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A review of the nebulosa-group of *Pardosa* Koch 1847 in Africa, a complex with some highly variable species (Araneae Lycosidae)

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The African representatives of the *Pardosa nebulosa*-group are revised. This group now includes 10 species, five of which are new: *P. alticola*, *P. kavango*, *P. nostrorum*, *P. palaesta* and *P. thompsoni*. The other five are *P. gefiana* Roewer 1959, *P. injucunda* (O.P.-Cambridge 1876), *P. lusimana* Roewer 1959, *P. messingerae* (Strand 1916), *P. naevia* (L. Koch 1875). *P. lycosina* Purcell 1903, only known from females, is a possible additional species. All the species are described and much attention is paid to intraspecific variability. In *P. injucunda* the high variability is thought to reflect the existence of different biospecies. An illustrated key to the males is provided. The generic placement of the group and the taxonomic level of the taxa it contains, are discussed.

INTRODUCTION

Since the advent of the pitfall trap in terrestrial invertebrate prospection, the number of lycosids in spider collections has increased dramatically. In the Tervuren Museum (MRAC) over 2500 tubes of unidentified African lycosids are now available. Identification of this enormous collection has failed largely because the latest general revision of the African representatives (ROEWER 1959, 1960) is virtually unusable. It is well known that this monumental paper cannot be trusted and we will not digress on the subject. Two facts emerge from ROEWER's paper: the number of African wolf spider species is very high, and thorough revisions are needed to clarify the situation.

This paper deals with a rather homogeneous species-group within the genus Pardosa Koch 1847. It includes several variable species some of which are extremely widely distributed and common in a large part of Africa. This is why priority was given to the revision of this species-group. The group is obviously not restricted to Africa alone. BUCHAR (1980) studied members of the same group, which he called the nebula-group, from Asia. One species in that paper [Pardosa sumatranus (Thorell 1892)] also proved to be extremely variable, as shown by the different shapes of the epigyne (BUCHAR 1980, figs 5-9) and the different colour patterns (figs 16-21). We have followed BUCHAR (1980) by calling this group the nebula-group because P. nebula (Thorell 1872) has priority. TONIOGGI (1966) mentioned three species of the group from southern Europe.

ZYUZIN (1985) suggested that some of the groups included in Pardosa should receive generic rank. SIMON's (1897) definition, although essentially followed by all subsequent workers, is certainly not narrow enough to be used. According to ZYUZIN (1985), P. nebula is essentially different from P. lugubris and should therefore, together with the entire group, be placed in an independent genus. ZYUZIN (1979) has indeed argued that not P. bortensis but P. lugubris is to be considered the type species of Pardosa. However, at this stage, the knowledge of the Pardosa-complex is still very scant and it is premature to split off one of the groups without profound insight in the limits of the other ones.

FORMAT

Descriptions are extensive mainly because many taxa have been diagnosed in the past on the base of colour patterns (e.g. DE LESSERT 1915). One of the aims of this paper is to show that colour patterns can vary to a large extent within the same species. However, spination formulae are not given because they are stable within this group and give no additional information for the delimitation of the taxa.
The Pardosa nebulosa-group in Africa

The literature cited for each species excludes the references given by Bonnet (1958) unless the names used therein are given a new status.

The distribution of the species is shown in Figs 58-60. The maps provide an approximation of the presently known areas in which they occur. It should be stressed that no individual localities are plotted here, the aim being simply to visualize the general distribution of each taxon.

All measurements are in mm. Unless mentioned otherwise, the descriptions are based on type material: holotype or lectotype and one of the paratypes for the other sex if available.

ABBREVIATIONS

ALE: anterior lateral eyes; AME: anterior median eyes; At: allotype; CL: carapace length; CW: carapace width; F: femur; Ht: holotype; juv.: juvenile; Lt: lectotype; MA: median apophysis; Mt: metatarsus; P: patella; PLE: posterior lateral eyes; Pt: paralectotype; PME: posterior median eyes; T: tibia; t: tarsus.

Acronyms used for museums, institutions and collections are as follows. MHNG: Muséum d’Histoire Naturelle, Genève (B. Hauser); MWNH: Museum Wiesbaden (Natural History) (M. Gelisheardi); MRAC: Musée Royal d’Afrique Centrale, Tervuren (R. Jocqué); MNHN: Muséum National d’Histoire Naturelle, Paris (J. Heurtaul & C. Rollard); NCP: National Collection, Pretoria (A. Dippenaar); NMSA: Natal Museum, Pietermaritzburg (P. Croeser); NMW: National Museum Windhoek, Namibia (E. Griffin); NRS: Naturhistoriska Riksmuseet, Stockholm (T. Kronestedt); SAM: South African Museum, Cape Town (H. Robertson); SMF: Senckenberg Museum, Frankfurt (M. Grasshoff); UMO: University Museum, Oxford (I. Lansbury); ZMB: Zoologisches Museum, Berlin (M. Moritz).

GENERAL DESCRIPTION

The species of this group of Pardosa are small to medium size wolf spiders (♂: 4.9-7.3, ♀: 5.6-9.0) with clear median and lateral bands on the carapace and a characteristic morphology of the secondary genitalia.

The male palp has a well developed MA which is directed retrolaterally (Figs 6, 9, 12, 15, 18, 25). The MA has only one branch. Characters in the male palp that can be used in species delimitation are the shape and orientation of the MA, the morphology of the tegular part that encircles the MA, the shape and orientation of the spermatoduct in the tegulum, the presence and orientation of grooves or ribs in the basal part of the tegulum, the presence and extent of a groove in the palea.

The female epigyne and vulva (Figs 1A-B, 33-45) is very characteristic. It has an inverted T-shaped median septum and two well developed atria. Although it is usually impossible to identify isolated females with certainty, vulval morphology can help to distinguish the species. In this context the following characters are useful: the shape of the median septum and the length of the posterior groove holding it, the size of the spermathecae, the width of the copulatory ducts and the presence and shape of lateral atria.

Ten African species are considered to belong to this species group. One of them, Pardosa paleata n. sp., has slightly divergent genital morphology as compared to the other species, but we have provisionally retained it in the P. nebulosa-group.
Several closely related species have been described from the palearctic region, e.g. *Pardosa aenigmatica*, *P. nebulosa* (see Tongiorgi 1966). Some of these were treated by Buchari (1980).

For a few species there are still problems because the type material is lost or because they are only known from females which are, in almost all cases, impossible to separate. The only problematic species (*P. lycosina*) for which the type locality is outside the known distribution area of any of the recognized species, is redescribed.

**NOMINA DUBIA**

**Pardosa proximella** Strand 1906

*Lycosa proximella* Strand 1906: 678 (♂♀) types lost [not Denis 1962: 31, misidentification of *Wadjica* venatrix (Lucas 1846)].

*Pardosa proximella* (Strand 1906) in Roewer 1959: 38 (♂♀).

Many specimens identified by Roewer as *P. proximella* (MRAC) proved to be *P. messingerae*.

**Pardosa feldmanni** Strand 1907

*Lycosa feldmanni* Strand 1907b: 186 (♀).

*Pardosa feldmanni* (Strand 1907b) in Roewer 1959: 142 (♀).

Types supposedly in MWNH, not available or lost.

**INCERTAE SEDIS**

**Pardosa lycosina** Purcell 1903

Redescribed below because no other species are known from the vicinity of the type locality.

**Pardosa tenera** Thorell 1899

*Pardosa tenera* Thorell 1899: 87 (♂); Roewer 1959: 141 (♀).

Holotype female: Cameroon (NRS) (examined).

A probable synonym of *P. injucunda* O.P.-Cambridge but not identifiable with certainty from females only. Two females identified by Roewer (1959: 141, material in SMF, examined) are not conspecific: one is most probably a female of *P. injucunda*, the other one is a specimen of another small Pardosinae species with a very different type of epigyne.
**Pardosa katangana** Roewer 1959

*A probable synonym of* P. *lusingana* Roewer or *P. injucunda* O.P.-Cambridge but not identifiable with certainty on females only (♀ type in SMF, examined).

**Pardosa subproximella** Strand 1906

*Lycosa subproximella* **Strand** 1906: 679 (♀); **Strand** 1907a: 362; (original types destroyed, neotypes designated by Roewer 1959, 2♀ in ZMB, examined).

*Pardosa subproximella*, Roewer 1959: 77 (♂).

The types of this species were deposited in Stuttgart but destroyed during the war. Roewer saw 1♂ and 2♀ (ZMB) from Addis Ababa that had been identified by Strand himself. We have had the same tube on loan but it contains only two females. They could belong to one of the three species that occur in the area, *P. injucunda*, *P. naevia* or *P. alticola*.

**KEY TO THE MALES**

1. Cymbium without short, curved, distal spines
   — Cymbium with one or a pair, exceptionally three, curved, distal spines

2. Tegulum in palp with strongly projecting, rounded, ribbed process, encircling the base of the MA
   — Tegulum in palp without such a process, base of MA covered by short bulge of tegulum, not ribbed and with slightly curved distal margin

3. Tegulum in palp with strongly projecting, rounded, ribbed process, encircling the base of the MA
   — Tegulum in palp without such a process, base of MA covered by short bulge of tegulum, not ribbed and with more or less straight distal margin

4. Palea with two appendages: a short sharp one and a stronger hooked one
   — Palea without appendages

5. Part of tegulum behind the spermduct with longitudinal ribs
   — Part of tegulum behind spermduct without such ribs

6. Cymbium with long, white hairs covering ventromesal part of bulbus, spermduct strongly procurved; a few short ribs, laterally in front of spermduct
   — Cymbium without white hairs, spermduct sinuous or straight, never procurved; ribs behind spermduct only
7. Proximal lip of palea in lateral view well delimit-ed and projecting beyond the rest of the sclerite; shiny area behind spermduct large, occupying more than half the area proximal to the spermduct.

— Proximal lip of palea in lateral view hardly separated from, or not projecting beyond the rest of the sclerite; shiny area occupying less than half the area proximal of the spermduct.

8. Spermduct almost straight and at an angle of c. 75° with longitudinal axis; distal ribs behind spermduct almost parallel with it.

— Spermduct straight or sinusuous but at a much smaller angle (most often c. 45°, max 60°) with longitudinal axis; distal ribs behind spermduct at an angle of 60° or more with the spermduct.

9. Median carapace band darkened in front of feo­veal constriction or with two triangular, posteriorly converging spots; ribs proximal of spermduct few (6-7), distal ribs almost parallel with longitudinal axis.

— Median carapace band not markedly darkened in anterior part, or with two tiny darker points; ribs behind spermduct more numerous (8 or more); distal ribs at an angle of c. 45° with longitudinal axis.

10. Proximal lip of palea in lateral view clearly separated from rest of sclerite, short, with steep slope; not more than 8 ribs proximal of spermduct; distal ribs at an angle of ± 30° with longitudinal axis.

— Proximal lip of palea in lateral view, less clearly separated from rest of sclerite by transverse groove, longer, slope less steep; more than 8 ribs behind spermduct, all at an angle of ± 45° with longitudinal axis.

DESCRIPTONS

_Pardosa naevia_ (L. Koch 1875) (Figs 2-4, 36, 52, 55, 60)

_Lycosa naevia_ L. Koch 1875: 72 (♂); _Pavesi_ 1883a: 1, 3; 1883b: 64, 93, 100; _Strand_ 1908: 357.
_P. potteri_ Simon 1901: 23 (♀ type from Ethiopia in MNHN, examined) (n. syn.).
_P. micheli_ Simon 1901: 26 (♂ type from Ethiopia in MNHN, examined) (n. syn.).
_P. infuscunda_, Roewer 1959: 35 (specimens from Egypt, Cairo, (♀), misidentification, SMF, examined).

_Type material._ Lectotype female (here designated): Abessinia, leg. Jickeli (ZMB) (examined). Paralectotypes: 2 juv. ♀ (or 1 juv. and 1 without epigyne): together with Lt.

_Diagnosis._ Males of this species are recognized by the following characteristics of the palp: the proximal lip of the palea protrudes beyond the main part of that sclerite.
Fig. 1. — A, *Pardosa injucunda* (from Zaire, Ruwenzori), epigyne, SEM, hairs removed; B, *P. messingerae* (from Zaire, Lulimbi), epigyne, SEM (scale bars = 0.1 mm).
(Fig. 2); the few ribs proximal to the ductus in the tegulum are parallel with its proximal (lateral) part; the flat shiny area is large and its prolateral corner almost reaches the lateral edge of the cymbium. Other indicative characters are the shape of the median carapace band which stops short in front, clearly away from the PLE, it tapers to a sharp point at the back, clearly separated from the margin. The sternum is always dark.

**Description.** Female (lectotype). Measurements: CW = 2.58, CL = 3.25, TL = 7.01, AME = 0.11, PME = 0.32. Epigyne (Fig. 36): T-shaped septum well delimited; posterior groove holding transverse bar of inverted «T», wider than long. Spermathecae small, copulatory ducts wide, strongly curved inward and provided with a lateral atrium.

This lectotype has been dried, its colour is not described.

Female (from Ethiopia, Jimma, MRAC 170780). Measurements: CW = 2.79, CL = 3.86, TL = 6.38, AME = 0.13, PME = 0.32. IV/CL: 3.48. Carapace (Fig. 55) dark brown with black radiating striae; median band yellow, relatively wide, expanded in front of fovea, with two ill-defined darker spots in that area; anteriorly truncated, well behind PLE; posteriorly tapering to sharp tip, well away from carapace margin. Lateral bands narrow, continuous, well defined. Carapace entirely clothed with short dark hairs, with silvery ones in eye region and along margin. Clypeus yellow. Sternum yellow, with large, dark brown median band, with small
The *Pardosa nebulosa*-group in Africa

yellow median spot. Chelicerae yellow with dark brown distal part. Abdomen: dorsum with dark brown lanceolate stripe with darker margins, strongly contrasting with pale kidney shaped patch on either side; followed by four dark transverse bands anastomosing with dark, mottled sides, the paler bands in between, provided with small dark spots. Venter and spinnerets pale. Legs medium brown, F clearly annulated with dark; remainder of legs medium brown, except T and Mt which have dark extremities. Epigyne as in Lt.

**Male** (from Ethiopia, Jimma, MRAC 170780). Measurements: CW = 2.37, CL = 3.34, TL = 6.05, AME = 0.14, PME = 0.34. IV/CL: 3.50. Carapace (Fig. 52) very much as in the female but anterior widened part of central band much darkened, very faint and posteriorly rounded. Sternum dark brown with paler lateral margins and small central pale spot. Abdomen: dorsum with dark brown lanceolate stripe and paler flanking stripes truncated, the latter reduced to frontal spots. Remainder of pattern as in the female but very faint. Legs as in the female but T and Mt faintly annulated.

Palp (Figs 2-4): tibia with well developed lateral group of hairs. Cymbium relatively wide. Proximal lip of palea protruding beyond main part of that sclerite (Fig. 2). Ductus sinusus. The few ribs proximal to the ductus in the tegulum are parallel with its proximal (= lateral) part. Flat shiny area large, its prolateral corner almost reaching the lateral edge of the cymbium. Projecting part of tegulum semicircular, smoothly rounded; MA rather broad, gently tapering towards apex.


The colour pattern is variable in intensity but the posteriorly truncated median thoracic stripe is constant. The anterior part varies in intensity. The sternum is usually dark but the pattern may vary greatly from uniform to pale margins and central pale spot. The abdomen may be either almost uniformly dark with tiny anterior pale spots or with a clear pattern of a lanceolate stripes, pale flanking patches and dark transverse bars behind these. Legs may have annulated or broadly striped femora, the remainder of the legs are uniform or faintly annulated. The male specimen from Cairo (SMF) has a slightly aberrant palp but keys out as *P. naevia*: the cymbium is narrow and has a few white mesal hairs; the ribs behind the tegular duct are fewer than in the other specimens and are mixed transverse and longitudinal; the flat shiny area is less large than elsewhere.

**Other material examined:** ETHIOPIA. 1♂ 1♀: Erythrea, Massana, L. Vincentini (MRAC 131237); 1♂: Shashamane, Wendo-Genet, 1980 m, marshy area near hot springs, 22.I.1986, together with *P. alitica*, A. Russell-Smith (MRAC 170774); 1♂: 6.XI.1988, further as previous; 1♂: E of Lake Langano, Munesa State Forest, 2000 m, grassy clearing, 12.II.1983, A. Russell-Smith (MRAC 170770); 1♂ 1♀: Guder, Guder Horticulture farm, 1950 m, *Eucalyptus* plantation, 2.VI.1987, A. Russell-Smith (MRAC 170778); 1♂ 2♀: Ambo Road, 35 km W of Addis Ababa, 2400 m, 14-20.IV.1988, swammy area, A. Russell-Smith (MRAC 170779); 1♂ 1♀: Jimma, Jimma College, 1780 m, 6.II.1986, short grass on lawn, together with *P. alitica*, A. Russell-Smith (MRAC 170780); 1♂ 2♀: Bole Shet, 15 km E Addis Ababa, 2400 m, 1.VI.1986, marshy area near stream, A. Russell-Smith (MRAC 170782); 1♂ 1♀: Aposto, near Yirgas Alem, near hot springs, 29.IX.1982, short grass in forested valley, A. Russell-Smith (MRAC 170783).

**Distribution.** Ethiopia, Egypt.
**Pardosa injucunda** (O.P.-Cambridge 1876) (Figs 1A, 5-7, 33, 38, 46-47, 49-50, 58)

*Lycosa injucunda* O.P.-Cambridge 1876: 605 (♀️).


*Pardosa injucunda* (sic), CAPORIACCO 1934: 25.

*Pardosa proximella*, ROEWER 1959: 38, part (misidentification).

*Lycosa proximella ituria* STRAND 1913: 463 (♂️, new variation) (types in ZMB, examined) (n. syn.).

*Pardosa ituria* (STRAND 1913) in ROEWER 1959: 91 (♂️).

*Tarentula berndti* STRAND 1913: 447 (♂️) (type in ZMB, examined) (n. syn.).

*Arizcosa berndti* (STRAND 1913) in ROEWER 1959: 338 (♂️).

*Lycosa feldmanni xanthippe* STRAND 1916: 106 (♀️, new variation) (type in MWNH, examined) (n. syn.).


*Pardosa gansmania* ROEWER 1959: 101 (♂️) (types in MRAC, examined) (n. syn.).

*Pardosa pelengae* ROEWER 1959: 114 (♂️) (types in MRAC, examined) (n. syn.).

*Passiana elegantula* ROEWER 1959: 166 (part: ♀️ At in MRAC, examined).

**Type material.** Lectotype male (here designated): Egypt, Cairo (UMO). Paralectotypes: 1 subadult ♀️: together withLt; 3♂️ 1♀️: Egypt, Alexandria (UMO).

**Diagnosis.** Only male representatives can be recognized with certainty: the anterior margin of the tegulum with strongly projecting, ribbed, broadly rounded process, covering the basal part of the broad MA and the posterior part of the tegulum. No ribs behind the ductus. Additional indicative characters are the interrupted lateral bands on the carapace, and for the female, the relatively small spermathecae with narrow copulatory ducts which have a well developed lateral atrium, and the long posterior groove in the epigyne.

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Figs 5-7. — *P. injucunda*, male palp. Fig. 5, mesal view; Fig. 6, ventral view; Fig. 7, lateral view (scale bar = 0.5 mm).
Description. Male (lectotype). Measurements: CW = 2.67, CL = 3.67, TL = 6.34, AME = 0.14, PME = 0.32. IV/CL: 4.37. Carapace (Figs 46-47) medium brown with yellow median band narrowed in front of fovea and interrupted lateral bands; darkened in eye region; entirely covered with short dark hairs and with longer, pale hairs in eye region. Clypeus yellow. Sternum uniform yellow. Chelicerae yellow; inner margin with three, outer margin with two teeth. Abdomen: dorsum with a lanceolate dark median stripe, flanked by two kidney-shaped pale spots, followed by dark transverse bands anastomosing with dark, mottled side. Venter and spinnerets pale. Legs uniform yellow.

Male palp (Figs 5-7) with F, T and P yellow, cymbium medium brown, bulbus dark brown. T without mesal, dense group of hairs. Anterior margin of tegulum with strongly projecting, ribbed, broadly rounded process, covering basal part of broad MA. Ductus in tegulum strongly sinuous.

Female (paralectotype). Measurements: CW = 2.92, CL = 3.84, TL = 7.38, AME = 0.15, PME = 0.37. IV/CL: ? (posterior tarsi lost). Carapace (Figs 49-50) dark brown with pale brown, poorly defined, median band narrowed in front of fovea and narrow, interrupted lateral bands; darkened in eye region; entirely covered with short dark hairs and with longer, pale hairs in eye region and along margin. Clypeus medium to dark brown. Sternum yellow, with large, dark but faint, Y-shape. Chelicerae brown. Abdomen: pattern as in male but generally darker; spinnerets pale brown. Legs medium brown with darker annulations. Epigyne (Figs 1A, 33, 38) with an inverted T-shaped scape. The groove holding the transverse part of the T as long as wide.

Variation. Although the structure of the palp is always virtually identical, there is a large variation in somatic characters between different populations. But even specimens from the same population (e.g. specimens from Ivory Coast MRAC 163 942) vary in colour. There seems to be a tendency for the specimens to be smaller, to have a uniform pale sternum and to be less darkly coloured in populations from western Africa. However, the biggest and most brightly coloured specimens come from Equatorial Guinea.

Measurements (range). $\delta$: CW = 2.00-2.67, CL = 2.29-3.67, TL = 4.92-6.34.

$\varphi$: CW = 2.08-3.04, CL = 2.58-3.84, TL = 5.80-7.50.

The colour pattern of the carapace is very variable in intensity but the lateral broken bands are present in almost all specimens. The tinge of the carapace may vary from yellow to orange. Male specimens from Equatorial Guinea have a broad reddish median carapace band, but the lateral bands may be reduced to a narrow interrupted line or even absent whereas the females are more yellow in colour and have well developed lateral bands. The colour of the sternum is also quite variable: the dark Y-shape is always absent in the West-African populations. In the Central, East- and North-African populations it may be absent, faint or very pronounced. In some of the southern populations the pale triangle in the upper part of the «Y» may be absent so that the shape is almost triangular. The abdomen is also very variable in colour; the aspect is strongly influenced by the colour of the central lanceolate stripe which may be so pale that it does not contrast at all with the lateral kidney-shaped patches. The dark transverse bars may be more or less oblique and thus forming chevrons rather than bars. The legs may be almost uniform in colour or pale yellow with strongly contrasting dark annulations. In some of the West-African populations the femora of
the forelegs have dark stripes or the proximal half entirely dark. The colour of the male palp may vary from yellow, with darker cymbium, to dark brown or almost black with black cymbium. In a population from Mt Elgon (Kenya) the cymbium is devoid of distal curved spines (cymbial claws) but the palp is otherwise identical with that of other populations. The female epigyne usually has a long groove, holding the transverse bar of the T-shaped scapus. In rare cases this groove is shorter than wide as in P. messingerae. The copulatory ducts are usually curved inwards but may be straight or even curved outwards.

Other material examined. BOTSWANA. 1♂: Okavango Delta, Mboma Island, pitfall in short *Pachytylus* grass, 25-30.VIII.1977, A. Russell-Smith (MRAC 171763). BURUNDI. 1♀: Usumbura, 1939, Lestradie (together with *P. messingerae*) (MRAC 3470, 3397-3399). CAMEROON. 4♀ 1♂: Kombetiko, 5 km Babara, 01-04.II.1976, F. Puylaert (MRAC 148275); 4♀ 8♂: Koundou, 28.XII.1975, F. Puylaert (mixed with *P. messingerae*) (MRAC 170612); 1♀ (Ht of *Lycosa feldmanni xanthitape*): Bibundi (MWNH). ETHIOPIA. 1♀: Lake Awassa, 3 km S of Awassa, 1580 m, 19.I.1983, under stones in ficus grove, A. Russell-Smith (MRAC 170899); 1♂ 2♀: Melka Worer, IAR Station, 750 m, 10.VII.1986, dry irrigation canal, A. Russell-Smith (MRAC 170900). EQUATORIAL GUINEA. 2♀ 1♂: Micomeseng, 13-17.VII.1989, field, pitfall, M. Alderweireldt (MRAC 170097); 2♂ 1♀: as previous (MRAC 170124); 1♂ 1♀: 9-13.VII, further as previous (MRAC 170082); 2♂ 3♀: as previous (MRAC 170064); 1♂ 1♀: shaded garden, further as previous (MRAC 170067); 1♂: as previous (MRAC 170185); 2♀: 10.VII, by hand, further as previous (MRAC 170082); 3♀: 9-11.VII, further as previous (MRAC 170160); 1♀: 9-13.VII, further as previous (MRAC 170133); 2♂: 18-27.VII.1989, river in cocoa plantation, further as previous, (MRAC 170054); 2♂: as previous (MRAC 170080); 3♂ 1♀: 18-27.VII.1989, relatively dry open forest with ferns, pitfall, further as previous (MRAC 170018); 4♂: as previous (MRAC 170028); 1♂ 1♀: 13-17.VII.1989, evergreen forest, pitfall, further as previous (MRAC 170121); 1♂: Micomeseng, 8-13.VII.1989, shaded garden, pitfall, M. Alderweireldt (MRAC 170181); 2♂: Micomeseng, 13-17.VII.1989, reeds near field, pitfall, M. Alderweireldt (MRAC 170099); 1♀: between Mibonde and Elon, 23-VII.1989, Rocky area, by hand, M. Alderweireldt (MRAC 170130); 1♂ 2♀: Bizika, road Mbini-Cogo, 19-25.VII.1989, humid bamboo forest, pitfall, M. Alderweireldt (MRAC 170053); 3♀ 2♂: between Mbâne and Abenenang, 22.VII.1989, primary evergreen forest, by hand, M. Alderweireldt (MRAC 170668); 6♂: between Cogo and Rio Muni, 20.VII.1989, secondary forest, by hand, M. Alderweireldt (MRAC 170076). IVORY COAST. 1♂: near Debébé, Bouitha, 15 km E Bouaflé, 28.II.1984, R. Schouten & J. Buysen (MRAC 165947); 5♀ 9♂: 24 juv.: as previous. 21.II.1984, pitfall, R. Schouten & R. Buysen (MRAC 165942); 2♂ 2♀: near Debébé, Pakoldji, 15 km E Bouaflé, 23.I.1984, pitfall, R. Schouten & J. Buysen (MRAC 165937); 20♀ 13♂: 30 juv.: as previous. 27.III.1983, R. Schouten & J. Buysen (MRAC 163941); 18♀ 14♂: 15 juv.: Titekro, 20 km E of Bouaflé, 15.II.1984, pitfall, R. Schouten & J. Buysen (MRAC 165929); 2♂: Bouaflé, 11.III.1981, J. Everts (MRAC 166421); 12♂ 2♀: Bouaflé, Koudougou, 09.II.1981, pitfall, J. Everts (MRAC 159526); 32♂ 19♀: 9 juv.: I.1981, further as previous (MRAC 166249); 10♀ 10♂: 1 juv.: II.1981, further as previous (MRAC 166245); many ♀ and ♂: III.1981, further as previous (MRAC 166329); 13♂ 10♀: Bouaflé, Kongo Aboioso, 22.I.1981, pitfall, J. Everts (MRAC 159545); 3♂ 1♀: 06.I.1981, further as previous (MRAC 159543); 10♂ 7♀: Bouaflé, Klébo, I.1981, pitfall, J. Everts (MRAC 166398); 7♀ 4♂: III.1981, further as previous (MRAC 166381); 4♀ 3♂: Bouaflé, Congo Aboioso, I.1981, pitfalls, J. Everts (MRAC 166352); 8♂ 8♀: II.1981, further as previous (MRAC 166352); 12♂ 3♀: III.1981, further as previous (MRAC 166348); 1290♀ 951♂: Mankono, Ranch de la Marahoué, riverine forest, XI.1979-V.1980, pitfalls, J. Everts (MRAC); 27♀ 21♂: N of Korhogo, Bandama river, riverine forest, XII.1979-V.1980, pitfalls, J. Everts (MRAC); 21♂ 17♀: Odiené, Samésò, Kourou Kélé, I.V.1980, pitfalls, J. Everts (MRAC); 40♀ 25♂: Odiené, Sama- guilla, Baudou River, I-V.1980, pitfalls, J. Everts (MRAC); 2♂ 1♀: Ferké, Poste de Komô, Komô River, 22.II.1980, pitfalls, J. Everts (MRAC); 2♂ 5♀: Lamto, 05.VIII.1965, J. van Mol (MRAC 134619); 1♀: Léra, near Léra, river, boundary with Burkina-Faso, 25.11.1980, J. Mertens (MRAC 170661). KENYA. 1♂: Mount Kenya, Täbi river, VII.1975, R. Bosmans (MRAC 161763); 1♂: Mount Kenya, Meru, VII.1975, R. Bosmans (MRAC 161757); 1♀ 1♂: 1 cocoon:
The *Pardosa nebulosa*-group in Africa

Kabete nr. Nairobi, ILRAD site, 1600 m, lush grass, 09.XI.1982, A. Russell-Smith (MRAC); 1\(^{\circ}\) Lake Nakuru nr. Hippo pool, marshy area with *Scirpus*, 27.XII.1984, A. Russell-Smith (together with *P. messingerae* (MRAC 171764); 9° 7'; Maralal, I. Bartuk, 23.I.1975, mountain forest, among litter, T. Kronestedt (NRS); 11\(^{\circ}\) Mt Elgon, NE slope, Kapeta River, 1930 m, near road Endebess-Bukwa, 30.I.1975, on leaves on shaded place near river, T. Kronestedt (NRS); 4\(^{\circ}\) 12°: Lake Nakuru National Park, 11.I.1972, grassy vegetation in *Acacia xanthophloea* forest, T. Kronestedt (NRS); 5° 3°: SW of Rumuruti, Ewaso Narok River, 24.I.1975, T. Kronestedt (NRS). NIGERIA. 2\(^{\circ}\): Ibadan, International Institute for Tropical Agriculture (IITA), 09.VIII.1980, shrubland, K. Jocqué (MRAC 153950); 11\(^{\circ}\) 1°: grassland, further as previous (MRAC 1539594); 10° 11'; IX.1980, grassy verge of woodland, further as previous (MRAC 153967); 11° 1°: arable field, further as previous (MRAC 153978); 7° 1°: Ibadan, IITA, cowpea-plots, 6-10.VII.1973. REPUBLIQUE CENTRAFRICAINE. 1°: Bambari, VIII-IX.1967, C. Pierrad (MRAC 133922); 4° 5°: Bambari, II.1969, C. Pierrad (MRAC 136658). RWANDA. 25°: Kigali district, Ruhengeri terr., Lac Luvungi, XI.1961, banana field, R. Kiss (MRAC 120746); 29° as previous (MRAC 120752); 2° 9°: Butare, P. Nyulugaka (MRAC 170662); 4°: Butare, VI.1971, R. Kiss (MRAC 141189); 1°: Cyumba, marais de la Mulindi, 1950 m, 19-23.XI.1949, R. Laurent (MRAC 67874-67876); 2° 1°: Akagera National Park, Ihema Lake, dense ticket, 24-27.XII.1985, pitfall, Jocqué, Michiels & Nsengimana (MRAC 165039); 10° 6°: Akagera National Park, 4 km S of Lake Ihema fisheries, 14.XI-3.XII.1985, pitfall in grassy area near *Cyperus* swamp, Jocqué, Michiels & Nsengimana (together with *P. messingerae* and *P. alitica*) (MRAC 165595, 165790); 2°: Akagera National Park, 6 km S of Lake Ihema fisheries, 14.XI.1985, dry forest, Jocqué et al. (MRAC 165512); 2°: Akagera National Park, Lake Ihema fisheries, 25.XI-3.XII.1985, pitfall under *Acacia*, Jocqué et al. (MRAC 165769). SIERRA LEONE. 1°: Freetown, Mount Aureol, IX.1976, D. Olu-Pitt (MRAC 148.492). ZAIRE. 1° 1°: Natal, Champagne Castle Hotel, I.1957, R.F. Lawrence (NMSA). TOGO. 1°: Bassari-Sokódé, V-VII.1984, wooded savanna, pitfall, P. Douben (MRAC 165896); 16° 9° 68 juv.: as previous (MRAC 166179). UGANDA. 1° 1°: ca 30 km E of Kampala, forest reserve, forest path, 11.V.1991, A. Russell-Smith; 1°: Mbale, 14.XI.1963, Cloudsley-Thompson (MRAC 125923); 1°: Mpanga, 65 km E of Entebbe, VIII.1939, P. Benoit (MRAC, without number). ZAIRE. 1°: Kasongo VIII.1939, P.L.G. Benoit (MRAC 114982); 3°: Wangusi, 16.VI.1936 (MRAC 27618-27620); 2° 8°: Elisabethville, IX.1961, M. Lips (MRAC 120486); 1°: I.1962, further as previous (MRAC 121185); 50° 180°: N slope of Ruwenzori, Kikura camp, 2000 m, VII-1974, M. Lejeune (MRAC 154151); 2° 9°: Mongbwalu, 1938, Scheitz (MRAC 1932-1939); 1° 1°: VII.1978, further as previous (MRAC 1573-1574); 1° 3°: as previous (MRAC 1836-1842); 1°: Mongbwalu, Lodjó, VII.1939, Lepersonne (MRAC 27697); 1° 3°: Kapanga, Overlaet (MRAC 30967-30970); 2°: Eala, 17.IV.1952, Bredo (MRAC 27622-27624); 1°: Eala, V.1936, J. Ghèsquière (MRAC 170660); 2°: Equateur, Ikela terr., Haute Lukendo, IX.1959, swampy forest, N. Leleup (MRAC 114615); 2°: Bunia, 1938, Lefèvre (MRAC 28664-28666); 1°: Landana, X.1937, Daratte (MRAC 27616); 1°: road Lumboro-Butembo, Lukanga region, Mount Vukengete, 2080-2210 m, XII.1974-1975, sweeping, M. Lejeune (MRAC 168166); 4° 8°: road Lumboro-Butembo, Lukanga region, 2000 m, XII.1974-1.1975, sweeping, M. Lejeune (MRAC 166195); 3° 7°: as previous (MRAC 170665); 1° 1°: Lokandum, 1939, A. Marée (MRAC 27669-27670); 2° 2°: Kivu, Kambila, Tantalittrandala valley, VI.1973, M. Lejeune (MRAC 145796); 1°: Kivu, Kalehe terr., Lwiro, IV.1962, banana field, R. Kiss (MRAC 122150); 2°: Luashi, 1937, Freyne (MRAC 28871-28872); 2°: Loashi valley, VIII.1937, J. Ghèsquière (MRAC 27760-27780); 1°: Dilbaya terr., Kamponde, 1945, R. Allaer (MRAC 95296); 1°: Thysville, big cave, 1500 m, 03.X.1937 (MRAC 1384); 2°: Kivu, Butembo, VI.1971, M. Lejeune (MRAC 140867); 1° 3° 217°: between Muyene and Kyondo, 2200 m, 5.IV.1976, mixed with *P. messingerae* and *P. gastropicta* Roever, M. Lejeune, (MRAC 170616); 1°: Karawa, 1936, Wallin (MRAC 27731); 1°: Kasai, Kamjala, VII.1971, C. Massin & D. Pierret (MRAC 139511); 1° 2° (types of *Lycosa proximella iturii*): Haute Ituri, ZMB. Parc National Uplena. Mission De Witte. 2° 6° (paratypes *P. lusingana*): Buye-Pala, 1450 m, 24-31.III.1947 (MRAC 139350); 1° 5° (paratypes *P. lusingana*): Kaziba, 1140 m, 09.II.1948 (MRAC 139351); 4° (paratypes *P. lusingana*): Lusina hill, 1810 m, 30.XI-12.XII.1947 (MRAC 139405); 1° 5° (paratypes *P. lusingana*): Lusina, 1810 m, 12.VII.1947 (MRAC 170664); 1°: Kaswabilenga, Lufira river, 680 m, 15.IX.1947 (MRAC 170663); 5° (Pts *P. lusingana*): 27.X.1947, further as previous (MRAC 170773); 13° (paratypes *P. gauzanii*): Ganza hills, 860 m, 16.VI.1949.
(MRAC 139408); 1\(²\) (holotype *P. pelengeae*): Gorges Pelenge, 1250-1600 m, 10-12.VI.1947 (MRAC 139453); 1\(³\) (At *P. pelengeae*): Pelenge Gorges, 1250-1600 m, 10-12.VI.1947 (MRAC 139454); 1\(³\) : Kafwe river, Lufira tributary, 1780-1830 m, 12.VIII.1947 (MRAC 138359); 2\(³\) 3\(³\) : Munoi, Lupiala river, Lufira tributary, 890 m, 16-24.VI.1948 (MRAC 139346); 1\(³\) : Kafwe Kanono, Lufwa spring, 1813 m, 18.III.1947 (MRAC 139363); 1\(³\) (At *Passiena elegantula*): Kamilingulu, Lusinga and Lufira tributaries, 1760 m, 21.I.1948 (MRAC 139885).

**Distribution.** From Sierra Leone in the West to Ethiopia and Kenya in the East (probably also Guinea and Senegal, no males available) and from Egypt in the north to South Africa in the south, including Central Africa.

**Remarks.** All the identifications given above are based solely on palpal morphology, which is virtually identical in all cases. Some females were identified on the basis of the colour pattern in those cases where males were available and where these have somatic characters that separate them from syntopic species (e.g. *P. lusingana* and *P. messingerae* in the «Parc National de l'Upemba» in Zaire). But considering the large somatic variation and the fact that specimens with obviously different habitus and size, occur together in the same sample (stations in Ivory Coast and Equatorial Guinea) we have little doubt that, what we have identified here as *P. injucunda*, is an amalgam of different biospecies. Ethological and biochemical studies will be needed to unravel this extremely complex species-group which cannot be resolved on the base of morphological characters alone. On the other hand there are spectacular colour variations within some of the apparently monospecific populations (again samples from Ivory Coast and Equatorial Guinea).

*Pardosa messingerae* (Strand 1916) (Figs 1B, 8-10, 34, 39, 60)

*Lycosa proximella messingerae* Strand 1916: 96 (\(³\)).

*Pardosa proximella messingerae* (sic) Caporiacco 1940: 800 (\(³\)).

*Pardosa messingerae* (Strand 1916) in Roewer 1959: 97 (\(³\)).

*Pardosa proximella*, Lessert 1915: 72 (misidentification).

**Type material.** Holotype female: Kenya, Kijabe, Em. Messinger (MWNH) (examined).

**Diagnosis.** Males of this species are recognized by the following combination of palpal characters: the proximal lip of the palca does not protrude beyond the main part of that sclerite; the almost straight ductus makes an angle of \(± 75°\) with the longitudinal axis; ribs are restricted to the area behind the ductus; the most distal ones are almost parallel with the ductus; the ribbed area behind it is relatively large as the flat shiny area occupies less than half its width. The female is characterized by the large globular spermathecae and the wide copulatory ducts, without lateral atrium.

**Description.** Male (from Rwanda, Mbazi, MRAC 139057). Measurements: CW = 2.29, CL = 3.04, TL = 5.34, AME = 0.13, PME = 0.35. IV/CL: 3.65. Carapace medium brown with yellow, well delimited median band, widened in front of fovea, faintly prolonged between PLE by a narrow stripe, widening at the back, reaching posterior margin. Lateral bands narrow, not interrupted. Eye region black. Carapace sparsely covered with short black hairs and silvery ones in eye region and along margin. Clypeus pale. Chelicerae uniform medium brown. Sternum pale yellow with a faint darker centre. Abdomen: dorsum with a brown lanceolate stripe with dark margins, flanked by pale longitudinal stripes and followed by four dark trans-
verse bars combined with two faint dark spots to delimit paler patches. Sides pale, upper part mottled. Venter uniform pale yellow, spinnerets pale yellow. Legs uniform yellow with F very faintly annulated, anterior F with dark frontal spot near base, extremity of Mt IV dark.

Male palp (Figs 8-10): all segments medium brown. T with poorly developed lateral hair group. Proximal lip of the palea not protruding beyond the main part of that sclerite (Fig. 10); the almost straight ductus makes an angle of \( \pm 75^\circ \) with the longitudinal axis; ribs restricted to area behind ductus; the most distal ones almost parallel with ductus; the ribbed area behind it relatively large because flat shiny area occupies less than half its width. MA fairly narrow, smoothly tapering towards distal hook; inferior margin straight, anterior margins rounded. Distal process of tegulum short, sclerotized, semicircular.

Female (specimen from Rwanda, Mbazi, MRAC 139057). Measurements: CW = 2.54, CL = 3.25, TL = 5.80, AME = 0.13, PME = 0.34. IV/CL: 3.57. Pattern very similar to that of male differing in the following respects: sternum uniform yellow; legs somewhat darker with annulations somewhat more strongly pronounced.

Epigyne (Figs 1B, 34, 39): septum well delimited; posterior groove wider than long. Copulatory ducts without lateral atrium, very wide, ending in large spermathecae.


As compared with other species of this group, the variation of the colour pattern is less wide. The basic pattern remains similar but there may be large variations in
darkness which give specimens from different localities quite different aspects. The sternalium never has a clear pattern but may be somewhat darkened in the centre or along the margin. The chelicerae may be striped with dark and darkened at the extremity. The legs may be almost uniform yellow or with marked dark annulations.

Other material examined. BURUNDI. 7♂ 31♀: Usumbura, 1939, Lestade (MRAC ex. 3176, 3372, 3199, 3258, 3283, 3380, 3394, 3497, 3436) (sometimes together with P. injucunda); 1♂ as previous, V.1948, Lestade (MRAC 59283). CAMEROON. 1♂ 5♀: Mrs Bamboutos, 2180 m, 17.I.1983, pitfalls in grassland, R. Bosmans & J. Van Stalle (MRAC 162584); 1♂ 26♀: Kounden, 28.XII.1975, F. Poulaert (mixed with P. injucunda) (MRAC 148393). KENYA. 1♂ 5♀: Mt Kenya, VII.1975, R. Bosmans (MRAC 161802, 161707 and 161714); 2♂ 1♀: Mt Kenya, Tabari riv., VII.1975, R. Bosmans (MRAC 161762); 1♂: Mt Kenya, Sirimon track, 2800 m, VII.1975, R. Bosmans (MRAC 161708); 1♂: Mt Kenya, Meru, VII.1975. R. Bosmans (MRAC 161769); 1♂: Mt Kenya, rain forest litter, 2650 m, 07.VII.1975. R. Bosmans (MRAC 161759, 161760); 3♂: Mt Kenya, Meru, VII.1975, R. Bosmans (MRAC 161758, 161772); 1♂ 3♀: Mt Kenya, VII.1975, R. Bosmans (MRAC 161766, 161767, 161770, 161771); 3♂: Mt Kenya, Tiba river, VII.1975. R. Bosmans (MRAC 161764, 161765); 1♂: Mt Kenya, camp, 2650 m, 21.VII.1975, R. Bosmans (MRAC 161756); 2♂: Nairobi, tall grass in garden, 30.VII.1977, A. Russell-Smith (MRAC); 1♂: Lake Nakuru, near Hipo pool, marshy area with Scirpus, 27.VII.1984, A. Russell-Smith (together with P. injucunda) (MRAC); 2♂: Nairobi, grounds of National Museum, in tall grass, 12.XI.1982, A. Russell-Smith (MRAC); 1♂ 12♀: foot of Aberdare escarpment, moorland grassland, 25.XII.1977, A. Russell-Smith (MRAC 171762); 5♂ 4♀: Maralal, large water-hole W of air-strip, 23.I.1975, T. Kronestedt (NRS); 10♂ 3♀: Mt Kenya, at gate to National Park, on Naro Moru track, 11.I.1972, T. Kronestedt (NRS); 1♂: Mt Elgon National Park, 3400 m, 27.I.1975, grassland with open rocky flats and Sesoecio, T. Kronestedt (NRS); 2♂ 2♀: Lake Nakuru, among Cyperaceae on shore, 24.I.1975, T. Kronestedt (NRS); 3♂ 3♀: Lake Naivasha, 13.11.1972, grass near Papyrus zone, T. Kronestedt (NRS); 5♂ 2♀: Moloo area, 31.I.1975, grassy strip along main road Nakuru-Eldoret, T. Kronestedt (NRS). RWANDA. 3♂ 1♀: Gishannvu, 23.II.1971, P. Nyalugaka (MRAC 139061); 1♀ as previous (MRAC 139165); 11♀ 60♂: Butare, VI.1971, P. Nyalugaka (MRAC 139114); 3♂ 1♀: Butare, Mukura, II.1971, P. Nyalugaka (MRAC 139051); 1♂ 3♀: Butare, Mbazi, II.1971, P. Nyalugaka (MRAC 139057); 2♂: Zaza-Kitungo, 27.VI.1975, P. Nyalugaka (MRAC 146534); 6♂ 7♀: Butare, Runyinya, 23.II.1971, P. Nyalugaka (MRAC 139065); 1♂: Nyungwe Forest, 8 km W of Pindura, 8.XI.1985, Jocqué, Michiels & Nsengimana (MRAC 165803); 10♂ 6♀: Akagera National Park, 4 km S of Lake ihemla fisheries, 14.XI-3.XII.1985, pitfalls in grassy area near Cyperus swamp, Jocqué, Michiels & Nsengimana (together with P. injucunda and P. alticola) (MRAC); 3♂ 1♀: Akagera National Park, lake ihemla, grassy area near fisheries, 16.XI-4.XII.1985, pitfall, Jocqué et al. (MRAC); 2♂: Akagera National Park, southern edge of Lake ihemla, 26.XI.1985, Jocqué et al. (MRAC 165368); 1♀ 1♀: Akagera National Park, 7 km W of Birengero, 16.XI-2.XII.1985, pitfall, wooded savanna, Jocqué et al. (MRAC 165466). UGANDA. 2♂: Mpanga, 65 km W of Entebbe, VIII.1959, P.L.G. Benoit (MRAC 115053). TANZANIA. 2♂ 1♀: Shume-Magambe Forest Reserve, 2300 m, II.1981, K. Howell (MRAC 159206); 1♂ 2♀: Bukoba, J. Carl, 1907 (MHNG). ZAIRE. 1♀: Karawa, 1936, Rw. Wallin (MRAC 170667); 1♀: Costermansville, IX.1949, H. Bosmans (MRAC 67250); 3♂ 1♀: Lubero-Butembo, Lukanga region, 2000 m, XII.1974-1.1975, M. Lejeune (MRAC 168274); 1♀ as previous, sweep netting (MRAC 168122); 90♀ 181♂: between Musyene and Kyondo, 2200 m, 5.IV.1976, mixed with P. injucunda, P. gasteropicta Roever and P. alticola, M. Lejeune (MRAC 168795); 5♂ 6♀: Komí, V.1930, J. Ghesquière (MRAC 27638-27655); 1♀: Lulimbi, Lake Edouard, Ihasha river, VII-VIII.1976, M. Lejeune (MRAC 169039); many 5♂ 1♀: as previous, grass tussocks (MRAC 169000 and MRAC 168326); 10♂ 4♀: as previous (MRAC 166283); 1♂ as previous, sweep netting in pasture (MRAC 169082); 1♀ as previous (MRAC 168298); 25♂ 15♀: as previous (MRAC 168981); 1♀ 1♀: Monguwalu, mundu camp, XI.1939, Lepersonne (MRAC 31341-31343); 1♀: W of lake Kivu, 1935 (MRAC 277759); 1♀: Butembo, lake Kivu, V.1967, M. Lejeune (MRAC 132845); 1♂ 2♀: as previous, Mount Lubwe, 2380 m, 13.IV.1971, M. Lejeune (MRAC 138857); 2♂ 9♀: as previous, 2400 m, 12.IV.1971, M. Lejeune (MRAC 138925); 1♀: Luviro, lake Kivu, IV.1962, R. Kiss (MRAC 122146); 8♂ 9♀: det. C.F. Roever, 1956 as P. proximella): Upemba National Park, Lufira, Kaswabilenga river, 15.II.1947, De
The *Pardosa nebulosa*-group in Africa

Witte (MRAC 139355); 1° (det. C.F. Roewer, 1956 as *P. proximella*): Upemba National Park, Lufira, Luwwa, 16.1.1948, De Witte (MRAC 139409).

**Distribution.** From Cameroon in the west to Tanzania in the southeast, including Central Africa.

*Pardosa geftsana* Roewer 1959 (Figs 11-13, 41, 59)

*Pardosa geftsana* Roewer 1959: 54, figs 113a-113e (♀).

*Pardosa nigristermis* Denis 1964: 123, figs 38-40 (♂♀) (n. syn.).

**Type material.** Holotype male: Tunisia, Gessa, unter Steinen, Kirhs hoffer (SMF RII/11707/752, examined).

Like most of Denis' types, the holotype of *P. nigristermis* is supposed to be in MNHN. We have not been able to locate it during one of our visits. However, Denis' (1964) description and drawings are sufficient to permit the synonymisation.

**Diagnosis.** Males of this species are recognized by the following characters of the palp: the anterior margin of the tegulum has a strongly projecting, ribbed, broadly rounded process, covering the basal part of the broad MA, and pronounced, almost

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Figs 11-13. — *P. geftsana*, male palp. Fig. 11, mesal view; Fig. 12, ventral view; Fig. 13, lateral view (scale bar = 0.5 mm).
longitudinal ribs on the tegulum behind the ductus; the dark part of the tegulum behind the ductus extends on the lateral side in front of it. Additional characters are the dense group of mesal hairs on T and cymbium, and the poorly defined lanceolate stripe on the dorsum of the abdomen.

Description. Male (holotype). Measurements: \( CW = 2.79, CL = 3.84, TL = 7.09, AME = 0.17, PME = 0.35. IV/CL: 3.58. \) Carapace medium brown with yellow median band with constriction in front of fovea; extended between PLE, strongly narrowed at the back, reaching posterior margin; lateral bands fairly wide, interrupted; eye region black; clypeus yellow at sides, dark brown in middle. Carapace sparsely covered with thin, short silvery and black hairs. Chelicerae dark brown at extremity but mesal part yellow, base yellow with dark brown network. Sternum dark brown, almost black, with dark yellow radiations which may be due to poor conservation; densely covered with thin, white hairs. Abdomen: almost uniform pale grey slightly mottled with pale brown and with a few tiny dark spots delimiting the lanceolate anterior stripe which is hardly defined. Legs yellow.

Male palp (Figs 11-13): dark brown; T and cymbium with dense mesal group of black hairs. Palea with proximal lip strongly projecting beyond general plane of this sclerite. Anterior margin of tegulum with strongly projecting, ribbed, broadly rounded process, covering basal part of broad, strongly tapering, MA; pronounced, almost longitudinal ribs on tegulum behind sinuous ductus.

Female from Baniou (MRAC 170793). Measurements: \( CW = 2.88, CL = 3.67, TL = 8.26, AME = 0.15, PME = 0.32. IV/CL: 3.84. \) Carapace medium brown with poorly delimited median band, less strongly tapering at the back than in male, and reaching posterior margin; lateral bands as in male; eye region black; clypeus yellow, slightly darkened in middle; carapace sparsely covered with short black hairs, mixed with silvery ones in eye region and along margin. Chelicerae yellow, slightly darker on condyle. Sternum dark brown with small paler patch in anterior centre and pale lateral margins. Abdomen: pattern as in male but very faint; dark points in transverse pale bars missing; venter entirely pale. Legs yellow, annulated on F and T.

Epigyne (Fig. 41) with strongly pronounced, relatively short, T-shaped septum. Copulatory ducts large and with thick walls, hardly delimited from spermathecae.

Variation. Measurements (range). \( \delta: CW = 2.50-2.92, CL = 3.25-3.84, TL = 5.21-7.09. \) \( \varphi: CW = 2.63-3.34, CL = 3.34-4.30, TL = 6.25-8.97. \)

The intensity of the colour and the pattern is variable. In males the contrast is more enhanced than in females. Great differences exist in the colour of the chelicerae and sternum which may range between the extremes as found in the male and the female from the same locality, described above. The median pale carapace band does not always reach the posterior margin of the carapace. In most specimens the sternum is black, sometimes there is a pale lateral margin which may be wide and provided with a series of dark blotches on each side. In specimens from Timimoun, the sternum is yellow with a short dark V-shape which is sometimes very faint. The abdominal pattern is usually quite different from that of the holotype. In a male from Baniou (MRAC 170793) it is as follows: lanceolate median stripe ill defined, anastomosing with lateral spots of the same colour, and darkened in posterior half; followed by five dark transverse bars, these delimiting paler patches each of which has two tiny dark spots. Sides pale, sparsely mottled with grey. Venter pale, with quadrangular dark
patch in front of epigastric fold, with a red spot in anterior corners. Spinnerets uniform pale yellow. The legs may be faintly annulated.

Little or no variation is found in the palpal and epigynal structures.


Distribution: Morocco, Algeria, Tunisia, Libya.

Pardosa lusingana Roewer 1959 (Figs 14-16, 40, 59)

Pardosa pelengis ROEWER 1959: 114 (♀♀).

Dingosa hamigerens ROEWER 1959: 352 (♂♀) (n. syn.).

Dingosa lusingensis ROEWER 1959: 353 (♂♀) (n. syn.).

Passiena elegans LA ROEWER 1959: 166 (♀♀).

Type material. Holotype female: Zaire, Parc National de l’Upemba, Lusina, 1810 m, 12.VII.1974, Mission de Witte (MRAC 139435) (examined). Paratypes: (all from Zaire, Parc National Upemba, all examined) 1♂: same data as Ht (MRAC 139436); 2♂: Kazinga, 1140 m, 1.VI.1948 (MRAC 139552); 6♀: Lusina Hill, 1810 m, 3-10.VII.1947 (MRAC 139349); 2♂: 12.VII.1947, further as previous (MRAC 139437); 1♀: Kasawbilenga, 680 m, 27.X.1947 (MRAC 139361); 4♀: Dipalia, 1700 m, 8.VII.1947 (MRAC 139333).

Diagnosis. Males of this species are recognized by the following combination of palpal characters: the proximal lip of the palea is not clearly separated from the main part of that sclerite; the MA is very large and has a recurved frontal margin; the ductus in the tegulum is sinuous. An additional indicative character is the dark sternum with pale median stripe. The epigyne is characterized by a wide median septum, rather large spermathecae and the absence of a lateral atrium at the base of wide copulatory ducts.

Description. Male (paratype MRAC 139436). Measurements: CW = 2.50, CL = 3.33, TL = 5.84, AME = 0.15, PME = 0.35. IV/CL: 3.56. Carapace dark brown
with pale brown, poorly delimited median band, widened in front of fovea, not prolonged between PLE, hardly narrowed at the back, not reaching posterior margin. Lateral bands wide, not interrupted. Eye region black. Carapace sparsely covered with short black hairs and silvery ones in eye region and along margin. Clypeus with dark quadrangle, pale in the middle and with a broad paler stripe on each side under the ALE. Chelicerae medium brown with dark brown network and darkened near extremity. Sternum dark brown with pale yellow medium stripe from front to centre. Abdomen: dorsum with dark grey lanceolate stripe with dark margins, flanked by pale longitudinal stripes and followed by four dark transverse bars, each of the paler patches the bars delimit has two faint dark spots. Sides dark, mottled. Venter uniform pale yellow, spinnerets pale yellow except ALS which are dark. Legs medium brown with faint darker annulations and stripes.

Male palp (Figs 14-16): all segments medium brown, T slightly darker, densely haired all over, but more densely so and hairs longer mesally. Proximal lip of the palea not clearly separated from main part of that sclerite; MA very large and with recurved frontal margin; ductus in tegulum sinuous; ribs on tegulum behind ductus well developed, almost parallel with ductus. Flat shiny area small, restricted to postero-mesal patch.

Female (holotype). Measurements: CW = 2.58, CL = 3.33, TL = 7.51, AME
The *Pardosa nebulosa*-group in Africa

= 0.17, PME = 0.35. IV/CL: 4.01. Pattern very similar to that of male but differing in the following respects: sternum with median stripe running from back to front. Lanceolate stripe on dorsum of abdomen poorly delimited, anastomosing with bars behind it.

Epigyne (Fig. 40): septum well delimited; posterior groove wider than long. Copulatory ducts without lateral atrium, wide, ending in small spermathecae.


The colour pattern can vary considerably in darkness: darker specimens have a much fainter pattern, with median carapace band and dorsal abdominal pattern very faint; the legs are then very faintly annulated or striped. In paler specimens the pattern is much clearer although the median carapace band is never well delimited; in paler specimens there is a tendency for the median carapace band to extend between the PLE and for the specimens to have clearly annulated legs. The sternum is always paler in the middle than along the edge although the general darkness and the width of the median band may vary considerably (exc. Ht of *Passiena elegantula*, could be *messingerae*).

In the males from Zaire the palps vary slightly: in the male from Mabwe, the proximal margin of the MA is much more rounded and the distal margin less curved than in the Ht. The female epigyne is quite variable too: the length of the posterior groove is by no means stable and does not provide a diagnostic character.

**Other material examined.** ZAIRE. Parc National Upemba, Mission de Witte: 1♀ (Ht of *Dingosa hamigerae*): Mabwe Riv., E of Lake Upemba, 385 m, 12.VIII.1947 (MRAC 139863); 1♂ (Ht of *Dingosa lusingenesis*): Lusanga Hill, 1810 m, 3-10.VII.1947 (MRAC 139861); 2♀ (Pts of *Pardosa pelengae*): Georges Pelenge, 1250-1600 m, 10-12.VI.1947 (MRAC 139459); 1♀ (Ht of *Passiena elegantula*): Kamitungulu left tributary Lusanga and right tributary Lafrira, 1760 m, 21.1.1948 (MRAC 139884). Other locality: 1♀: Katanga, near Elisabethville, I.1962 (MRAC 121166); 1♀: as previous (MRAC 121163). NAMIBIA. 4♀: Andara, Kavango, IV.1979, M.E. Baddeley (MRAC 171807) (together with P. *kavango*).

**Distribution.** Zaire, Namibia.

**Pardosa aliticoia** n. sp. (Figs 17-19, 37, 59)

**Type material.** Holotype male: Simien Mts, Gzech Camp, 3650 m, 8.IX.1974, R. Bosmans (MRAC 170642). Paratypes: 1♀ together with Ht.

**Diagnosis.** This species is similar to *P. naevia*. Males are recognized by the following characteristics of the palp: the proximal lip of the palea is not extended beyond the main part of that sclerite (Fig. 19); there are few ribs proximal to the ductus and the most distal are almost parallel with the longitudinal axis.

Other indicative characters are the shape of the median carapace band which usually extends to the margin at the back and the narrow cymbium. Females often have an epigyne with a short, almost rectangular indentation in front of the groove holding the transverse bar of the T-shaped septum.

**Etymology.** This species is apparently restricted to habitats of high altitude between 1600 and 3700 m.

**Description.** Male (holotype). Measurements: CW = 1.92, CL = 2.67, TL =
4.71, AME = 0.11, PME = 0.25. IV/CL: 3.77. Carapace dark brown with brownish yellow, well delimited median band, widened in front of fovea, faintly prolonged between PLE by two narrow stripes, truncated at the back, not reaching posterior margin. Lateral bands narrow, interrupted. Eye region black. Sparsely covered with short black hairs; no silvery ones. Clypeus dark with paler patches near ALE. Chelicerae yellowish brown with dark network at the base, darkened in distolateral half. Sternum dark brown with tiny pale spot in the middle. Abdomen dark grey with contrasting pale patches flanking black lanceolate stripe, which is followed by four pairs of pale spots with black centres. Sides dark, mottled with yellow; venter uniform dark grey, spinnerets yellowish brown with dark lateral streaks. Trochanters dark brown with pale proximal ventral and distal dorsal patches. Legs brownish yellow without annulations; F with longitudinal ventral and dorsal black lines, the former much wider than the latter. P with narrow dark dorsal lines in proximal half.

Male palp (Figs 17-19): F dark brown with pro- and retrodorsal yellow patch, P yellow, T dark brown, with prodorsal, retrodorsal, and ventral brownish yellow lines; with more or less dense mesal group of long, dark hairs. Cymbium dark brown, paler towards tip. Proximal lip of palea not produced beyond the main part of that sclerite (Fig. 19) but in the prolongation of its ventral margin; the few ribs proximal to the ductus in the tegulum make an angle of about 60° with that ductus, which is very slightly sinuous and runs at an angle of 45° with the longitudinal axis. Flat shiny area small, occupying less than half the regular area behind the ductus. MA fairly narrow tapering towards the distal hook. Distal process of tegulum membranous, broad, with straight distal margin, and short, rounded lateral margins.
Female (paratype together with Ht). Measurements: CW = 2.08, CL = 3.04, TL = 5.71, AME = 0.12, PME = 0.26. IV/CL: 3.64. Carapace as in male but lighter patches between PME not in connection with median band. A few short silvery hairs present in eye region. Clypeus medium to dark brown. Sternum paler brown than in male, with a bigger yellow central patch and a series of lateral blotches united into a lateral stripe. Chelicerae as in male. Abdomen: pattern basically as in male but rows of pale patches anastomosing with kidney-shaped anterior ones and with each other, forming a continuous wide pale stripe with black points behind the dark lanceolate stripe. Sides and spinnerets as in male. Venter pale. Legs: trochanters ventrally yellow, dorsally dark brown. F and P with dark stripes and blotches; other segments annulated, the annulations sometimes interrupted.

Epigyne (Fig. 37): septum poorly delimited; posterior groove short and wide; anterior extension almost quadrangular. Copulatory duct with wide transverse part extending laterally a considerable distance, then bent over c. 135° into distal part which is directed inwards, not curved, ending in fairly small spermatheca.


Although the structure of the male palp leaves no doubt as to the identity of the specimens, the variation of the colour pattern is so large that it made us question the validity of our initial identifications. There is a clear tendency for specimens from high altitude to be darker than those of lower elevations. The former have a dark carapace with narrow bands, usually a, sometimes uniform, dark sternum, and legs with dark lines in the male, dark annulations in the female. Specimens from lower altitude tend to have a much lighter general colour: the bands are wider and the median one extends to the posterior margin; the sternum may be entirely pale yellow or have a faint darker Y-shape. The abdomen is much paler in general and has contrasting median lanceolate and lateral kidney-shaped stripes followed by a series of white spots with black centres often absent in specimens from high altitude. Even the colour of the egg-sac is quite different: high altitude populations have pale brown egg-sacs whereas those from lower altitudes have pale yellow or almost white egg-sacs.

The male palp is quite constant in structure and allows easy identification at least for the specimens from Ethiopia. However, the few specimens from Zaire and Rwanda are slightly different: a remarkable character is the straight dorsal profile of the cymbium; the ductus in the tegulum is less sinuous and runs at an angle of 60° with the longitudinal axis. The MA is not tapering and relatively broad at the extremity. These specimens might belong to another species but more material is needed to allow the decision.

The female epigyne is very variable and a number of identifications are based on the fact that they were taken together with males of the species. Females from lower altitude have a more pronounced septum and the shape and direction of the copulatory ducts and spermathecae vary to an extent that they are not recognizable as conspecific with specimens from higher altitude.

Other material examined. ETHIOPIA. 7♂ 4♀: Simien Mts, Gheech Camp, 3650 m, 8.IX.1974, R. Bosmans (MRAC 159058); 2♂ 1♀: Simien Mts, Gheech Camp, 3650 m, 7.IX.1974, R. Bosmans (MRAC 159057); 3♂: 7.IX.1974, further as previous (MRAC 159064); 6♂: Simien Mts, Kaba Wantz, 3150 m, marshy area, 24.IX.1974, R. Bosmans (MRAC 159052); 1♂: Simien Mts, Tjennek (= Chennek), 3610 m, 21.IX.1974, R. Bosmans (MRAC 159049); 1♂: Simien Mts, Tjennek Pass,
24.X.1973, G. De Rougemont (MRAC 158980): 1♂ 4♀♀: Shoa, Mussolini Pass, 3100 m, 10.VIII.1973 (MRAC 158920); 2♂: Shoa, Mt Salale, 3000 m, VII.1971, G. De Rougemont (MRAC 158914); 2♂ 2♀♀: Bale Mts, 3 km W of Dinsaw, 3000 m, 30.XII.1982, tall grass tussocks in small valley, A. Russell-Smith (MRAC 171664); 2♂: Debre Zeit, edge of Crater Lake near ILCA station, 1900 m, 24.IX.1983, long Hyparrhenia grass, A. Russell-Smith (MRAC 171669); 2♂ 2♀♀: 5 km W of Debre Sina on road to Debre Berhan, 3000 m, 19.VI.1988, under stones in grazed moorland, A. Russell-Smith (MRAC 171667); 4♂ 3♀♀: Zuai, floodplain of Lake Zuai, 1600 m, 23.I.1986, A. Russell-Smith (MRAC 171803); 6♂ 1♀: Near Addis Ababa, 2380 m, garden, II.1985, A. Russell-Smith (MRAC 171663); 3♂ 2♀♀: Lake Langano, Wabe Shebelle Hotel, 1600 m, 24.X.1982, under and between rocks, A. Russell-Smith (MRAC 171668); 1♂ 2♀♀: W side of Lake Abiata, 1600 m, 31.XII.1981, marshy area, A. Russell-Smith (MRAC 171665); 3♂ 1♀♀: Ambo, Wonchi Crater, 3000 m, 22.X.1986, short grazed grassland, A. Russell-Smith (MRAC 171671); 1♂ 2♀♀: Mt Wuchacha, 30 km W of Addis Ababa, 3000 m, 13.IV.1982, grazed grassland, A. Russell-Smith (MRAC 171670); 1♂: Jimma, Jimma College, 1780 m, 6.II.1986, short grass on lawn, together with P. naevia, A. Russell-Smith (MRAC 170781); 1♂: Shashamane, Wendo-Gener, 1850 m, marshy area near hot springs, 22.I.1986, together with P. naevia, A. Russell-Smith (MRAC 170775); 1♂: Addis-Abbeba, J. Cloudsley-Thompson (MRAC 128748). ZAIRE. 3♂: between Musyenene and Kyondo, 2200 m, 5.IV.1976, mixed with P. messingerae, P. injuncta and P. gastroplaga Roewer, M. Lejune, (MRAC 170641). RWANDA. 5♂ 2♀♀: Gisenyi, road to Gishwati forest, 8 km S of Kanama, 1900 m, 11.XII.1985, Jocqué & Nsengimana (MRAC 165723); 3♂: Akagera National Park, 4 km S of Lake Ihema fisheries, 14 XI-3.XII.1983, pitfall in grassy area near Cyperus swamp, Jocqué, Michiels & Nsengimana (together with P. injuncta and P. messingerae) (MRAC).

Distribution: Ethiopia, Zaire, Rwanda.

Pardosa kavango n. sp. (Figs 20-23, 42, 60)


Diagnosis. Males are recognized by the following characters of the male palp: the palea has a well developed proximal lip, not protruding beyond the remainder of the sclerite. The spermduct makes an angle of about 45° with the longitudinal axis; the ribs behind it are almost parallel with that axis. Additional characters are the pale median carapace band of which the anterior part is darkened or has two dark triangular, longitudinal spots, converging towards the back and the sternum which has pale lateral margins with darker circular spots.

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

Description. Male (holotype). Measurements: CW = 2.25, CL = 3.00, TL = 5.92, AME = 0.12, PME = 0.34. IV/CL: 3.78. Carapace dark brown with striae in shape of black network; median band yellow in posterior half, reaching posterior margin, yellow in widened anterior part, not extended between PLE, but there with two faint paler brown, longitudinal marks; remainder of eye region dark brown. Lateral bands wide, continuous, pale yellow. Carapace sparsely covered with short, dark hairs and few silvery ones in cephalic area. Clypeus yellow, with broad trapezoidal quadrangle in middle, its longest base in front. Chelicerae as in female but less strongly darkened. Sternum pale yellow with faint, complex, dark pattern. Abdomen as in female but posterior male patches faint.
Male palp (Figs 20-22): yellow to medium brown. T and cymbium with poorly developed mesal group of dark hairs. Palea with proximal lip well separated from remainder of sclerite but not protruding beyond it. Anterior margin of tegulum covering MA, without rounded process, almost straight. MA strongly tapering. Ductus very slightly sinuous, somewhat procurred, angle with longitudinal axis slightly over 45°; ribs proximal to ductus pronounced, almost parallel with longitudinal axis; ribbed area about half the width of the tegular part delimited in front by the ductus, remainder flat and shiny.

Female (paratype, MRAC 170807): CW = 2.75, CL = 3.75, TL = 7.80, AME = 0.17, PME = 0.38. IV/CL: 3.52. Carapace (Fig. 23) dark brown with striae in shape of black network; median band yellow in posterior half, almost reaching posterior margin, pale brown in widened anterior part, not extended between PLE, but represented there with two faint paler brown, longitudinal marks; remainder of eye region dark brown. Lateral bands wide, continuous, pale yellow. Carapace sparsely covered with short, dark hairs and few silvery ones in cephalic area. Clypeus yellow, with broad trapezoidal quadrangle in middle, its longest base in front. Chelicerae medium brown in distal half, yellow with oblique darker stripe in proximal half. Sternum pale yellow with broad, U-shaped dark pattern and numerous long dark hairs. Dorsum of abdomen with dark grey lanceolate stripe, flanked by white reniform pale patches, followed by five pairs of white spots, the posterior pairs anastomosing; each white spot with dark point in middle; pairs separated by transverse dark grey bands. Sides of abdomen dark grey, mottled; venter pale. Legs yellow with marked annulations from femora to tarsi.

Variation. (Entirely based on the collection from Namibia, Andara, Kavango).

Although the specimens studied are mainly from one population the colour pattern is quite variable. The anterior part of the median carapace band is sometimes entirely medium brown or brown with a lighter margin, but most often pale with triangular spots of variable size, converging towards the back. The colour of the chelicerae may vary from largely pale to pale with dark distal end and dark oblique stripes near the base. The sternum may vary from pale yellow to dark brown, the latter sometimes with a tiny pale spot in the middle near the anterior margin, but always with a paler margin and some darker spots near the lateral margins; most often the sternum is pale yellow with a large thick V-shape and three dark spots on either side along the margin and one on the posterior tip. The abdominal pattern ranges from one that is entirely faint and greyish with poor contrast, to a well defined pattern: in the latter the lanceolate stripe is pale brown with dark margin, strongly contrasting with the flanking white reniform patches, these are followed by bright pale pairs of spots with dark central points, separating dark transverse bars.

Other material examined. BOTSWANA. 1♂ 1♀: Okavango Delta, Thamalakane River, in Vossia swamp, 26.II.1976, A. Russell-Smith (MRAC 171763); 1♂ 2♀: Okavango Delta, Moremi, N Gate, margin of Kwai River, in flooded Vossia swamp, 15.VII.1978, A. Russell-Smith (MRAC 171768).

Distribution: Namibia, Botswana.
Figs 20-23. — *P. kasango*, male palp. Fig. 20, mesal view; Fig. 21, ventral view; Fig. 22, lateral view; Fig. 23, female carapace, dorsal view (scale bar for Figs 20-22 = 0.5 mm, for Fig. 23 = 2 mm).
**Pardosa nebulosa-group in Africa**

*Pardosa nosorum* n. sp. (Figs 24-26, 44, 53, 56, 60)

*Pardosa proximella*, L. Lessert 1936: 283 (♂, misidentification).

**Type material.** Holotype male: South Africa, Natal, St. Lucia, Fanies Island, 22.VI.1990, by hand, edge of lake, M. Alderweireldt & R. Jocqué (MRAC 171756). Paratypes. 3♂ 2♀ 1 juv.: 23.VI.1990, further as Ht (MRAC 171715; 1♂ in NCP); 7♂: as Ht (MRAC 171717; 1♂ in NCP).

**Diagnosis.** The male is recognized by the absence of short, curved distal spines («palpal claws») on the cymbium combined with the absence of a ribbed process of the tegulum.

**Etymology.** This species is called «nosorum» (Latin for «ours») because it is from the only sample we collected together.

**Description.** Male (holotype). Measurements: CW = 2.63, CL = 3.50, TL = 6.42, AME = 0.20, PME = 0.37. IV/CL: 3.80. Carapace (Fig. 53) medium brown with narrow, pale yellow median band, stopping short far in front of posterior margin, strongly widened in front of darkened fovea but there pale brown with dark patch on each side; central band extended between PME as two long, oval, pale brown spots; lateral bands wide, not interrupted; eye region black; clypeus pale yellow with two oblique dark stripes under ALE; carapace sparsely covered with short black hairs, mixed with few silvery ones in eye region and along margin. Sternum pale yellow with faint darker «V» running from front to posterior margin. Chelicerae uniform pale yellow. Inner margin with three, outer margin with two teeth. Abdomen: dorsum with greyish brown lanceolate median stripe, with darker margins, flanked by kidney-shaped pale spots, followed by five pairs of paler spots with dark centre, the posterior two fused, separated by dark grey chevrons. Sides pale, sparsely mottled with grey. Venter and spinnerets uniform pale yellow. Legs yellow, femora very faintly annulated.

Male palp (Figs 24-26): cymbium yellowish orange; densely haired; without short, curved, distal spines (so-called palpal claws) but with a few spiniform setae near base. Tegular duct sinuous, mesal part recurved; angle with longitudinal axis large, nearly 80°. MA with large with rounded anterior margin. Tegular frontal process large and strongly extended forwards, smooth, broad, with lateral edge at right angle with frontal margin, parallel with longitudinal axis. Palea with proximal lip projecting beyond general plane of this sclerite; lips separated by marked groove. Tegular ribs proximal to spermduct few (5) and short, making slight angle (± 30°) with lateral part of spermduct. Flat shiny area near proximal margin large, occupying 3/4 of area proximal to ductus.

Female (paratype MRAC 171717). Measurements: CW = 2.75, CL = 3.88, TL = 6.79, AME = 0.21, PME = 0.37. IV/CL: 3.70. Carapace (Fig. 56) dark brown with narrow, yellow median band, stopping well short of posterior margin; strongly widened in front but darkened to medium brown, median band thus appearing as very short; oval spots between PME dark; lateral bands relatively broad, continuous; eye region black; clypeus dark with faint paler longitudinal stripe along anterior margin. Carapace sparsely covered with short black hairs, mixed with silvery ones in eye region and along margin. Sternum pale yellow with clear, dark V-shape. Chelicerae yellow with oblique dark network in proximal half. Abdomen: dark brown, almost black, without well delimited lanceolate stripe; five pairs of pale spots with dark
centre; posterior pair fused; anterior pair located at the place where in the male there is a pair of pale kidney-shaped pale spots; sides pale mottled with venter pale yellow. Legs yellow, strongly annulated with grey.

Epigyne (Fig. 44) well pronounced T-shaped septum. Groove holding transverse bar of T-shaped septum, short. Copulatory ducts large at base, with marked constriction before ending in relatively small spermathecae.


In the four males available, the colour pattern is relatively stable: in contrast to the H1, the sternum may be uniform pale and the legs may be faintly annulated. The palp is virtually identical in these specimens. Females differ a lot as far as their colour pattern is concerned: the anterior, widened part of the median carapace band may be very dark, it then appears as a small light area around the fovea, or it may be light although there are always darkened steaks in it. The sternum may be entirely pale yellow, with a darkened V-shape or almost entirely dark, with a pale margin and a short longitudinal frontal bar. The abdomen is very variable: it may be very dark with only three pairs of pale spots, or almost entirely pale with numerous small black spots, a clear, slightly darker, lanceolate stripe and transverse dark bars; in one case the pale spots are orange and in another one there is a reddish orange spot in front of the lanceolate stripe. The legs may be very faintly to strongly annulated.
Other material examined. MOZAMBIQUE. 1♀ 1♂: Charre (17°S 34°E), 1927, H.-B. Cott (MHNG).


Pardosa paleata n. sp. (Figs 27-29, 48, 51, 58)


Diagnosis. Males of this species are easily recognized by the structure of the palea (sensu DONDALE 1986) which has two appendages, a sharp, tapering point and a long hook-shaped process; the embolus is swollen and visible over its entire length. Additional characters are the small spermathecae and large copulatory ducts and the faint carapace pattern.

Note. There is some doubt about the conspecificity of the male and females here described, mainly because of the differences in leg length and abdominal pattern. However, considering the variability encountered in other species here treated, these differences fall within the acceptable limits. The female doubtlessly belongs in the nebulosa-group, but the male palp is very unusual and even resembles some species of Wadicosa Zyuzin.

Figs 27-29. — *P. paleata*, male palp. Fig. 27, mesal view; Fig. 28, ventral view; Fig. 29, lateral view (scale bar = 0.5 mm).
**Etymology.** The name refers to the striking processes on the lateral side of the palaea, which make this species so characteristic.

**Description.** Male (holotype). Measurements: CW = 2.79, CL = 3.54, TL = 6.46, AME = 0.15, PME = 0.35. IV/CL: 4.55. Carapace (Fig. 48) medium brown with yellow median band with constriction in front of fovea; extended between PLE, narrowed at the back, reaching posterior margin; lateral bands fairly wide, interrupted; eye region black; clypeus yellow at sides, mottled with dark in centre. Carapace sparsely covered with thin, short black hairs; some silvery hairs along margin and in eye region. Chelicerae pale brown at extremity, yellow with oblique dark stripe in superior half. Sternum entirely pale yellow, with some dark hairs. Abdomen: brownish grey, with pale horseshoe-shape in front, followed by five pairs of pale spots, with dark central point, delimiting transverse bars; sides mottled, venter pale yellow. Legs yellow, faintly annulated on femora.

Male palp (Figs 27-29): medium brown; T and cymbium without mesal group of hairs. Distal lip of palaea with two appendages: a very thin, slender process, and a hook-shaped, somewhat stronger one. Embolus swollen at base, visible over its entire length. Anterior margin of tegulum with strongly projecting, ribbed, broadly rounded process, covering basal part of narrow, but thick, hooked MA; tegulum strongly grooved on the spot where the ductus is visible in other species; subtegulum strongly developed, visible in mesal view.

Female. Measurements (second Pt in brackets, third Pt mutilated): CW = 3.08 (3.17), CL = 3.96 (4.00), TL = 7.26 (7.34), AME = 0.17, PME = 0.37. IV/CL: 3.87. Carapace (Fig. 51) pale brown with poorly delimited median band, constricted in front of fovea, extended between PLE and reaching margin at the back; lateral bands rather wide, interrupted. Eye region black; clypeus yellow, with oblique dark line under ALE. Carapace sparsely covered with short black hairs, mixed with silvery ones in eye region and along margin. Chelicerae yellow, pale brown at extremity and near base. Sternum entirely yellow or with dark, elongate, V-shape. Abdomen: pattern faint, basically reddish brown. Lanceolate stripe poorly delimited, but somewhat more reddish than surroundings; a more or less large horseshoe-shaped dark patch in front of it (pale horseshoe of male absent here); remainder of pattern with transverse bars behind lanceolate stripe very faint. Sides yellowish orange, venter yellow. Legs yellow, more or less clearly annulated.

Epigyne with well developed T-shaped septum; length of groove holding transverse bar about 2/3 its width. Copulatory ducts large and with thick walls, hardly delimited from spermathecae.

**Other material examined.** None.

**Distribution.** Only known from the type locality.

**Pardosa thompsoni** n. sp. (Figs 30-32, 35, 45, 54, 57, 59)


**Diagnosis.** The male is recognized by the long white mesal cymbial hairs, hiding part of the tegulum, the strongly procurred duct in the tegulum, the projecting
proximal lip of the palea, the presence of lateral tegular ribs in front of the ductus and the absence of posterior tegular ribs.

Etymology. The species name is a patronym in honour of J. Cloudsley-Thompson in recognition of his work on desert spiders.

Description. Male (holotype). Measurements: CW = 2.79, CL = 3.54, TL = 6.88, AME = 0.16, PME = 0.34. IV/CL: 3.15. Carapace (Fig. 54) pale brown with narrow, pale yellow median band narrowed in front of fovea; this band with two pale brown spots behind PLE, two long, oval paler spots between PLE, tapering at the back, not reaching posterior margin of carapace; lateral bands wide, not interrupted; eye region black; clypeus pale yellow with two small black spots along margin. Carapace sparsely covered with short black hairs, mixed with silvery ones in eye region and along margin. Sternum and chelicerae uniform yellow. Abdomen: dorsum with greyish brown lanceolate median stripe, not flanked by kidney-shaped pale spots, but surrounded by grey with dispersed small black spots and followed by four pairs of paler spots with dark centre. Sides pale, sparsely mottled with grey. Venter and spinnerets uniform pale yellow. Legs uniform yellow.

Male palp (Figs 30-32) pale yellow. Cymbium densely haired; long pale mesal hairs extending over reddish brown tegulum. Tegular duct strongly procurred. MA with parallel side, relatively narrow. Tegular frontal process smooth, broad, with lateral side at right angle with frontal margin. Palea with proximal lip strongly
projecting beyond general plane of this sclerite. Tegular ribs lateral in front of spermduct (between spermduct and MA).

Female (paratype from Burkina Faso). Measurements: CW = 3.04, CL = 4.08, TL = 7.42, AME = 0.18, PME = 0.40, IV/CL: 3.87. Carapace (Fig. 57) medium brown with narrow, poorly delimited median band; two long, oval paler spots between PLE, tapering at the back, not reaching posterior margin of carapace; yellow lateral bands relatively broad, 3 times interrupted; eye region black; clypeus dark with small crescent-shaped pale patch in the middle of anterior margin. Carapace sparsely covered with short black hairs, mixed with silvery ones in eye region and along margin. Sternum uniform yellow. Chelicerae medium brown, darker and with dark network near base, darkened near extremity. Abdomen: as in male Ht but generally darker. Legs brownish yellow, annulated with medium brown.

Epigyne (Figs 35, 45) with strongly pronounced T-shaped septum. Vertical bar broad; transverse bar wide, filling entire groove which is thus short. Copulatory ducts large and with thick walls, hardly delimited from spermathecae.

Variation. ♂ from Burkina Faso: CL = 3.12; CW = 2.33; TL = 5.75.

The colour pattern of this male is intermediate between the male from Sudan and
The *Pardosa nebulosa*-group in Africa

Figs 36-40. — Vulva, cleared, in dorsal view. Fig. 36, *P. naevia*; Fig. 37, *P. alticola*; Fig. 38, *P. injucunda*; Fig. 39, *P. messingerae*; Fig. 40, *P. lasingana*. 
Figs 41-45. — Vulva, cleared, in dorsal view. Fig. 41, *P. gelsana*; Fig. 42, *P. kasongo*; Fig. 43, *P. paleata*; Fig. 44, *P. nostrorum*; Fig. 45, *P. thompsoni*. 
The female from Burkina Faso. There is a slight indication of pale spots flanking the lanceolate stripe at the front of the abdominal dorsum. The legs are faintly annulated. The male palp is identical to that of the Ht. The specimens from Kenya are very similar to the Ht but usually slightly darker. One of these males has three terminal cymbial claws on one side, two on the other.

Other material examined. KENYA. 1♂: Marsabit, Lake Paradise, 16.1.1975, T. Kronestedt (NRS); 4♂ 3♀: as previous; 2♂ 1♀: Loitygalani, SE shore of Lake Turkana, Oasis Lodge, among partly overflowed grass at the lodge, 18.1.1975, T. Kronestedt (NRS).

Figs 52-57. — Figs 52-54, habitus of males: Fig. 52, *P. naevia*; Fig. 53, *P. nostrorum*; Fig. 54, *P. thompsoni*. Figs 55-57, habitus of females: Fig. 55, *P. naevia*; Fig. 56, *P. nostrorum*; Fig. 57, *P. thompsoni*.

**Pardosa lycosina** Purcell 1903

*Pardosa lycosina* Purcell 1903: 134 (♂).


*Diagnosis*. In the present state of our knowledge this species cannot be identified unequivocally.
The species is only known from two females, preventing certain identification. Both females are from the type locality which is remote from other localities from whence we now mention other species, some of which are new. For that reason we provide a redescriptions of this taxon. However, considering the large distribution of several of the species, and the fact that some type localities have a comparable climatic regime (Schulze & McGee 1978), these females might be conspecific with *P. nostrorum*, *P. kavango* or even *P. injucunda* which is also known from South Africa. Males from the type locality are needed to verify this possibility.

**Description.** Female (lectotype, paralectotype in brackets). Measurements: CW
= 3.29 (2.29), CL = 4.17 (3.21), TL = 8.21 (5.92), AME = 0.18, PME = 0.41.
IV/CL: 3.71. Entire specimen strongly bleached. Carapace pattern reduced to pale median band; sparsely covered with short black hairs.

Epigyne with well developed inverted T-shaped septum; groove holding transverse bar short; spermathecae small.

Male. Unknown.

Other material examined. None.

Distribution. Only known from type locality.

DISCUSSION

It is clear that the species here described are very similar, closely related, but also very variable. (One possible exception is P. paleata, see note thereunder.) Earlier workers had to admit (Strand 1913: 465) they could not identify particular «variations» and in some cases simply did not mention specimens they could not determine. De Lessert (1936) reports a female of P. proximella from southern Mozambique but does not mention the male in the same sample. The label accompanying the specimens reads «3 different from P. proximella». We now know both specimens belong to P. nostrorum. The climax of confusion was reached in Roewer (1959, 1960) who mentioned P. injucunda under eight different names, in three different genera and P. lusingana under five species, also in three genera. It is possible there will be a few more because the drawings do not always give a clue as to what species they are meant to illustrate! The reason for this confusion is mainly due to the use of somatic characters in Roewer’s taxonomy and the fact that Roewer’s drawings were prepared by a drawer who lived in an other country and thus never saw the specimens he had to illustrate.

Our taxonomy is therefore almost entirely based on the morphology of the male palp. Habitus characteristics vary considerably, e.g. the shape and colour of the lateral bands on the carapace, often used as a diagnostic character in other lycosid groups, are very variable and useless for the identification of members of this group. The colour of the sternum, used in the past for diagnosis, (Strand 1908: 359; De Lessert 1915: 72); may vary, even within the same population. Specimens of P. lusingana for instance, most often have a dark sternum with a short pale median stripe, but there are specimens with a pale sternum with a dark median stripe, which may be V-shaped in some cases!

The habitus of different species tends to converge where they occur together. On Mt Kenya and in the Uperumba National Park in Zaire, where both P. messingae and P. injucunda occur, they have a very similar carapace pattern. However, apart from genital characters, the colour of the sternum is different and often allows differentiation of the species at a particular locality. P. messingae from Zaire have a dark sternum with a short median pale stripe in front. P. injucunda from the same locality have a pale sternum with a dark frontal «V».

Intermediate forms are also found in a mixed population of P. lusingana and P. kavango in northern Namibia in which almost all males can be attributed with ease to one of the species by the diagnostic characters mentioned above. Another intermediary male between P. lusingana and P. kavango was found in Weenen (Natal, South
Africa, XII.1941, NMSA). In the palp of this specimen the tegulum has few (4) ribs behind the ductus but they are orientated as in *P. lusingana*. Therefore this male might represent another species or an intermediate between the species mentioned. Other examples of mixed populations with intermediate forms are available.

We therefore assume that there is a certain degree of hybridisation occurring in overlapping populations. Hence, it might be considered that some of the taxa described here should be given subspecific status. Indeed, taxa such as *P. alticola*, *P. kavango*, *P. lusingana*, *P. messingerae*, *P. naevia*, have distribution areas which are mainly separate but where they overlap, interbreeding appears to occur. In the present state of knowledge, the decision as to whether these taxa should be assigned specific or subspecific rank is merely speculative. We have therefore chosen the most straightforward solution which is to give them all specific rank.

Although the identification of males is difficult but possible in the large majority of the specimens, identification of females is often impossible. Except for *P. messingerae*, in which the large spermathecae are diagnostic, the large variation of the epigynal structures does not permit females to be identified with certainty. Therefore, isolated females were not always included in this study.

The distribution of the group as a whole covers almost the entire African continent although there are some remarkable exceptions. True forest areas in central Africa appear not to belong to the distribution area of the group but particular human alterations of the habitat are sufficient to create a suitable habitat for these wolf spiders. Indeed, road verges and clearings in dense forest are almost always colonized by *P. injucunda*. Pure desert areas are not inhabited by members of the *P. nebulosa*-group but very dry sub-desert habitats are colonized by *P. geofana*, *P. paleta* or *P. thompsoni*. Although the presently known distribution area of the last is very disjunct, it is likely that it is a Sahel species which will be found throughout this zone just as *Eivipa aequalis* Alderweireldt (see Alderweireldt 1991). The distribution of *P. injucunda* on the other hand is less easily understood. It is possible that during the last pluvial (+ 5000 BP) a corridor existed along the Nile which has enabled this species to reach northern Egypt. This locality has become isolated from the rest of the vast distribution area once the corridor disappeared as a result of increasingly dry climatic conditions. Another gap in the distribution of the group is the southwestern Cape and the largest part of Namibia. This area has winter rains, a climatic regime to which other taxa have apparently been adapted before. However, *P. geofana* is widespread in an area in which winter rains are the rule, which might indicate that some important ecological changes have occurred in northern Africa in geological recent times. A last gap is the *Brachystegia* (= miombo) zone in south-eastern Africa (mainly in Rhodesia, Zambia and Malawi) in which no representative of the group has been found despite considerable sampling efforts. This vegetation is known to be an old, quite stable formation (Andrews & Van Couvering 1975). This could have prevented colonization by what we assume is a recent group of still speciating spiders.

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REFERENCES


The *Pardosa nebulosa*-group in Africa


