

NEW AND LITTLE KNOWN ARACHNIDA FROM THE NAMIB DESERT, S.W. AFRICA

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(With 6 figures).

New Arachnid material recently collected in the desert litoral between Gobabeb and the Ugab river, north of Swakopmund, demonstrates what was previously surmised, that there exists a considerable fauna of dune-living Sparassid spiders ranging from small to very large species, now allocated to five genera and nine species.

I am greatly indebted for this material to Dr. W. Steyn, Director of the State Museum, Windhoek, Dr. C. Koch of the Transvaal Museum and Mr. E. von Koenen, previously caretaker at the Namib Desert Research Station, Gobabeb; for the excellent contributions of material provided by these collectors, I am deeply grateful. The type of *Leucorchestris steyni* will be deposited in the State Museum, Windhoek, all remaining types in the Transvaal Museum, Pretoria.

The following list summarises the extent and nature of the material on which the present paper is based:

SOLIFUGAE.

Solpugista bicolor (Lawrence)
Key to the species of *Solpugista* Roewer
Metasolpuga picta (Kraepelin)

SCORPIONS.

Parabuthus villosus Peters
Opisthophthalmus wahlbergi (Thorell) subsp.

ARANEAE.

Family Sparassidae

Leucorchestris steyni n. sp.
Leucorchestris kochi n. sp.
Leucorchestris porti n. sp.
Orchestrella n. genus
Orchestrella longipes n. sp.

A key to the genera of Sand-dune spiders of the Namib.

Observations on the nest-making habits of *Leucorchestris* species.

Family Zodariidae.

A description of the male of *Caesetius deserticola* Simon.

A preliminary list of spiders hitherto recorded from the Namib litoral (Lüderitzbucht to the Huab river valley).

References.

SOLIFUGAE

Genus SOLPUGISTA Roewer

SOLPUGISTA BICOLOR (Lawrence)

Solpuga bicolor Lawrence 1952, Proc. Zool. Soc. London, 122 (IV), p. 967, Fig. 5.

Fig. 1a—c.

1 ♀ (NM. 7563), Gobabeb, Namib Desert Research Station, S.W. Africa, collected by Dr. C. Koch. Oct. 1963.

Colour. Chelicerae and headplate pale yellow with light reddish-brown markings as in Fig. 1a, abdominal tergites yellow with an ill-defined reddish-brown lateral margination consisting of a somewhat ill-defined blotch on each segment; tergites bisected by a narrow reddish-brown stripe consisting of a short bar on each tergite except the last three; thoracic tergites similar, the first, however, without a median bar, the pleurites above leg III with a large ill-defined reddish-brown marking; anal valves and a small circular area surrounding them, black; pleurites silvery white, sternites dirty white, distinctly demarcated from the pleurites; malleoli without dark margination. Legs I—III light brown dorsally but whole of metatarsi-tarsi yellow, IV with femur reddish orange, tibia and basal half of metatarsus black, contrasting with the white apical half; tarsi brown above, the first segment more so. Leg IV with fine, silvery-white to cream, long hairs as far as apex of metatarsus, fairly thick but not quite forming a mane, those at the apex of metatarsus a little longer than the others and standing out like a brush,

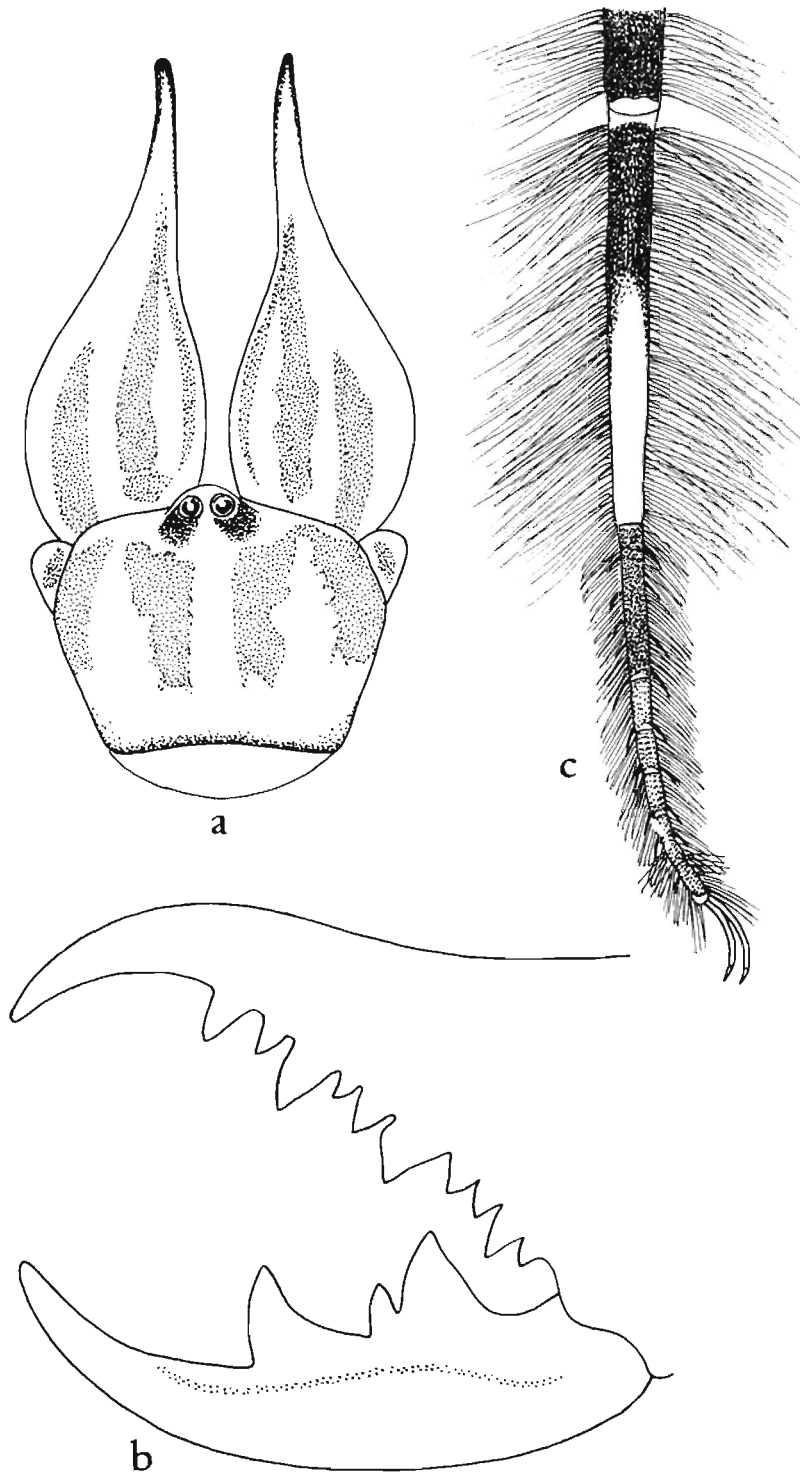


FIG. 1. *Solpugista bicolor* (Lawrence)
♀. *a*, head-plate and chelicerae, dorsal
view; *b*, chelicera from outer side; *c*
apex of femur and distal segments,
leg IV.

Fig. 1c; whole of pedipalp dorsally blackish-brown but femur-tibia light yellow below.

Setation. Chelicerae and headplate without spines or setae, covered (headplate thickly so) with a coating of long fine silvery-white hairs; tergites in the middle with a fur-like coating of short pale golden hairs, pleurites with sparse, much longer silvery-white setiform hairs, the sternites thickly covered with hairs similar in colour but much shorter. Tibia, metatarsus-tarsus of pedipalp with a thick brush-like coating of cream coloured hairs standing well up from the segments, mixed with them a few weak, slender, much longer setae, tarsus and distal two-thirds of metatarsus with slender cylinder bristles. Legs with a similar brush-like coating of white or cream hairs. Spination of tarsi II—IV similar to that of *Solpugista* but II and III with a few short accessory spiniform setae ventrally.

Dentition: Dorsal jaw as in Fig. 1b, the intermediate teeth large. Inner series with the first tooth very large, the second moderate, third small and close to the second (first more than twice as far from second as this is from third); outer surface of ventral jaw with a slightly sinuous, weak keel, demarcated by an irregular double row of minute granules; 9—10 strong stridulatory ridges.

Dimensions: Total length 37, pedipalp 23, width of headplate 6.8, length of chelicera 8.5 mm; greatest width of headplate greatly exceeding its length and equal to tibia, or metatarsus and $\frac{2}{3}$ tarsus of pedipalp.

The ♀ collected by Dr. Koch, at Swartbankbergen, 30 m SE Walvis Bay, 18.5.1959, and briefly described by me (1962a, p. 219), is undoubtedly this species.

Remarks: The dentition agrees in number and arrangement with that of the female of *Solpugelis pictichelis* Kraepelin and also with that of the East African *Solpugiba svatoshi* Birula though the latter must have been very immature (see Roewer's figures 308b and 308f, 1934, p. 488); the individual teeth however are much larger, the ventral jaw shorter and more massive. Two distinguishing features of the species are the woolly coating of fine white hairs, which covers most of the trunk and appendages, and the unusual width of the headplate.

The above description was based on a mature female which appeared to be an undescribed species; later, however, on receiving a male from Dr. Koch at Gobabeb, there could be no doubt that the first specimen was a female of *Solpuga bicolor* Lawrence, a species which had been described from a single male captured 25 miles inland from Swakopmund. I erroneously placed this species in the genus *Solpuga* (1953, p. 967) which in most respects resembles *Solpugista*, the differences consisting in the wider spacing of the main teeth of the dorsal jaw of the ♂ in the latter and the presence of minute granuliform intermediate teeth between the two anterior main

teeth; the main teeth of the dorsal jaw, though not of the ventral, are almost always much smaller and weaker in *Solpugista* than in *Solpuga*.

Solpugista is thus characterised by a reduction or degeneration of the teeth, more particularly those of the upper jaw, in the males. Roewer in his monograph of the order (1934, p. 56) gives two explanations for this difference in the dentition of the sexes which is considered to be a secondary sexual character on the one hand, while on the other it is ascribed to dietary influences, the short-lived males requiring a less intensive and less prolonged feeding period than the notoriously voracious females. The latter seems perhaps a better explanation for many deserticolous Solifuges which, like most members of the family Hexisopodidae *par excellence*, have adopted a specialised and largely exclusive diet of termites, and of which the great majority (at least 16 species) are deserticolous.

In all the 10 families of Solifugae, with the exception of the Rhagodidae, Daesiidae and Ammotrechidae, there is, to a greater or less extent, degeneration of the teeth in males. Most genera of the family Solpugidae reveal little difference in the size of the teeth in the two sexes; but in *Solpugista*, as stated above, and also in *Zeriassa* the teeth of the females are, in contrast to those of the males, strong and large; in two more desert living genera, *Solpugelis* and *Solpugiba*, the teeth of both sexes tend to be reduced in size, a condition not frequently met with in the Solifugae.

Of the two families inhabiting the new world, the Eremobatidae, which exhibit a pronounced dental heteromorphism in the sexes, are confined to North America, while the Ammotrechidae which lack such a difference, are almost all found in South America.

In deserts and sandy regions where many orders and families of insects, such as Cicindelid, Carabid and Tenebrionid beetles, have developed armour-like exoskeletons, it would be natural for many solifuges to take to a diet of soft-bodied termites, leading in such cases to a progressive reduction in the number and size of the cheliceral teeth.

The colouring of *bicolor* is also peculiar and differs from all other South African species of *Solpuga* which are known to me; on the other hand it agrees with two of the three known species of *Solpugista* (*hastata* and *methueni*) in the dark brown or blackish colour of the tibia and basal half of the metatarsus of leg IV, though differing from them in having the pedipalp-metatarsus yellow instead of blackish-brown, while the malleoli are also not margined with a dark rim. *Solpugista namibica* Kraus appears to lack the dark contrastive colouration of leg IV characteristic of the other three species; in view of the absence of a scopula on the pedipalp-metatarsus of the male however, this species might equally well be assigned to the genus *Sol-*

pugiba; in the strongly developed dentition of the ventral jaw it appears to differ markedly from both of these genera.

A brief description of the ♂ collected by Dr. C. Koch from the same locality as the ♀ (Dec. 1963), is as follows:

Colouring: The dorsal pattern markings of head and chelicera much less clearly defined than in the ♀ (Cp. fig. 1a).

Dentition: A single microscopic granule midway between the 2 anterior main teeth, two intermediate teeth between the second and third main teeth, the anterior one microscopic, subequal to the first intermediate tooth, the posterior, though still small, distinct and about twice as large as the anterior; the four main teeth of dorsal jaw also reduced, subequal, the first (anterior) a little smaller than the others; the four outer cheek teeth with the penultimate (third) largest; three inner cheek teeth with the first large, the third minute; teeth of ventral jaw well developed and very much larger than those of dorsal jaw.

Dimensions: Total length 32.5, pedipalp 29.5; width of head-plate 6.8; length of chelicera 7.5 mm. The ♂ from Gobabeb thus differs from the Swakopmund type of *bicolor* only in the fact that a small granuliform intermediate tooth between the two anterior teeth of the dorsal jaw is undoubtedly present; in addition there are 2 instead of 1 intermediate teeth between the second and third main teeth. In the type these intermediate teeth were either absent or so small as to escape observation.

A key to the known species of SOLPUGISTA Roewer

1. Pedipalp-metatarsus without scopula; leg IV without contrastive colouration
namibica Kraus
- Pedipalp-metatarsus with scopula; leg IV with tibia and part of metatarsus black or blackish-brown, the rest yellow 2
2. Anterior tooth of ventral jaw truncate and slightly bifid at apex
hastata (Kraepelin) = *ornithorhyncha* (Hewitt).
- Anterior tooth of ventral jaw normal, pointed 3
3. Flagellum seen from the side with a slight regular curve, long, slender, passing back well beyond ocular tubercle; pedipalp without spines or enlarged setae
bicolor (Lawrence)
- Flagellum seen from the side with 3 dorso-ventral bends, short, reaching only a little behind basal enlargement; femur and tibia of pedipalp with 4 spines each
methueni (Hewitt).

Genus METASOLPUGA Roewer

METASOLPUGA PICTA (Kraepelin)

Solpuga picta Kraepelin 1899, Mitt. Mus. Hamburg, 16, p. 219, Fig. 8. — *Solpuga nigrobraccata* Purcell 1899, Ann. S. Afr. Mus., 1, p. 431, Fig. 30.

Fig. 2.

Only two females of this peculiar species have previously been collected and the male when found should be of great interest. Neither Kraepelin nor Purcell have emphasized the contrasting arrangement of three colours, red, black and yellow, so unusual in Solifugae and which make the living animal a very attractive and unusual sight. The head and chelicerae are bright orange red, the pleurae above the legs jet-black, Fig. 2. The chelicerae are unusually long and slender, $1\frac{1}{2}$ times the width of the headplate, the pedipalp short, about two-thirds the body length. The minute tooth just in front of the second main tooth of dorsal jaw, shown in Kraepelin's figure of *picta* but not in Purcell's illustration of *nigrobraccata*, is also not present in a living specimen sent by Dr. C. Koch from the Desert Research Station at Gobabeb, Oct. 1963, Fig. 2. It agrees fully with Purcell's description of the colour; in size (29 mm.) it is intermediate to Kraepelin's specimen of 19.5 mm. and Purcell's of 45 mm.; it would seem that the former must have been quite immature while the Gobabeb specimen is also not fully adult.

The dimensions of the Gobabeb female are as follows: width of headplate 6.5, length 4.3; length of chelicera 9.2, pedipalps 19, total length 29 mm.

This Solifuge when disturbed attempts to dig into the sand or under a piece of wood in order to conceal itself; for digging the second pair of legs is used, assisted rather feebly by the first pair; scooping or scraping away of the sand is also effected with these legs, the chelicerae apparently not being used at all.

SCORPIONS

Family Buthidae

PARABUTHUS VILLOSUS (Peters)

Four males of this species were captured by Dr. C. Koch at Gobabeb at night. They differ considerably in colour as follows: one female, uniformly blackish-brown except the fingers which are a little lighter (found under white quartz boulders); two other males are blackish-brown but the pedipalps and legs light-brown (found in the living quarters of the Desert Station), the fourth, a male, is similar to the previously named pair except that the legs are yellow, not light brown. All these have the widely triangular, pale marking on the posterior margin of abdominal sternite III, also characteristic of *brachystylus* Lawrence. As implied by Purcell in his redescription of the species (1901, p. 159), there

is a certain amount of colour variation in this species which cannot be accounted for as a sexual difference.

Family Scorpionidae

OPISTHOPHTHALMUS WAHLBERGI Thorell

A quite immature ♂ specimen from Gobabeb collected at night by Dr. C. Koch, Dec. 1963, will no doubt be found to represent a new subspecies of *O. wahlbergi* when adult forms have been collected. It resembles both *wahlbergi* Thorell and *adustus longiceps* Lawrence (1942, p. 401, Fig. 1a) in having

weakly curved, resembling those of *adustus longiceps* (loc. cit. figs. 1c, d).

Hand-back subequal to width of hand.

Pectinal teeth. 34—34.

Dimensions. Total length 56, tail 25 mm.

Further material. A complete left hand pedipalp of a much larger and indubitably adult male was found by myself on the sanddunes at Gobabeb in May 1959. The shape, granulation and keels of the various segments agree in all respects with those of the above



FIG. 2. *Metasolpuga picta* (Kraepelin).

black markings on parts of the body but differs markedly in the colour pattern from both of these.

Though appearing to stand nearest to *O. wahlbergi litoralis* Lawr. it differs from this subspecies in the larger number of pectinal teeth and especially in the colour pattern.

Colour: The whole scorpion is yellow except the following parts of the dorsal surface, which are black: chelicerae, ocular tubercle and a small area laterally and posterior to it; the whole of abdominal tergites I—VI except a wide crescentic yellow marking in posterior half of each segment, VII with some ill-defined symmetrical black markings in anterior half (in tergites I and II the black anterior band is divided in the middle by a prolongation of the posterior crescentic marking). It is noteworthy that the tail is entirely yellow while in most varieties of *wahlbergi* some of the posterior segments are blackened.

Legs. Tarsal segments of legs III and IV resemble those of *O. wahlbergi litoralis* in having one weak spine on the outer side; the claws long, slender and

described specimen and the hand-back is also just equal to the width of the hand.

ARANEAE

Fam. Sparassidae

Genus **LEUCORCHESTRIS** Lawrence

LEUCORCHESTRIS STEYNI n. sp.

Fig. 3a, b

Holotype, 1 ♀ (NM. 8851), Torrebaai, Namib desert, S.W.Africa, collected W. Steyn and C. Koch, Nov. 1961.

Colour. Carapace light brown, chelicerae deep reddish, almost black; abdomen yellow, a little infuscated ventrally in the middle, a subcircular area surrounding the spinners and anal tubercle deep black; sternum and coxae yellow, mouth-parts light reddish brown; legs and pedipalps yellow, the patellae brown, contrasting with the remaining segments, tibiae with a small brown spot on each side at extreme base, anterior metatarsi and tarsi slightly in-

fuscated above, black below where these segments are covered with a black scopula. Carapace covered with long greyish-white hairs at the sides, these rubbed off in the middle, abdomen rubbed smooth, sternum with numerous long brownish hairs, coxae and basal segments of legs with long greyish hairs.

Chelicera. Inferior margin with 3 strong pointed triangular teeth, Fig. 3b, the two distal ones subequal or the middle a little smaller, the basal tooth much smaller than the others, about half as large as the apical one.

Eyes. Anterior row considerably more recurved than posterior row which exceeds it in width by about the diameter of an anterior median eye, medians $1\frac{1}{2}$ times diameter of laterals, about their own radius apart, half as far from the laterals, about $1\frac{3}{4}$ their diameter from edge of clypeus; posterior laterals twice as large as medians and subequal to anterior laterals or a little smaller, posterior medians distinctly further from the laterals than from each other; laterals on each side a little further from each other than is a posterior from an anterior median eye; median quadrangle narrower in front than behind, its posterior width greater than its length.

Vulva as in Fig. 3a.

Pedipalp. Femur, tibia and tarsus ventrally on the outer margins with a fringe or sweep of about 30 long stiff setae each, those of the femur a little weaker than the others, of the tibia very distinct, forming a straight, regular, but more or less duplicated row, these setae as long as the segment in tibia and tarsus, shorter in the femur where those of the distal half are angularly bent. Femur with 1 dorsal, 4 dorso-lateral spines, patella with 1 outer, tibia with 1 dorsal, 3 inner, 2 outer, tarsus with 3 inner 2 outer spines.

Legs. Tarsi and metatarsi with a thick, short, black scopula as in *L. arenicola*; femora I—III with 3 anterior, 2 dorsal, 3 posterior spines, IV similarly with 3.2.1; tibiae similarly with 2.2.2 spines and 3 pairs of ventral spines, patellae with 1 anterior, 1 posterior spine; metatarsi with 3 lateral and 3 inferior pairs of spines.

Dimensions: Length of carapace 12.5, abdomen 16.4, total length 25 mm. Transverse measurement from tarsus to tarsus of second legs, 88 mm.

The species differs from the genotype, *L. arenicola*, in colouring, details of the eye arrangement and the relative size of the teeth on lower margin of chelicerae (figs. 3b, 3c).

LEUCORCHESTRIS KOCHI n. sp.

Fig. 3d, e

Holotype, 1 ♂ (NM. 8847). Gobabeb, Namib desert, S.W.Africa, collected C. Koch, October 1962.

Colour. Carapace and chelicera light reddish-brown, apical third of chelicera darker; abdomen cream, dorsally a large central rounded portion light brown, a broad median ventral strip smoky brown with blackish hairs, area encircling spinners and scopulae of legs deep black, especially on tarsi. Legs yellow, patellae a little darker than remaining segments. Carapace at the sides and posteriorly with a very thick woolly coating of white hairs (rubbed off in the middle) dense between the eyes, on clypeus and basal two-thirds of chelicera (black short hairs on apical third); legs covered with white hairs, sternum, coxae and trochanters with some blackish ones intermixed.

Chelicera as in previous species.

Eyes. Posterior row wider than anterior row by about $1\frac{1}{2}$ diameters of an anterior median eye which are $\frac{2}{3}$ their own diameter apart and half as far from the laterals, not more than $1\frac{1}{4}$ diameters from the edge of clypeus; anterior laterals $\frac{3}{4}$ the diameter of the medians; posterior laterals twice as large as medians, equal to the anterior laterals, posterior medians distinctly further from the laterals than from each other; laterals on each side a little further from each other than is a posterior from an anterior median; median quadrangle as wide in front as behind, a very little longer than wide.

Pedipalp. Femur with a ventral outer row of about 20 setae, shorter and weaker than those of *steyni*, patella with about 4, tibia with 8—10, only some of them strong and setiform; inner surface of femur with a very irregular row of about 7 black setae; femur with 3 dorsal, 1 (0) inner spines, patella with 1 (0) inner, tibia with 3 inner (1 dorsal outer). Tarsus from below as in Fig. 3d, outer tibial process as in Fig. 3e, from outer side.

Legs II, III, IV, I. Anterior femora with 3 anterior, 2 dorsal, 3 posterior spines, posterior pair with 3.2.2; all patellae with a pair of spines; tibiae I, II and IV with 2.3.2 spines, III with 3(2).2.2, all tibiae with 3 pairs of ventral spines; metatarsi I—III with 3 dorsal and 2 ventral pairs of very long spines, IV similar but with 2 pairs and a row of 3 smaller apical spines ventrally. Tibiae and metatarsi dorsally with a sparse fringe of long whitish almost erect setae, remaining segments without; scopulae of legs, especially of tarsi, very dense.

Dimensions: Length of carapace 12, of abdomen 13, total length 25 mm; transverse measurement from tarsus to tarsus of legs II, 118 mm.

LEUCORCHESTRIS PORTI n. sp.

Fig. 3f, g.

Holotype 1 ♂, cotype 1 ♂ (NM. 8852), between Ugab and Huab rivers, Namib desert, north of Swakopmund, S.W.Africa, collected W. Steyn and C. Koch, Nov. 1961.

Colour. Carapace brown, darker than in other species of the genus; chelicera reddish-brown; abdomen cream, epigastric fold light brown, spinners and an encircling ring, black; legs yellow, sternum and mouth-parts a little darker, dull orange to light brown, all patellae and bases of tibiae brown, contrasting with remaining segments; most of the hairs rubbed off the carapace and abdomen, those remaining on margins of carapace, clypeus and anterior surfaces of chelicera white, as dense as in other species.

Chelicera. Anterior surfaces inflated, rounded, short and very thick-set; inferior margin with 3 teeth, the basal much smaller than the others, which are subequal.

Eyes. Posterior row slightly, anterior row moderately recurved; anterior laterals $\frac{3}{4}$ diameter of anterior medians which are less than their own radius apart, a little nearer to the laterals; posterior medians a little nearer to each other than to the laterals, 3—4 diameters apart; laterals on each side subequal;

ocular quadrangle a little longer than posteriorly wide, wider behind than in front by the diameter of a posterior median eye; anterior medians $1\frac{1}{2}$ times their diameter from the edge of the clypeus.

Pedipalp. Femur with 5 dorsal and lateral spines near apex, patella unspined, tibia with a row of 4 inner spines and 1 dorso-exterior spine at base; none of the segments with a row of long modified ventro-exterior setae but with thick tufts or bristles of white hairs, largely obscuring the structures of the ventral surface of tarsus, Fig. 3f.

Legs detached, spined as in previous species; scopula of anterior legs fairly dense on whole of metatarsus but sparse (rubbed off?) on posterior legs.

Dimensions: Length of carapace 12.8, of abdomen 15.5 mm.

ORCHESTRELLA n. genus

Anterior row of eyes very large, distinctly more recurved than posterior row; medians $\frac{2}{3}$ diameter

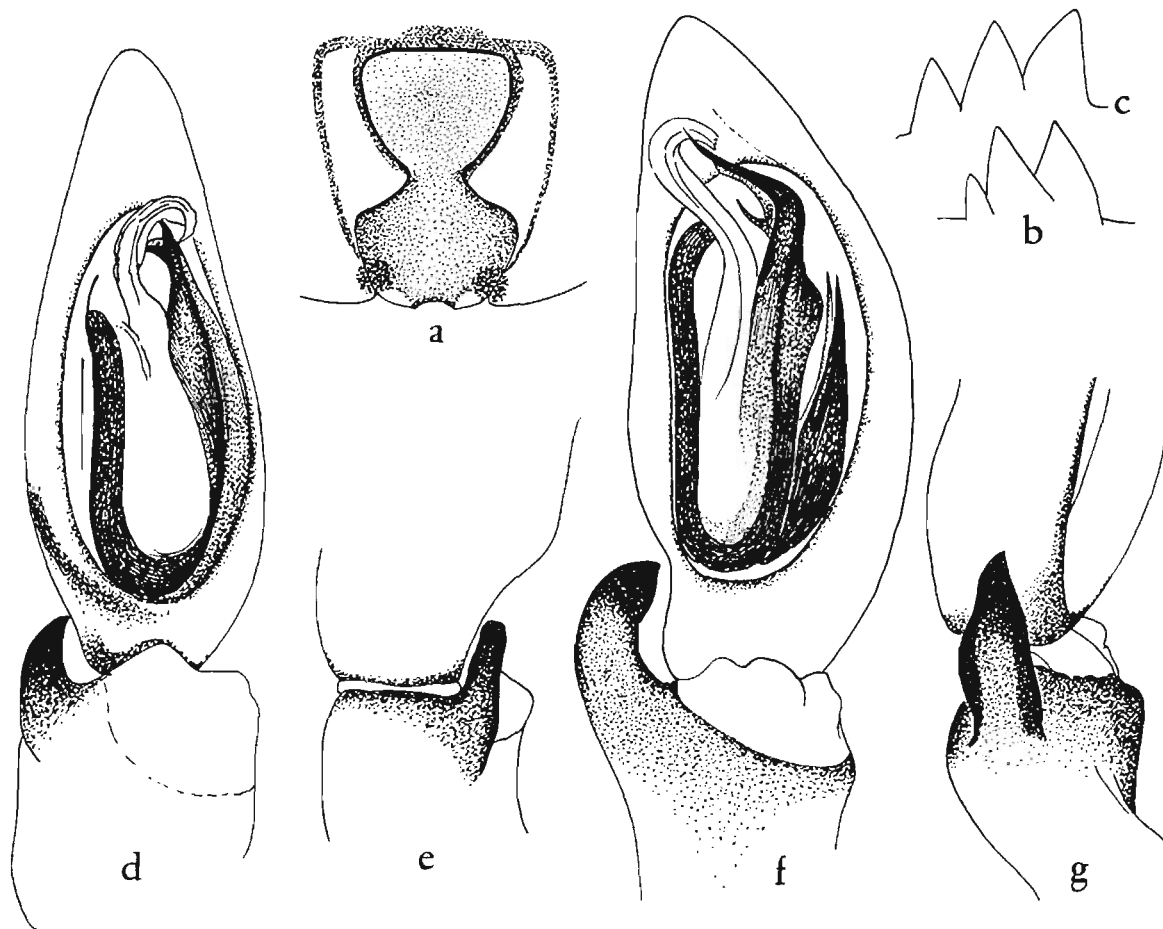


FIG. 3. *Leucorchestris steyni* n. sp. ♀. a, vulva; b, teeth on inferior margin of chelicera; c, the same of *L. arenicola* Lawrence. *Leucorchestris kochi* n. sp. ♂; d, tarsus and tibia of pedipalp, from below; e, tibia of pedipalp, outer side. *Leucorchestris porti* n. sp. ♂; f, tarsus and tibia of pedipalp, from below; g, tibia of pedipalp, outer side.

of laterals, all the eyes almost touching; posterior row only a little wider than anterior row, laterals 3 times diameter of medians which are by far the smallest of the eyes; laterals on each side much nearer to each other than is a posterior to an anterior median; median quadrangle considerably longer than wide, a little wider in front than behind. Chelicera with 3 strong pointed teeth on inferior margin. Pedipalp of ♂ with 8—9 spines, some of them weak, inner surface of tibia without a row of 3 or 4 spines, femur to tibia with a distinct ventral row of modified setae; legs of ♂ very long and slender, especially metatarsi, these with very long spines; a distinct scopula on the tarsi, that of the metatarsi sparse in basal half.

Genotype: *Orchestrella longipes* Lawrence.

ORCHESTRELLA LONGIPES n. sp.

Fig. 4a, b.

Holotype 1 ♂ (NM 8848), Gobabeb, Namib desert, S.W.Africa, collected by E. von Koenen, Aug. 1963.

Colour. Carapace and chelicerae light brown, thickly covered with white woolly hairs, chelicerae not darkened apically but with black hairs; abdomen yellow, thickly covered with whitish hairs, only the spinners and the small area surrounding them black; legs, sternum and mouth-parts yellow, sternum with

a few long fine darker setae mixed with the usual whitish ones, pedipalp yellow but tarsus blackish brown.

Eyes as in generic description, posterior row wider than anterior row by the radius of an anterior lateral eye; anterior laterals distinctly larger than posterior laterals, separated from them by two-thirds their own diameter; posterior laterals at least 3 times the diameter of posterior medians which are twice their own diameter apart, a little more from the laterals; median quadrangle much longer than wide, slightly wider in front than behind.

Chelicera as in generic description, apical tooth largest; the basal smallest but not very much smaller than the others.

Pedipalp. Femur with 1 dorsal subapical and a recurved row of 4 spines near apex, patella with 0, tibia with 1 outer, 1 inner spine (proximal to this 2 strong setae). Tarsus from below as in Fig. 4a.

Legs II, III, IV, I. Femora I—III with 3 anterior, 3 dorsal, 3 posterior spines (IV similarly with 2.3.2); patellae with a pair of lateral spines; tibiae with 2 anterior, 2 dorsal, 2 posterior, and 3 pairs of ventral spines; metatarsi with 3 lateral and 2 ventral pairs of spines. Scopula becoming progressively sparser towards the base of metatarsi from I—IV backwards.

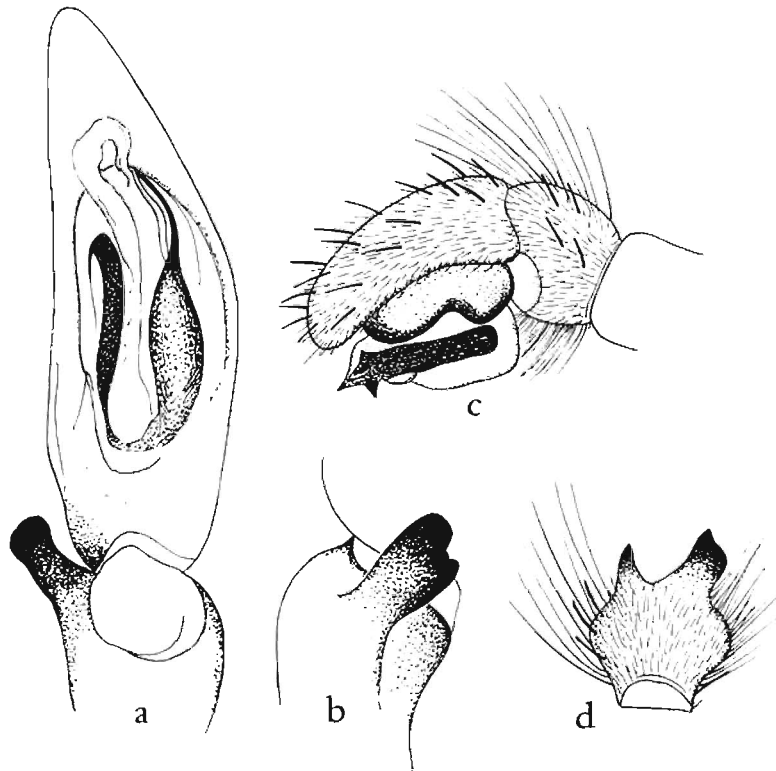


FIG. 4. *Orchestrella longipes*, n. sp. ♂. a. tarsus and tibia of pedipalp, from below; b. tibia of pedipalp, outer side. — *Caesetius deserticola* Simon. ♂. c. tibia and tarsus of pedipalp, inner side. d. tibia of pedipalp, from above.

Dimensions: Length of carapace 10.5, abdomen 9.3, total length 18 mm; transverse measurements from tarsus to tarsus of second legs 112 mm.

The species described by me under the name of *Palystella browni* (1962, p. 206) should be transferred to this genus.

**Key to the genera of dune-spiders (Sparassidae)
from the Namib, S.W. Africa**

The members of the five genera keyed below are all characterised by a sweep or brush of modified setae on the ventral surface of the pedipalp segments except in *Arandisa* and the ♂ of *Leucorchestris porti*. All are in general light coloured with the exception of the spinners and anus which are deep black; the bodies and appendages, (at least in the basal segments) of these spiders are clothed with a thick coating of long white or greyish hairs; in all the genera except *Microrchestris* the scopulae of the metatarsi and tarsi are very well developed. *Carparachne* and *Microrchestris* differ from the other genera in having a distinct row of long modified setae (6—8) on the inner surface of pedipalp femur in addition to the row on the ventral surface.

1. Posterior row of eyes only a little wider than anterior row; anterior laterals distinctly larger than anterior medians; median quadrangle much longer than wide 2
- Posterior row much wider than anterior row; anterior eyes subequal or the laterals considerably smaller than the medians; median quadrangle not much longer than wide 3
2. Posterior medians much the smallest of the eyes; maxillae bluntly pointed apically, their inner margins distinctly divergent
Orchestrella Lawr.
- Anterior medians much the smallest of the eyes; maxillae abruptly truncate apically (cf. Lawrence, 1938, Fig. 8d), their inner margins vertical
Arandisa Lawr. (1938, p. 223, Figs. 8a—d)
3. Inferior margin of chelicera with 3 large pointed teeth; tibia of pedipalp (♂ and ♀) with an inner row of 3 spines; median quadrangle a little longer than wide
Leucorchestris Lawr.
- Inferior margin of chelicera with 2 smaller teeth; tibia of pedipalp with an inner row of 4 spines; median quadrangle as long as wide or much wider than long 3
4. Scopula of anterior legs very strong; posterior row of eyes almost twice as wide as anterior row, the anterior medians much larger than the laterals; lateral eyes on each side much further from each other than is a posterior from an anterior median eye; size large
Carparachne Lawr.

- Scopula of anterior legs very weak; posterior row of eyes not twice as wide as anterior row, those of the anterior row subequal; lateral eyes on each side a little nearer to each other than is a posterior to an anterior median eye; size small

Microrchestris Lawr.

**Observations on the nest making habit of
LEUCORCHESTRIS species.**

A shallow excavation is made in loose sand by the male of *Leucorchestris kochi*, see Fig. 5, as well as by the female previously reported in the case of *Leucorchestris arenicola* (1962, p. 211), the sides of the burrow being rather crudely cemented with silk to prevent them from collapsing.

Digging in soft sand is carried out with the three anterior legs, usually only on one side, the tarsi being used to scabble at the sand with rapid movements; when a certain amount of sand has been heaped up with the legs of the right side, the carapace is suddenly lowered and with a single sideways sweeping movement, the sternum pushes the sand to the left hand side, the opposite to where the digging is taking place; surprisingly the male pedipalp is also sometimes used to remove the sand when that which has accumulated in front of the spider has to be pushed aside; this is done with a quick sideways scooping movement, the pedipalp being laid more or less flat on the sand.

From time to time the spider turns around and directs the posterior end of the abdomen to the places from which sand has been removed; the spinners then appear to rapidly lay down a matting of silk composed of numerous very fine short criss-cross threads which stabilise the sand and enable the shallow burrow with its sloping but hardly vertical walls to assume some sort of outline; at various points also the silk mat is fastened more securely against the sand by means of minute depressions where the mat is pushed inwards with the spinners; these resemble the buttons which at regular intervals secure the leather seats of railway carriages; whether this is done by a special manipulation of the spinners at the time the mat is laid down or by working over it after it is completed, could not be established.

As soon as the burrow was roughly finished, the spider lay down in it and remained motionless with the legs contracted.

Text-figure 5 is based on a photograph of *Leucorchestris kochi* which had been placed in a circular glass jar with loose sand, the photograph being taken through the glass; it does not give a clear picture of the burrow so that the text-figure has somewhat exaggerated various features, the criss-cross threads being shown larger than in actuality

since the inner surface of the nest is very smooth except for the dimpled appearance described above. The outline of the burrow, where it rests against the sides of the glass jar, can be clearly seen; the sides are by no means strong or firm and if made too steeply tend to crumble or collapse at the top of the burrow, as can be seen on the right hand side of the text-figure.

The fringes of long wiry setae on the pedipalp of both males and females of various species are widespread in these sand frequenting forms and evidently play a considerable part as sweeps in the scooping or removing of sand. The dense woolly covering of white hairs on the bodies of these spiders also appear to be a desert adaptation since very similar ones occur on some or all of the legs of Solifuges from the same locality, *Solpugista bicolor* (Lawrence), Fig. 1c, and *Metasolpuga picta*, Fig. 2, being examples.

A colour modification in these desert spiders, represented by the deep black round spot at the extreme posterior end of the abdomen, is also found in the Solifuge *Solpugista bicolor* and many other members of the family Solpugidae; black banding of the legs and black spots on other parts of the body are also probably examples of desert colouration as they are not found in Solifuges from other parts of Southern Africa while good examples from the western litoral of South West Africa are provided by *Solpugista bicolor* (Lawrence) and *Metasolpuga picta* (Kraepelin). It is noteworthy that these two species, while differing widely in many taxonomic characters have an identical colour pattern with regard to the fourth pair of legs.

Family Zodariidae

Genus CAESETIUS Simon

CAESETIUS DESERTICOLA Simon 1910

C. deserticola Simon 1910, Schultze's Forschungsreise, 4, p. 183.

Fig. 4c, d.

The nine species and subspecies of this genus and its close relative *Tryssochilus* were all, with the exception of one species, described by Simon (1910, pp. 182—185) and on the basis of females only. *Caesetius masculinus* Lawrence (1938, p. 218, Fig. 4) was described from a single specimen taken at Port Nolloth and is probably the male of *C. canosus* Simon.

I take this opportunity of adding a brief account of a male of the above species sent to me by Dr. C. Koch, collected at Swakopmund, Nov. 1961. It differs from *C. masculinus* in the details of the bulb of tarsus and in the processes of the tibia of pedipalp.

Colouring, spination and general appearance as in the ♀. Chelicerae with a strip of about 35 black thickened spine-like hairs with rather blunt tips along the inner surface, the strip about three hairs wide. Simon describes these as spinules (petites épines) but they are I think modified hairs, quite different and distinct from the other types of setation on the chelicerae or elsewhere. The incrassate hairs of the clypeus in front of the anterior row of eyes (Simon, 1892, p. 417, Fig. 386), are poorly developed.

Dorsum of abdomen with a longish oval scute in

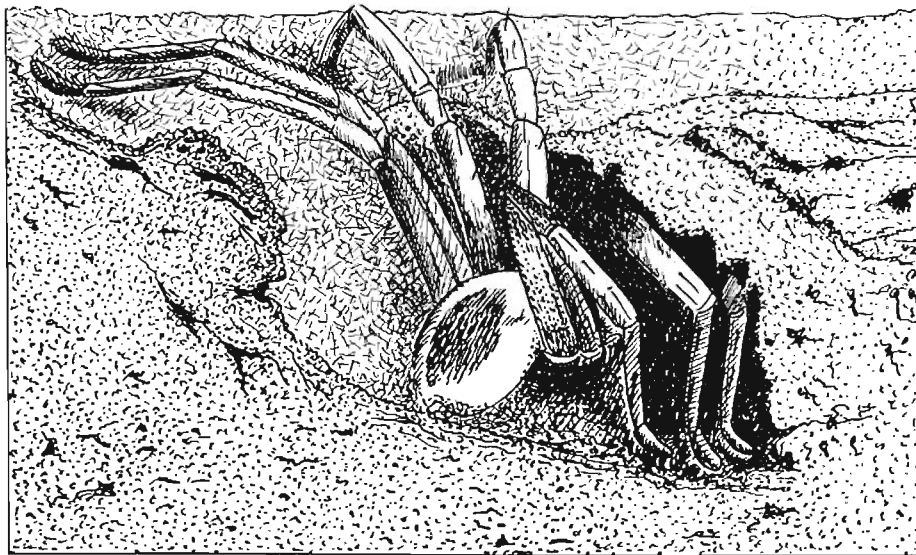


FIG. 5. *Leucorchestris kochi* in a recently made shallow burrow in loose sand (after a photograph by L. Kelsall).

its anterior half, 3.4 mm long, almost three times as long as wide, rounded at both ends.

Pedipalp as in Fig. 4c seen from the inner side; tarsus and tibia dorsally with a number of rather blunt incrassate black hairs; in addition to these but quite distinct from them, some much longer and more slender setae; tibia seen from above, Fig. 4d, with 2 processes on the outer dorsal aspect (not seen from inner side in Fig. 4c), the more lateral of the two much thicker and weakly bifid at apex, the mesial one pointed and slender.

Dimensions. Length of carapace 4, of abdomen 5.3, total length 7 mm.

All the members of this genus appear to be typical sand inhabiting spiders living on the dunes of the maritime litoral from Walvis Bay to Port Elizabeth or inland (Kalahari and the Transvaal). Other spiders adapted for existence in or on sand are *Salsula parvimanus* (Oonopidae), several species of *Ammozenus* (Ammozenidae), *Seothyra* sp. (Eresidae) and perhaps *Uroctea schinzi* Simon.

In August, 1963, Dr. L. Schulze of the Transvaal Museum sent me a photo of a nest made on the surface of sand on the dunes near Gobabeb which is obviously that of a species of *Seothyra* Purcell (Fig. 6). The nest in its general appearance resembles that of *Seothyra schreineri* figured by Purcell (1903, p. 32, figs. 5—7) from Hanover, Cape. Its detailed pattern however, appears to be different from that of *S. schreineri* and when adult forms have been obtained the spider making it will no doubt prove to be new to science; another species, *S. fasciata* Purcell, is known from the South West Kalahari.

A preliminary list of the spiders hitherto recorded from the Namib (Lüderitzbucht to the Huab River Valley)

Aviculariidae

1. *Hermacha lanata* Purcell
2. *Harpactira namaquensis* Purcell

Eresidae

3. *Eresus echinatus* Purcell
4. *Stegodyphus canus* Purcell
5. *Seothyra* sp.

Sicariidae

6. *Sicarius hahni* Karsch
7. *Sicarius albospinosus* Purcell
8. *Loxosceles spinulosa* Purcell
9. *Scytodes arenacea* Purcell
10. *Scytodes broomi* Purcell

Oonopidae

11. *Salsula parvimanus* Simon
12. *Nephrochirus copulatus* Simon

Dysderidae

13. *Ariadna insularis* Purcell
14. *Ariadna pulchripes* Purcell

Prodidomidae

15. *Prodidomus reticulatus* Lawrence

Drassidae

16. *Platyoides beta* Lawrence
17. *Scotophaeus relegatus* Purcell
18. *Melanophora aculeata* Purcell
19. *Camulina corrugata* (Purcell)
20. *Setaphis anchoralis* Purcell



FIG. 6. Nest of a species of *Seothyra* made on the surface of sand dunes near Gobabeb (phot. L. Schulze).

21. *Asemethes decoratus* Purcell
22. *Asemesthes flavipes* Purcell
23. *Asemesthes lineatus* Purcell
24. *Asemesthes albovittatus* Purcell
25. *Zelotes aculeata* Purcell
26. *Xerophaeus perversus* Purcell
27. *Xerophaeus aridus* Purcell
28. *Theuma longipes* Lawrence

Palpimanidae

29. *Palpimanus stridulator* Lawrence
30. *Palpimanus namaquensis* Simon
31. *Iheringia biplagiata* (Simon)

Zodariidae

32. *Cicymethus acanthopus*
33. *Cydrela approximata* (Karsch)
34. *Caesetius deserticola* Simon
35. *Caesetius deserticola lüderitzi* Simon

Ammoaxenidae

36. *Ammoaxenus* spp.

Urocteidae

37. *Uroctea schinzi* Simon

Pholcidae

38. *Smeringopus atomarius* Simon

Theridiidae

39. *Theridion purcelli* Simon
40. *Latrodectus geometricus* C. L. Koch
41. *Latrodectus mactans* Fabr.
42. *Teutana grossa* (C. L. Koch)
43. *Teutana lepida* (O. P. Cambridge)

Argyropidae

44. *Nemoscolus tubicola* (E. Simon)
45. *Argyope nigrovittata* Thorell
46. *Tetragnatha andonea* Lawrence

Thomisidae

47. *Thanatus namaquensis* Simon
48. *Thanatus lüderitzi* Simon

Clubionidae

49. *Selenops radiatus* Latr.
50. *Argistes africanus* Simon
51. *Thysanina serica* Simon

Sparassidae

52. *Leucorchestris arenicola* Lawrence
53. *Leucorchestris steyni* Lawrence
54. *Leucorchestris kochi* Lawrence
55. *Leucorchestris porti* Lawrence
56. *Carparachne alba* Lawrence
57. *Orchestrella longipes* Lawrence
58. *Orchestrella browni* (Lawrence)
59. *Olios correvoni nigrifrons* Lawrence
60. *Microrchestris melanogaster* Lawrence
61. *Arandisa deserticola* Lawrence

Agelenidae

62. *Desis formidabilis* (O. P. Cambridge)

63. *Tegenaria domestica* (Clerck), Possession Isl. introduced

Lycosidae

64. *Hogna swakopmundensis* Strand
65. *Lycosa lüderitzi* (Simon)
66. *Tricassa deserticola* Simon
67. *Trochosippa eberlanzi* Roewer
68. *Evipella eberlanzi* Roewer
69. *Pardosa manubriata* Simon

Oxyopidae

70. *Peucetia fasciventris* Simon

Salticidae

71. *Heliophantus trepidus* Simon
72. *Dendryphantas schultzei* Simon
73. *Mogrus semicanus* Simon
74. *Neaetha heteropogon* Simon

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