopulae or claw tufts; no incised hairs. Femoral



Figs. 371–377. *Suffasia tigrina.* **371.** Female habitus, dorsal view. **372.** Female carapace, lateral view. **373.** Female carapace, frontal view. **374.** Labium and endites. **375.** Sternum. **376.** Epigyne, ventral view. **377.** Epigyne, cleared dorsal view.

organ with 3 spines with short barbs in 1 row; present on all F.

Abdomen with dorsal scutum in males; venter slightly sclerotized leaving only narrow strip of membranous area. Four spinnerets, no colulus. Sometimes with row of modified hairs in front of tracheal spiracle.

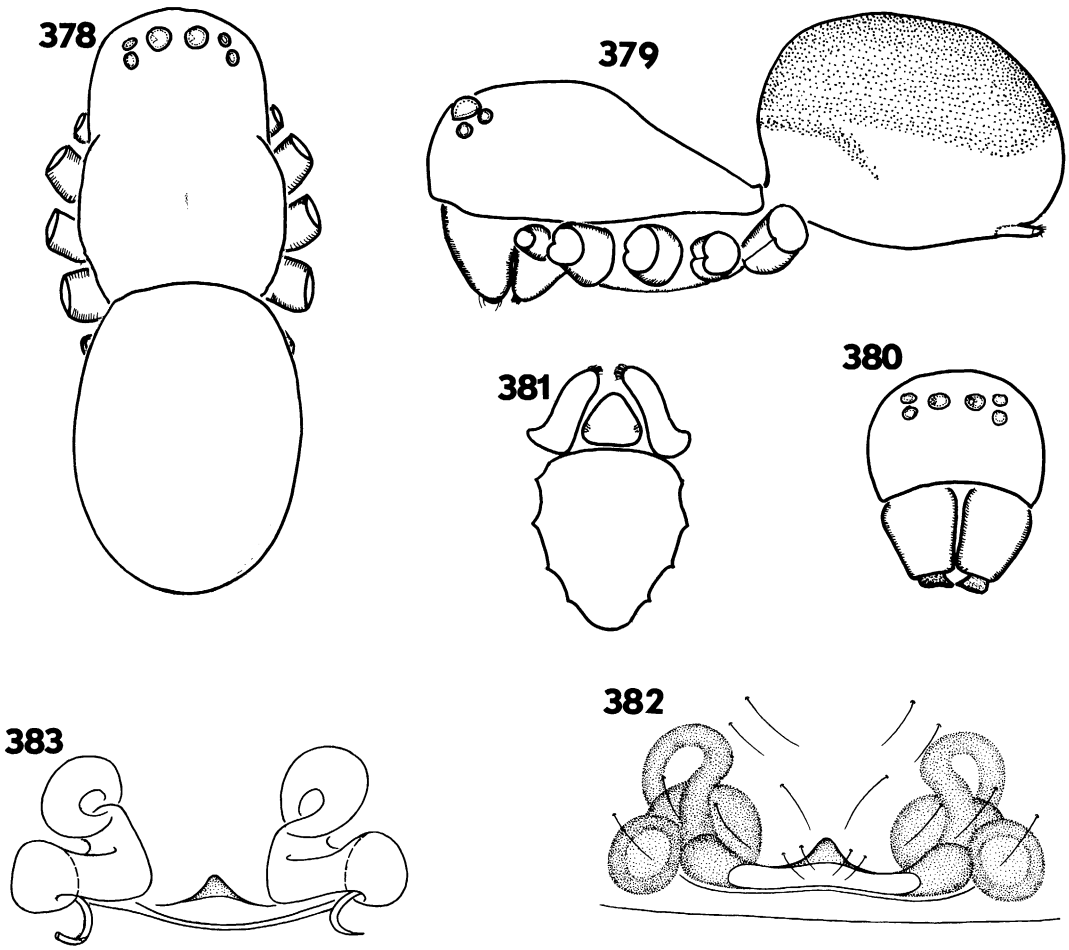
Male palp with lateral tibial apophysis; cymbium with few plumose hairs; embolus threadlike, originating on posterior part of tegulum, protected by broad tegular apophysis.

Epigyne very simple, with central anchoring hole, lateral entrance openings and wound copulatory ducts ending in spermathecae, situated near entrance openings.

OTHER SPECIES INCLUDED: *Trygetus berlandi* Denis, *T. riyadhensis* Ono and Jocqué, *T. nitidissimus* Simon; a few undescribed species.

DISTRIBUTION: Sahara, as far south as arid Kenya, deserts of Middle East and Arabian Peninsula.

NATURAL HISTORY: Simon (1890) men-



Figs. 378–383. *Trygetus sexoculatus.* **378.** Female habitus, dorsal view. **379.** Female habitus, lateral view. **380.** Female carapace, frontal view. **381.** Sternum, labium, and endites. **382.** Epigyne, cleared dorsal view (drawing by H. Ono). **383.** Epigyne, cleared ventral view (drawing by H. Ono).

tioned specimens of *T. nitidissimus* running around in the sunshine with great speed. Similar observations have often been published about *Zodarion.* These spiders do indeed run around agitatedly when their hiding corners are destroyed and they are exposed to bright sunlight, to which they are normally not exposed.

Trygetus sexoculatus (O. P.-Cambridge)
Figures 378–383

Palaestina sexoculata O. P.-Cambridge, 1872: 270 (descr. ♂). Simon, 1874: 253.
Trygetus senoculatus (lapsus): Simon, 1882: 228; 1893b: 439.
Trygetus sexoculatus: Ono and Jocqué, 1986: 9.

TYPE MATERIAL: Holotype female: Syria (UMO B.439) (examined).

DIAGNOSIS: Representatives of this species differ from those of *T. riyadhensis* Ono and Jocqué by the course of the copulatory ducts in the epigyne and by the shape of the epigyneal slit which is here recurved, whereas procurved in *T. riyadhensis.*

Female: Total length 1.78; carapace 0.93 long, 0.63 wide.

Color: Prosoma, including legs entirely pale brown. Abdomen dark sepia on dorsum, pale on venter and sides, which have downcurved dark sepia stripe in anterior half.

Eyes: a: 1.00 (0.07); b: 0.86; c: 0.71; e: 0.57; f: 0.42; i: 0.29.

Legs: Spination: none. Measurements:

	I	II	III	IV
F	0.62	0.57	0.50	0.64
P	0.23	0.23	0.22	0.24
T	0.53	0.42	0.38	0.55
Mt	0.51	0.47	0.45	0.57
t	0.47	0.39	0.35	0.44
Tot	2.36	2.08	1.90	2.44

Epigyne: Figures 382, 383.

Male: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Syria.

Trygetus nitidissimus Simon
Figures 384–389

Trygetus nitidissimus Simon, 1882: 229 (descr. ♂); 1890: 92; 1893b: 437. Benoit, 1974: 435. Ono and Jocqué, 1986: 9.

TYPE MATERIAL: Holotype male: Aden (=Yemen), 1880, Doria and Beccari (MCSG) (examined).

Note: Ono and Jocqué (1986) examined four males and one female from MNHN and mentioned these as syntypes of this species. This is impossible as Simon in his original description (1882) only mentioned the presence of 3 males. However, Simon studied more material later (1890). The tube (MNHN 4224) (examined) indeed contains a mixture of types and nontypes.

DIAGNOSIS: This species is so far the only one for which males are known. Females were not examined.

Male: Total length 1.55; carapace 0.82 long, 0.58 wide.

Color: Carapace, chelicerae, and sternum pale brown; legs yellow, dorsal scutum dark sepia, shiny; venter yellow.

Carapace: Figures 384–386.

Sternum, labium, endites: Figure 387.

Male palp: Figures 388, 389.

OTHER MATERIAL EXAMINED: 1♂: French Somalia, Djibouti, 1926, A. Leroy (MRAC 144722).

DISTRIBUTION: Yemen, Djibouti.

ZODARION WALCKENAER

Enyo Savigny and Audouin, 1825: 135 (new genus, preoccupied); 1827: 349. Walckenaer, 1833: 438, 442; 1837: 20. Simon, 1864: 159; 1870: 51, 97; 1873: 55, 65; 1874: 241. Becker, 1896: 180.

Zodarion Walckenaer, 1825 *in*: Savigny and Audouin, 1825: 135 (new genus); 1837: 639. Simon, 1893b: 408–411, 423, 432–435 (syn. *Enyo*); 1914: 226. Lamy, 1902: 189. Lessert, 1904: 294. Scheffer, 1905: 114. Hingston, 1928: 849. Roewer, 1928: 127; 1932: 429. Berland, 1929: 42. Denis, 1935a: 51; 1935b: 65; 1937: 1, 2. Lehtinen, 1967: 276. Roth, 1985: B47-1. Brignoli, 1980: 372. Jocqué, 1987a: 143. Bosmans, 1988: 4.

Clotho (part): Walckenaer, 1837: 635. Lucas, 1840: 408, 410.

Lucia C. L. Koch, 1837a: 141, pl 3, 4 (new genus, preoccupied); 1937b: 19. Karsch 1878b: 96.

Argus (part): Walckenaer, 1842: 347. Karsch, 1878b: 96.

Zodarium: Thorell, 1869: 107. Chyzere and Kulczynski, 1897: 147. Bösenberg, 1901: 12; 1902: 220. Gerhardt and Kästner, 1938: 601.

Metargus: F. O. P.-Cambridge, 1902: 8 (nomen novum for *Argus*).

Zodarian (lapsus) Vogel, 1968: 96.

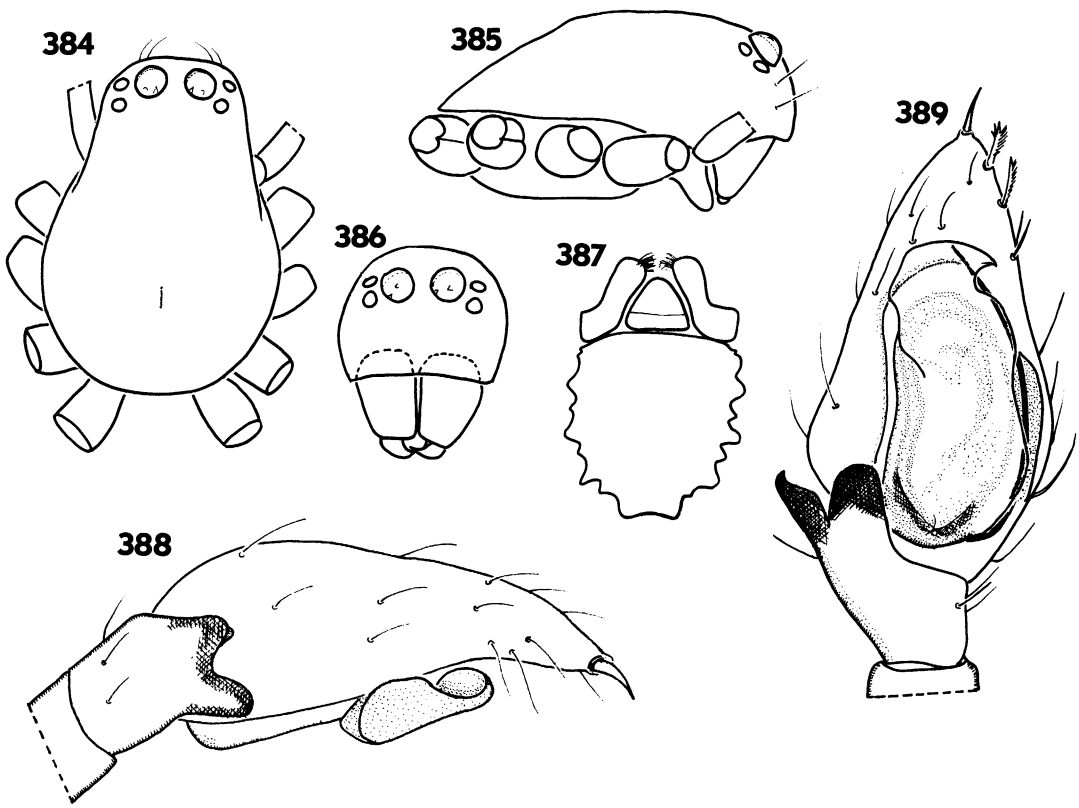
Zoradion (lapsus) Hubert, 1979: 123.

TYPE SPECIES: *Enyo nitida* Savigny and Audouin (probably no type material designated) (see Bosmans, 1988).

DIAGNOSIS: Recognized by the following combination of characters: tegument, including that of femora, with a dense cover of flattened incised hairs; not more than one dorsal femoral spine; the carapace is less strongly narrowed than in *Acanthinozodium* (the anterior width, measured at the tangent to the PME, more than 0.6 times the maximum carapace width in females, more than 0.55 in males), the intercheliceral triangle is large.

Note: Vogel (1968) mentioned the presence of a serrate keel on the margin of the chelicerae of *Z. fulvonigrum* (Simon). This is probably the distal toothed cusp which cannot be designated as a retromarginal serrated ridge as the one known in the genus *Gnaphosa* (Gnaphosidae). The character is used as such by Roth (1985) and may cause confusion.

DESCRIPTION: Small to medium-size spiders (2.5–6.5), with smooth, oval, rather elongate carapace, narrowed in front to not less than 0.6 times maximum width in females, to not less than 0.55 times carapace width in males (cephalic width measured on posterior tangent to PME).



Figs. 384–389. *Trygetus nitidissimus*. **384.** Male carapace, dorsal view. **385.** Male carapace, lateral view. **386.** Male carapace, frontal view. **387.** Sternum, labium, and endites. **388.** Male palp, lateral view. **389.** Male palp, ventral view.

Color variable, ranging from pale yellow over yellowish orange to dark brown or sepia. Abdomen often with simple dark dorsal pattern on pale background.

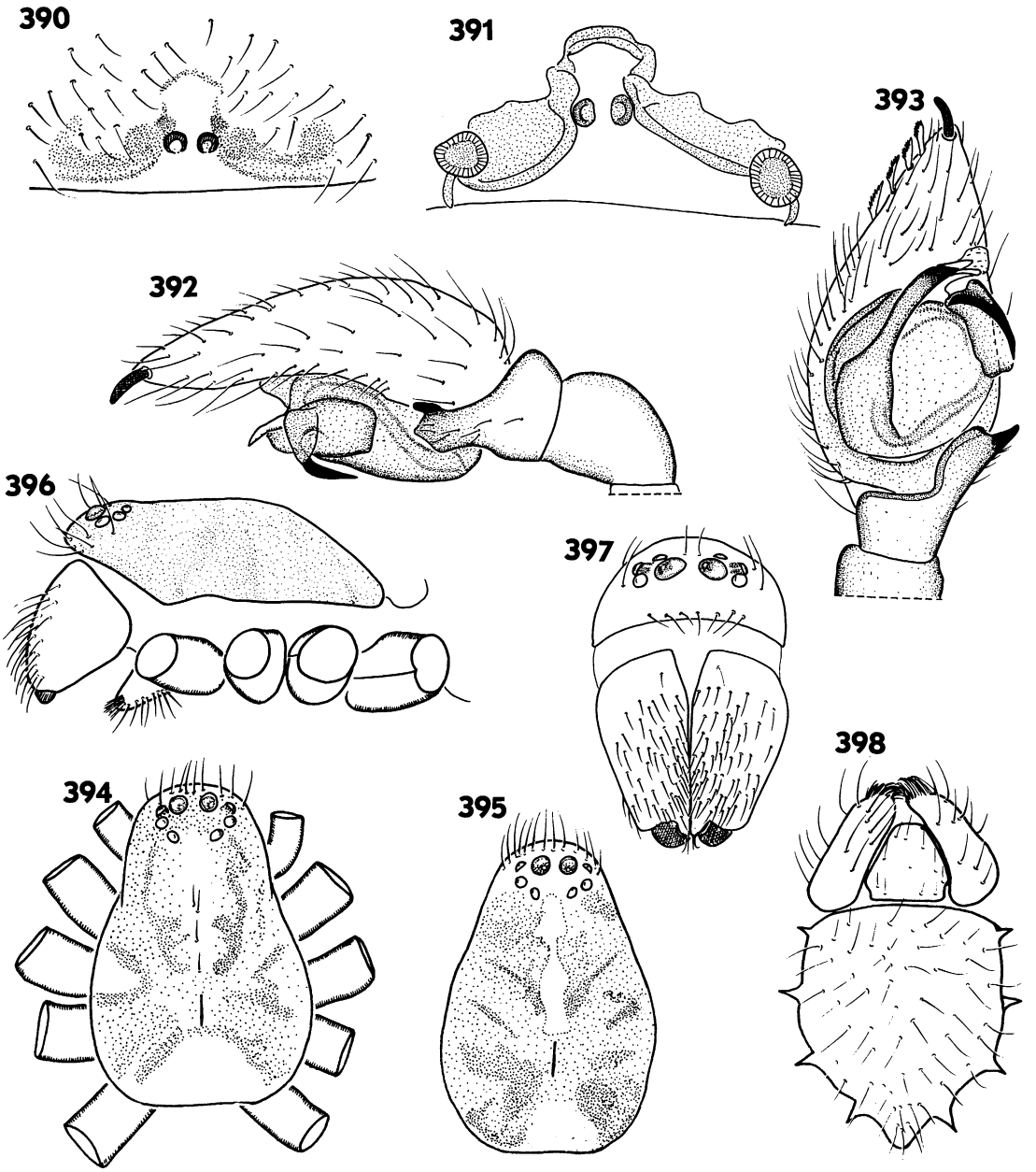
Eyes in 2 rows: PER strongly recurved, AER only slightly recurved. AME large, dark, circular. Remainder small, light PME oval. AME less than their radius apart and close to ALE. PME 2 to 3 times their diameter apart and less than their diameter from PLE. MOQ almost quadrangular; anterior width almost equal to posterior width. Clypeus strongly convex, about as high as 1.5 times diameter of AME.

Chilum absent. Chelicerae fused posteriorly in the middle. Intercheliceral triangle large. With many strong setae on dorsal side. With distal cusp bearing one tooth and curved spiniform seta. Fang shorter than wide at base.

Endites roughly rectangular, strongly convergent. Sternum basically triangular with rounded sides; provided with triangular extensions corresponding with coxal concavities. About 1.2 times longer than wide.

Legs: Slender. Formula 4123 or 4132. Spination strongly reduced: at most one dorsal spine on femora. Incised hairs dense on all legs including femora. Tarsi with 3 claws, paired ones with about 6 teeth. Trichobothria in 2 rows on T, in 1 row on Mt and t. Femoral organ with 2 to 6 barbed hairs; sometimes absent, e.g., in *Z. margininiceps* Simon and *Z. nigriceps* (Simon) (Jocqué, 1988a).

Abdomen oval. Tracheal spiracle wide (0.3 to 0.45 times maximum width of abdomen), slightly procurved, often with one row of modified hairs in front of it. Tracheae reduced to 2 well-developed stems reaching into



Figs. 390–398. 390–393. *Zodarion andalusiacum.* **390.** Epigyne, ventral view. **391.** Epigyne, cleared dorsal view. **392.** Male palp, lateral view. **393.** Male palp, ventral view. 394–398. *Zodarion kabylianum.* **394.** Female carapace, dorsal view. **395.** Male carapace, dorsal view. **396.** Female carapace, lateral view. **397.** Female carapace, frontal view. **398.** Sternum, labium, and endites.

carapace. Males with 2 spinnerets, females with 6. AS large, conical, biarticulate, on common base. PS small, biarticulate; MS very small, one-segmented. Colulus represented by broad haired field.

Male palp: Tibia with prolateral apophysis; bulbus with retinaculum (tegular apophysis attached to tegulum with membranous support); embolus usually short.

Epigyne variable. Female palp with finely pectinate claw turned inward over 60–90°.

OTHER SPECIES INCLUDED: 115 nominal species; many undescribed.

DISTRIBUTION: Western Europe, Mediter-

ranean, Middle East, U.S.A. (introduced, Vogel, 1968), Hawaii (introduced? see Suman, 1967). Probably also in Far East (India and Philippines).

NATURAL HISTORY: As described several times (see review in Jocqué and Billen, 1987) these spiders are night-active and hide during the day in a self-made retreat, covered with pebbles or small sticks, stuck to the underside of a stone or another hard substrate. They are compulsory ant-eaters. They have often been reported as seen running around in bright sunlight. This is probably true when their igloo-shaped retreat is destroyed and they seek new shelter.

Zodarion andalusiacum, new species
Figures 390–393

TYPE MATERIAL: Holotype male: Spain, Andalucia, Torre de la Higuera near El Rocio, coastal dunes, pitfalls, 28.III–6.IV.1972, R. Jocqué (KBIN).

Paratypes: 15♂, 4♀, 5 imm.: together with Ht.

DIAGNOSIS: This species is similar to *Z. rubidum* Simon; *Z. andalusiacum* is recognized by the uniform pale sepia, dorsal abdominal pattern. The embolus of the male palp lacks the large mesoproximal swelling, which is typical for *Z. rubidum* (Broen and Moritz, 1987: fig. 2C). The epigyne differs with that of *Z. rubidum* by the absence of a deep indentation at the anterior margin of the central depression.

ETYMOLOGY: The name of the species is obviously derived from the type locality.

Male: Total length 1.94 (1.80–2.25); carapace 1.04 (1.01–1.11) long, 0.70 (0.68–0.74) wide.

Color: Prosoma and legs pale yellow, carapace darkened in eye region. Abdomen pale cream except dorsum, which is dark sepia with 4 pale transverse bars in posterior half; frontal one often reduced to 2 circular patches, posterior 3 sometimes anastomosing.

Eyes: a: 1.00 (0.09); b: 0.63; c: 0.42; d: 0.52; e: 0.31; f: 0.10; g: 0.79; h: 0.10. MOQ: AW = 0.95 PW; AW = 1.22 L.

Legs: Without spines. Measurements:

	I	II	III	IV
F	0.83	0.81	0.77	1.13
P	0.32	0.26	0.26	0.34
T	0.67	0.53	0.53	0.93
Mt	0.69	0.67	0.67	1.03
t	0.57	0.50	0.46	0.59
Tot	3.07	2.76	2.71	4.02

Male palp: Figures 392, 393.

Female: Total length 2.58–3.12; carapace 1.09–1.35 long, 0.70–0.84 wide.

Further as male.

Epigyne: Figures 390, 391.

OTHER MATERIAL EXAMINED: 1♂: Spain, Andalucia, Torre de la Higuera near El Rocio, coastal dunes, pitfalls, 6–1.IV.1988, R. Jocqué (personal collection).

DISTRIBUTION: Only known from type locality.

Zodarion kabylianum Denis
Figures 394–398

Zodarion kabylianum Denis, 1936: 1038 (descr. ♂♀), 1937: 16.

Note: This species is only mentioned because specimens are used to illustrate the genus description. It was sufficiently described by Denis (1936).

MATERIAL EXAMINED: 5♂, 3♀: Algeria, Meurdja, 12.V.1983, chêne vert, R. Bosmans (MRAC).

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