

REVISION OF THE *MILVINA* GROUP  
OF THE WOLF SPIDER GENUS *PARDOSA*  
(ARANEAE: LYCOSIDAE)<sup>1</sup>

BY C. D. DONDALE AND J. H. REDNER  
Biosystematics Research Institute  
Research Branch, Agriculture Canada,  
Ottawa, Ontario, Canada K1A 0C6

INTRODUCTION

The genus *Pardosa* C. L. Koch is a large and widespread group of wolf spiders. Several species groups have been recognized in North America (Lowrie and Dondale 1981). The objective of the present paper is to define and revise the *milvina* group.

The *milvina* group of the genus *Pardosa* consists of 18 American species of wolf spiders. The greatest concentration of species seems to be in the southeastern United States and Mexico. Only *P. milvina* (Hentz), *P. saxatilis* (Hentz), and *P. littoralis* Banks range northward as far as Canada, and only *P. portoricensis* Banks, *P. hamifera* F. Pickard-Cambridge, and *P. littoralis* have been found in the West Indies. *P. fastosa* (Keyserling) extends into South America as far as Ecuador. None are found on the U.S. Pacific coast or in the U.S. Rocky Mountains, and few specimens are recorded from the Great Plains.

Terminology for anatomical parts is defined by Dondale and Redner (1978) and by Figures 2-7 and 41-45 here. Measurements are given as the mean and standard deviation for 10 to 20 specimens or as the range for fewer.

RELATIONSHIPS

The external genitalia, in our opinion, provide the best indicators of relationships within the *milvina* group. The inferred relationships among the species are shown in Figure 1.

Females of all species in the group have the lateral margins of the median septum raised and thickened at the site of the copulatory openings (character 1, Fig. 1; Fig. 45). This modification appears to enlarge the openings and to reinforce the margins, and we speculate

---

<sup>1</sup>Manuscript received by the editor December 10, 1983.

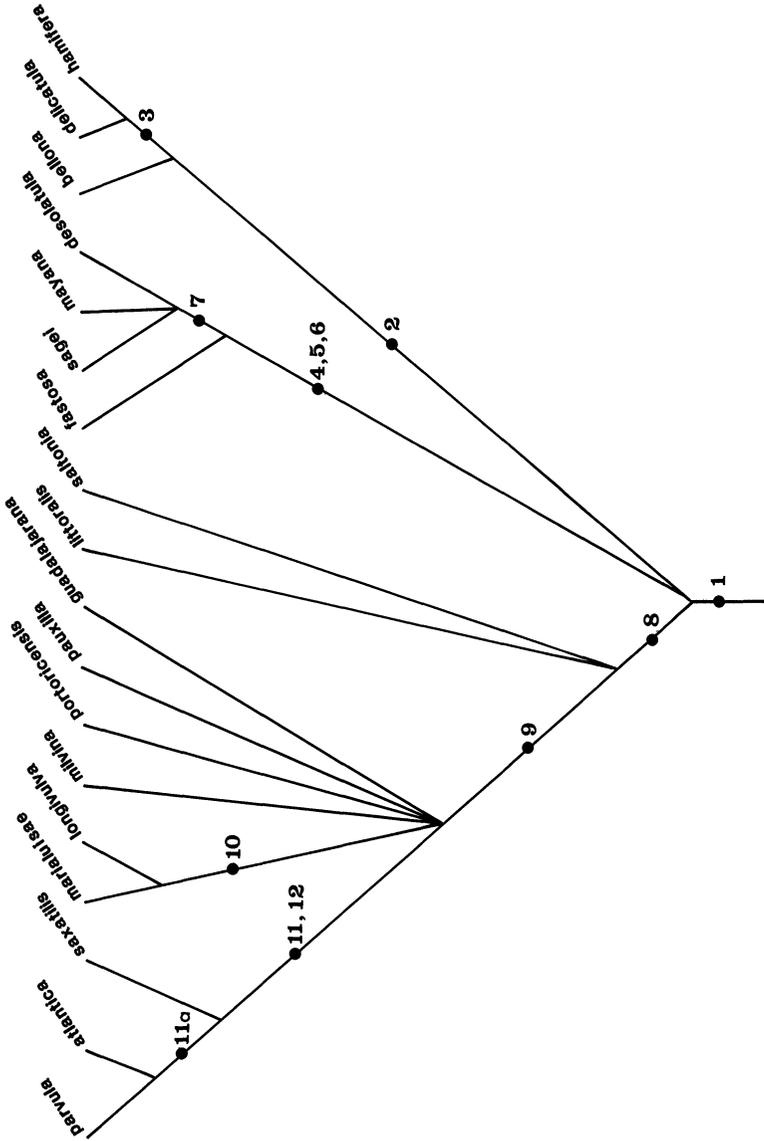


Fig. 1. Cladogram of the *milvina* group. See text for definition of the numbered components.

that each opening may accommodate not only the embolus, which is a slender shaft, but the enlarged, sclerotized tip of the conductor as well. The condition is not found elsewhere in *Pardosa* except in two species of the Old World *wagleri* group, which have a quite different kind of median septum, hood, and copulatory tubes. We infer the condition found in the *milvina* group to be apomorphic, and the absence of the condition to be plesiomorphic.

The base of the median septum is more or less rectangular in females of certain species of the group (character 4, Fig. 1; Fig. 50). This condition is unique among the species of *Pardosa*, and is inferred to be apomorphic. The plesiomorphic state is a triangular base. Also, a strongly tapered anterior part of the septum (character 9, Fig. 1; Fig. 65), in combination with a single hood cavity, is inferred to be apomorphic and a broader anterior part to be plesiomorphic.

The epigynal hood may extend posteriad at the sides, thus defining a raised, tapered, median area (character 12, Fig. 1; Fig. 58). This condition, found only in specimens of the *saxatilis* complex, is inferred to be apomorphic. The simpler, lobed hood found in the other members of the *milvina* group is inferred to be plesiomorphic.

The median apophysis, which is believed to assist indirectly in aligning the embolus tip with the copulatory opening, may be unusually short and blunt (character 2, Fig. 1; Fig. 3), with its basal process located at midlength on the apophysis (character 5, Fig. 1; Fig. 8) and having its mesal margin thickened (character 7, Fig. 1; Fig. 8). These states are inferred to be apomorphic and the more slender, elongate apophysis, with the basal process located at the base and with the mesal margin not thickened, to be plesiomorphic.

The conductor in the *milvina* group is a stout rod, lying transversely in the groove between the apical division of the genital bulb and the tegulum. In the unexpanded bulb, only its tip is visible (Fig. 3), but it becomes fully exposed by dissection (Fig. 6). The apomorphic states of this character are inferred to be "angulate or pointed on basal margin" (character 3, Fig. 1; Fig. 6), "fluted at tip" (character 6, Fig. 1; Fig. 11), "possession of dark, shiny knob near tip" (character 8, Fig. 1; Fig. 21), and "knob excavated" (character 10, Fig. 1; Figs. 38, 40, arrows). The plesiomorphic states are inferred to be "straight basal margin", "thick tip", "knob lacking", and "knob not excavated".

Certain segments of the male palpus may be covered dorsally with reflective white setae (characters 11, 11a, Fig. 1; Figs. 16–18). These setae probably serve as a visual cue to the female during male courtship, and their presence is believed to be apomorphic. In *saxatilis*, only the patella bears such a covering; in *atlantica*, both patella and tibia are covered, and in *parvula*, both segments plus the basal half of the cymbium are covered. Males of only the remotely related *P. tesquorum* (Odenwall) have a similar covering on the palpal patella. We infer that the presence of this covering in the *milvina* group is apomorphic, and that the plesiomorphic state of the character is the involvement of a single segment.

#### UNIDENTIFIED SPECIES

A name associated in the past with the *milvina* group, namely, *Lycosa canadensis* Blackwall, 1871, treated as a junior synonym of *P. milvina* by Chamberlin (1908), could not be identified by us, and is treated here as *nomen dubium*. The holotype of *canadensis* was an unidentifiable juvenile and is no longer in existence. *Pardosa accurata* Becker, 1886, described from “Mexico”, has been identified as an unknown species of *Lycosa*, *s.l.*, through examination of the holotype by us; the type is a juvenile specimen deposited in the Institut Royal des Sciences Naturelles de Belgique.

#### DESCRIPTION

Total length 3.00 to 7.50 mm. Carapace smoothly convex at sides, vertical anteriorly at sides, approximately uniform in height between dorsal groove and posterior row of eyes, covered sparsely with short setae; eye area black, often iridescent; anterior row of eyes somewhat procurved, distinctly shorter than middle row, with median eyes equal in size to lateral eyes or somewhat larger and located slightly closer to laterals than to each other. Legs moderately long and strong, with thin scopulae and sparse setae; femur I with 3 dorsal macrosetae, 2 prolaterals (near tip), 2 or 3 retrolaterals; tibia I with 2 slender bristlelike dorsals, 2 prolaterals, 2 retrolaterals, 3 pairs of ventrals; basitarsus I with 1 bristlelike dorsal, 3 prolaterals, 2 or 3 retrolaterals, 3 paired and 1 unpaired ventral; trochanters with deep notch distally at tip. Abdomen ovoid, covered with dense, short setae and with cluster of longer, erect setae at anterior end.

Male palpus usually black and contrasting with pale areas on legs and carapace, often with fringes of black setae at sides of segments; palea (Fig. 6) projecting liplike at tip of genital bulb, giving rise prolaterally to slender, rather short, slightly curved embolus and giving rise basally to elongate, stout conductor that lies largely hidden between base of palea and tegulum; terminal apophysis toothlike or bladelike, located retrolaterodistally (Fig. 6); median apophysis short, straight or somewhat curved, with strong basal process (Fig. 3).

Epigynum (Fig. 41) rather long (often longer than twice maximum width of median septum), with median septum broad posteriorly and slender or evanescent anteriorly; hood small, distinct, with single cavity; copulatory openings with margins raised and thickened. Copulatory tubes (Fig. 44) short, angulate or somewhat curved, with swelling on ventral or lateral side; spermathecae small, bulbous.

#### KEY TO MALES OF THE *MILVINA* GROUP

1. Distal process of median apophysis short, broad, lacking hook at tip (Fig. 3) .....2
- 1'. Distal process of median apophysis elongate, usually hooked at tip (as in Fig. 9, arrow) .....4
- 2(1). Terminal apophysis broad (ventral view, Figs. 2, arrow, 5); conductor smoothly curved on basal margin (Fig. 5) ..... *bellona* Banks
- 2'. Terminal apophysis more slender (ventral view, Figs. 6, 7); conductor angular or pointed on basal margin (Figs. 6, 7, arrows) .....3
- 3(2). Conductor with hooked point on basal margin (Fig. 6); embolus bent near tip (Fig. 6) .....  
..... *delicatula* Gertsch and Wallace
- 3'. Conductor with angulate basal margin (Fig. 7); embolus gently curved at tip (Fig. 7) .....  
..... *hamifera* F. Pickard-Cambridge
- 4(1'). Median apophysis with basal process small, located about midlength of apophysis (Fig. 8); conductor thin, fluted at tip, lacking knoblike process at tip (Fig. 11) .....5
- 4'. Median apophysis with basal process located at base of apophysis or, if located at middle then large (Figs. 19, 24);

- conductor thickened at tip, bearing dark, shiny, knoblike process near tip (as in Figs. 21, 26, 38) ..... 8
- 5(4). Median apophysis with distal process straight at tip (Fig. 8, arrow) ..... *sagei* Gertsch and Wallace
- 5'. Median apophysis with distal process hooked at tip (as in Figs. 9, 10, 14) ..... 6
- 6(5'). Terminal apophysis separated from mesal swelling by acute angle (Fig. 12); median apophysis with distal process strongly hooked (Fig. 9, arrow) .....  
..... *fastosa* (Keyserling)
- 6'. Terminal apophysis separated from mesal swelling by broad curve (Fig. 13, arrow); median apophysis with distal process weakly hooked (Fig. 10) ..... 7
- 7(6'). Median apophysis with marginal swelling broad (Fig. 10, arrow) ..... *desolatula* Gertsch and Davis
- 7'. Median apophysis with marginal swelling narrow (Fig. 14, arrow) ..... *mayana* sp.n.
- 8(4'). Patella (and sometimes additional segments) of palpus covered dorsally with reflective white setae (most noticeable in living or dried specimens) (Figs. 16-18); conductor sinuous along basal margin (Fig. 21, arrows) ..... 9
- 8'. Patella of palpus covered dorsally with dark setae (though few reflective white setae may be present); conductor with single curve along basal margin (as in Figs. 25, 38)...  
..... 11
- 9(8). Tibia (as well as patella, and sometimes basal half of cymbium) covered dorsally with reflective white setae (Figs. 17, 18) ..... 10
- 9'. Tibia of palpus covered with dark setae (Fig. 16) ....  
..... *saxatilis* (Hentz)
- 10(9). Basal half of cymbium (except narrow band at basal margin) covered dorsally with dark setae (Fig. 17)...  
..... *atlantica* Emerton
- 10'. Basal half of cymbium covered with reflective white setae (Fig. 18) ..... *parvula* Banks
- 11(8'). Terminal apophysis large, extending basad to or beyond tip of embolus (Figs. 22, arrow, 25) .....  
..... *littoralis* Banks
- 11'. Terminal apophysis smaller, extending only short distance basad (as in Figs. 24, 35, 42) ..... 12

- 12(11'). Terminal apophysis arched retrolaterally (Figs. 23, arrow, 26); median apophysis small, occupying about one-third length of genital bulb (Fig. 23) ..... *saltonia* sp.n.
- 12'. Terminal apophysis arched mesally, or not arched (Figs. 27, 34, 40); median apophysis larger, occupying distinctly more than one-third of genital bulb (Figs. 24, 31, 42).  
..... 13
- 13(12'). Terminal apophysis with mesal swelling toothlike (Fig. 27, arrow); median apophysis thick throughout most of its length, with basal process swollen (Fig. 24) .....  
..... *pauxilla* Montgomery
- 13'. Terminal apophysis with mesal swelling not toothlike, i.e., lacking sharp point (Fig. 34); median apophysis slender at middle (Figs. 28, 37) ..... 14
- 14(13'). Median apophysis with distal process expanded (ventral view, Fig. 28, arrow). Dorsum of abdomen with pale median band flanked by paired distinct, dark, longitudinal bands ..... *portoricensis* Banks
- 14'. Median apophysis with distal process more slender (Figs. 31, 37, 42). Dorsum of abdomen dark or mottled, or, if pale mesally then lacking paired dark longitudinal bands  
..... 15
- 15(14'). Terminal apophysis broad, blunt (Fig. 30, arrow). Species occurring only north of Tropic of Cancer (Map 5) ...  
..... *milvina* (Hentz)
- 15'. Terminal apophysis more slender, pointed (Figs. 33, 36, 39). Species occurring only south of Tropic of Cancer (Map 6) ..... 16
- 16(15'). Median apophysis abruptly angled on mesal margin (Fig. 35, arrow). Carapace width less than 1.35 mm. Dorsum of abdomen with median band of reflective white setae ..  
..... *guadalajarana* sp.n.
- 16'. Median apophysis curved on mesal margin (Figs. 37, 42). Carapace width greater than 1.35 mm. Dorsum of abdomen lacking median band of reflective white setae  
..... 17
- 17(16'). Terminal apophysis rather long (Fig. 36). Tibia and basitarsus I with fringe of long, erect setae along prolateral and retrolateral surfaces. Carapace with black lateral margins ..... *longivulva* F. Pickard-Cambridge

- 17'. Terminal apophysis shorter (Fig. 39). Tibia and basitarsus I lacking fringe. Carapace usually with pale lateral margins .....*marialuisae* sp.n.

KEY TO FEMALES OF THE *MILVINA* GROUP  
OCCURRING IN EASTERN CANADA AND UNITED STATES

1. Median septum extending anteriorly nearly to level of hood (Figs. 46, 60, 65) .....2  
 1'. Median septum extending anteriorly one-half length of epigynum or less (Figs. 58, 70) .....4  
 2(1). Median septum broad anteriorly (Fig. 60, arrow) .....  
 ..... *littoralis* Banks  
 2'. Median septum distinctly tapered anteriorly (Figs. 46, 65) .....3  
 3(2'). Median septum with expanded posterior part concave at lateral margins (Fig. 65, arrow) *pauxilla* Montgomery  
 3'. Median septum with expanded posterior part convex at lateral margins (Fig. 46, upper arrow) .....  
 ..... *delicatula* Gertsch and Wallace  
 4(1'). Hood continuing posteriorly at sides where it defines a raised, tapered median area (Fig. 58, arrows) .....5  
 4'. Hood continuing posteriorly at sides where it defines a depressed, non-tapered area (Fig. 70, arrow) .....  
 ..... *milvina* (Hentz)  
 5(4). Species restricted to Great Lakes-St. Lawrence region and southward in Appalachian Mountains (Map 3) .....  
 ..... *saxatilis* (Hentz)  
 5'. Species restricted to southeastern coastal plain (including Florida) and the Mississippi basin (Map 3) .....6  
 6(5'). Species restricted to Florida and eastern Gulf Coast region (Map 3) .....*parvula* Banks  
 6'. Species restricted to Atlantic coast States east of the Appalachians and in the Mississippi basin (Map 3) ...  
 ..... *atlantica* Emerton

KEY TO FEMALES OF THE *MILVINA* GROUP  
OCCURRING IN SOUTHWESTERN UNITED STATES,  
MEXICO, AND CENTRAL AMERICA

1. Median septum with expanded posterior part approximately rectangular (Figs. 50, 52, 54, 56) .....

- ..... *desolatula* Gertsch and Davis, *mayana* sp.n.,  
*sagei* Gertsch and Wallace, and *fastosa* (Keyserling)
- 1'. Median septum with expanded posterior part more or less  
triangular (Figs. 48, 62, 68) .....2
- 2(1'). Median septum broad anteriorly, bordered by pair of  
ridges that extend posteriad along interior surface of  
septum (Figs. 41, arrow, 43, 44) ..... *bellona* Banks
- 2'. Median septum slender or evanescent anteriorly, lacking  
bordering ridges .....3
- 3(2'). Epigynum with curved ridges posteriorly (Figs. 46, lower  
arrow, 48, 72, 74, 76) .....4
- 3'. Epigynum lacking curved ridges (Fig. 62).....  
.....*saltonia* sp.n.
- 4(3). Curved ridges concealing lateral angles of median septum  
(Fig. 46, lower arrow) .....  
.....*delicatula* Gertsch and Wallace
- 4'. Curved ridges not concealing lateral angles of median  
septum .....5
- 5(4). Epigynum short (ratio of epigynal length to greatest  
median septum width less than 2:1) .....  
.....*hamifera* F. Pickard-Cambridge
- 5'. Epigynum longer (ratio of epigynal length to greatest  
median septum width more than 2:1) .....6
- 6(5'). Carapace width usually less than 1.6 mm. Retromargin of  
chelicera with 2 teeth ..... *guadalajarana* sp.n.
- 6'. Carapace width usually greater than 1.6 mm. Retro-  
margin of chelicera with 3 teeth .....7
- 7(6'). Copulatory tubes with small swelling at base (Fig. 75).  
Carapace margins dark .....  
.....*longivulva* F. Pickard-Cambridge
- 7'. Copulatory tubes with large swelling on lateral margins  
(Fig. 77, arrow). Carapace margins usually pale .....  
.....*marialuisae* sp.n.

KEY TO FEMALES OF THE *MILVINA* GROUP  
OCCURRING IN THE WEST INDIES

1. Median septum rather broad anteriorly (Fig. 60, arrow)  
..... *littoralis* Banks
- 1'. Median septum distinctly tapered anteriorly (Figs. 48, 68)  
.....2

- 2(1'). Copulatory tubes broad, and spermathecae widely separated (Fig. 49). Epigynum long (ratio of epigynal length to greatest median septum width more than 2:1) . . . . .  
 . . . . . *hamifera* F. Pickard-Cambridge
- 2'. Copulatory tubes slender, and spermathecae narrowly separated (Fig. 69, arrows). Epigynum shorter (ratio of epigynal length to greatest median septum width less than 2:1) . . . . . *portoricensis* Banks

*Pardosa bellona* Banks

Figures 2, 5, 41, 43, 44; Map 1

*Pardosa bellona* Banks, 1898:275, Fig. 21 (pl. 16). Two male and two female syntypes from Coral de Piedras, Baja California (Eisen and Vaslit), deposited in MCZ, examined. Syntypes from San Miguel de Horcasitas, Magdalena Island, and from San José del Cabo, deposited in California Academy of Sciences, presumed destroyed. Gertsch 1934:21. Gertsch and Wallace 1935:3, Fig. 14. Roewer 1954:189. Bonnet 1958:3359.

Male. Total length  $4.50 \pm 0.34$  mm; carapace  $2.28 \pm 0.18$  mm long and  $1.75 \pm 0.13$  mm wide (20 specimens). Carapace with dark orange median and submarginal areas, and with pair of broad, dark longitudinal bands bordering pale median area; margins dark. Sternum yellow orange, sometimes with several small black spots. Chelicerae orange brown to black, pale mesally; retromargin with 3 teeth. Legs yellow orange; femur I often black basally; tibia and basitarsus I with sparse fringe of long lateral setae. Abdomen pale mesally, dark laterally; venter orange yellow. Terminal apophysis broad; median apophysis short, broad, with large basal process, lacking hook at tip of distal process (Fig. 2); conductor rounded on basal margin (Fig. 5).

Female. Total length  $4.85 \pm 0.35$  mm; carapace  $2.34 \pm 0.17$  mm long and  $1.86 \pm 0.13$  mm wide (18 specimens). General color and structure as in male but dark pigment on carapace margin may break into spots, femur I lacking dark pigment at base, and leg I lacking fringe of long lateral setae. Median septum rather broad posteriorly, little tapered anteriorly, flanked anteriorly by ridges that continue along internal surface (Fig. 41); copulatory tubes rather thick, with swelling on ventrolateral surface (Figs. 43, 44).

Diagnosis. Specimens of *P. bellona* most resemble those of *P. delicatula* and *P. hamifera*, differing by the broad terminal

apophysis, by the rounded basal margin of the conductor, and by the anteriorly broad median septum with paired ridges.

Range. Utah south to Colima, Mexico. Included, but not mapped here, are the following: Utah: Monroe Canyon, 112° 10'W, 38° 38'N. Nevada: Las Vegas. California: Seeley, 7 mi. west of El Centro; Indian Wells, Riverside Co.

Natural History. Males have been collected in December to February, and June to September, females in January, March, June to September, and November. Females with egg sacs were collected in January, March, and May to July.

*Pardosa delicatula* Gertsch and Wallace

Figures 3, 6, 45–47; Map 1

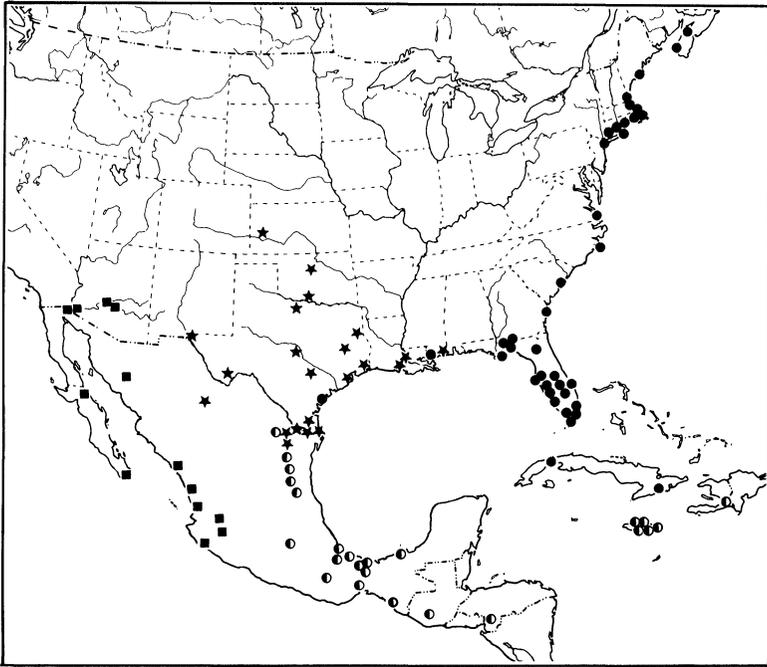
*Pardosa pauxilla*: Montgomery 1904:268 (part, not lectotype).

*Pardosa delicatula* Gertsch and Wallace, 1935:4, Figs. 13, 17.

Male holotype and female allotype from Edinburg, Hidalgo Co., Texas (Stanley Mulaik), deposited in AMNH, examined. Gertsch and Davis, 1940: 5. Roewer 1954:189. Bonnet 1958:3365.

Male. Total length  $4.78 \pm 0.32$  mm; carapace  $2.59 \pm 0.15$  mm long and  $1.90 \pm 0.14$  mm wide (20 specimens). Carapace with dark orange median and submarginal areas, and with pair of dark brown longitudinal bands flanking pale median area; margins dark, pale, or marked with series of 3 or 4 dark spots. Sternum orange yellow, sometimes suffused with black or with faint, V-shaped dark mark. Chelicerae variable in color; retromargin with 3 teeth. Legs yellow orange; femur I dark prolaterally at base. Abdomen dull yellow mesally, darker laterally, sometimes black throughout; venter pale. Terminal apophysis rather slender (ventral view); median apophysis short, broad, with large basal process, lacking hook at tip of distal process (Fig. 3); conductor with sharp, hooked point on ventral surface; embolus bent near tip (Fig. 6).

Female. Total length  $5.73 \pm 0.79$ ; carapace  $2.63 \pm 0.20$  mm long and  $2.02 \pm 0.23$  mm wide (20 specimens). General color and structure as in male but carapace paler, usually having pale margins. Median septum strongly tapered anteriorly, lacking lateral ridges, convex along lateral margins of posterior part, partly concealed laterally by curved ridges (Fig. 46); copulatory tubes rather slender (Fig. 47).



Map 1. Collection localities for *Pardosa bellona* (squares), *P. delicatula* (stars), *P. hamifera* (half-circles), *P. littoralis* (circles).

**Diagnosis.** Specimens of *P. delicatula* most resemble those of *P. bellona* and *P. hamifera* but differ by the sharp, hooked point on the conductor, by the bent embolus, and by the concealment of the lateral angles of the median septum by curved ridges.

**Range.** Oklahoma and Mississippi south to Chihuahua and Nuevo Leon, Mexico.

**Natural History.** Males and females have been collected in every month except January, and females with egg sacs were taken from April to October. Common habitats are pastures and other grasslands, where they are taken in numbers by pitfall trap; one large collection was taken by sweep net in Louisiana sweet potato fields at night.

*Pardosa hamifera* F. Pickard-Cambridge  
Figures 4, 7, 48, 49; Map 1

*Pardosa hamifera* F. Pickard-Cambridge, 1902:320, Fig. 4, 4a (pl. 31). Holotype male from Guatemala (Sarg), deposited in BM(NH), examined. Roewer 1954:187. Bonnet 1958:3373.

*Pardosa delicata* Gertsch, 1934:20. Holotype female from La Zacualpa, Chiapas, Mexico, August 1909 (A. Petrunkevitch), deposited in AMNH, examined. Allotype male and paratype female from the type locality, with same data as for holotype, not examined. Gertsch and Wallace 1935:3, Fig. 18. Roewer 1954:186. Bonnet 1958:3365. **NEW SYNONYM.**

**Male.** Total length  $4.54 \pm 0.38$  mm; carapace  $2.36 \pm 0.18$  mm long and  $1.83 \pm 0.14$  mm wide (20 specimens). Carapace with dark orange brown median and submarginal areas, and with dark longitudinal bands flanking median area; lateral margins usually pale. Sternum dark orange, sometimes paler or darker mesally. Chelicerae variable in color; retromargin with 3 teeth. Legs dark orange; femur I often dark at base. Abdomen black with dull yellow heart mark, or yellow brown mesally and darker laterally; venter pale, sometimes suffused with black. Terminal apophysis slender (ventral view); median apophysis short, broad, with large basal process, lacking hook at tip of distal process (Fig. 4); conductor angled on basal margin (Fig. 7).

**Female.** Total length  $5.10 \pm 0.48$  mm; carapace  $2.45 \pm 0.22$  mm long and  $1.95 \pm 0.19$  mm wide (20 specimens). General color and structure as in male but paler. Median septum slender anteriorly, lacking lateral ridges, concave at lateral margins of expanded posterior part (Fig. 48); copulatory tubes rather thick throughout, with ventral swelling (Fig. 49).

**Diagnosis.** Specimens of *P. hamifera* most resemble those of *P. bellona* and *P. delicatula* but differ in having an angular basal margin on the conductor, a gently curved embolus (as in *bellona* but not as in *delicatula*), and in having a slender anterior part and fully exposed posterior part of the median septum.

**Range.** Nuevo Leon south to Honduras; Jamaica, Haiti.

**Natural History.** Males have been collected in February, March, June, and August to December, females in all months except April and September. Habitat is unrecorded.

*Pardosa sagei* Gertsch and Wallace  
Figures 8, 11, 50, 51; Map 2

*Pardosa sagei* Gertsch and Wallace, 1937:1, Figs. 1,2. Holotype male and allotype female from El Volcan, Chiriqui, Panama, 26 February 1936 (W. J. Gertsch), deposited in AMNH, examined. Three paratype males and four paratype females from the type locality, with same data as holotype, deposited in MCZ, examined. Roewer 1954:188. Bonnet 1958:3420.

Male. Total length  $5.00 \pm 0.35$  mm; carapace  $2.69 \pm 0.12$  mm long and  $2.40 \pm 0.10$  mm wide (20 specimens). Carapace yellow orange mesally and submarginally, with pair of dark longitudinal bands flanking mesal area; margins dark. Sternum orange yellow, sometimes with few black spots. Chelicerae yellow orange; retro-margin with 3 teeth. Legs yellow orange; tibia and basitarsus I with fringe of long, erect, lateral setae. Abdomen yellow brown mesally, darker laterally; venter pale yellow, sometimes with few small black spots. Terminal apophysis small, pointed (ventral view); median apophysis with distal process elongate and straight, with basal process small, located about midlength on apophysis (Fig. 8); conductor thin, fluted at tip, lacking knoblike process (Fig. 11).

Female. Total length  $5.38 \pm 0.57$  mm; carapace  $2.63 \pm 0.18$  mm long and  $2.04 \pm 0.18$  mm wide (20 specimens). General color and structure as in male but leg I lacking fringe of setae. Median septum with posterior part approximately rectangular (Fig. 50). Copulatory tubes rather thick, curved near middle (Fig. 51).

Diagnosis. Specimens of *P. sagei* most resemble those of *P. fastosa*, *P. desolatula*, and *P. mayana*. Males of *sagei* are diagnosed by the straight distal process of the median apophysis. Diagnostic characters are not available for female *sagei*; the known females were collected together with males.

Range. Panama.

Natural History. Males and females have been collected in February, March, July, and August. Egg sacs were found in July and August.

*Pardosa fastosa* (Keyserling)  
Figures 9, 12, 52, 53; Map 2

*Lycosa fastosa* Keyserling, 1877:618, Figs. 5, 6 (pl. 1). Six syntype males and four syntype females from "Umgebung von St. F  de Bogota", Bogota, Colombia

(Lindig), deposited in BM(NH), examined.

*Pardosa fastosa*: Petrunkevitch 1911:570. Roewer 1954:186.

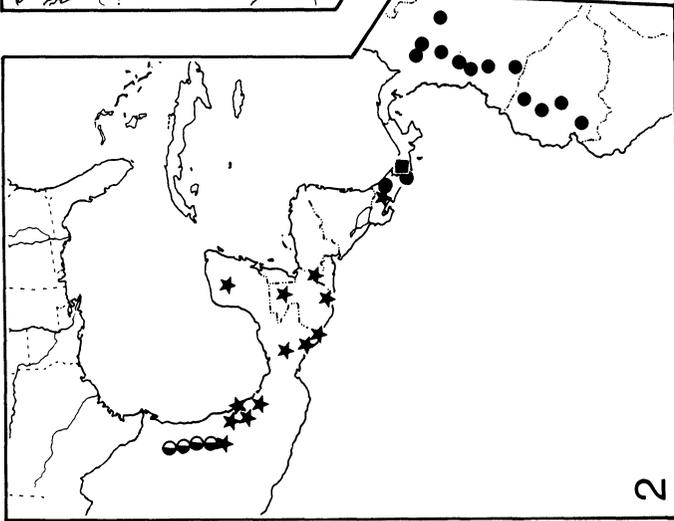
*Pardosa fastuosa*: Bonnet 1958:3367 (incorrect subsequent spelling).

*Pardosa uncatula* F. Pickard-Cambridge, 1902:319, Figs. 27, 28 (pl. 30). Lectotype male from La Palma, Costa Rica (Tristan), deposited in BM(NH), examined and here designated. Three paralectotype males and six paralectotype females from the type locality, with same data as lectotype, deposited in BM(NH) and here designated. One male and two females from original syntype series, collected at the type locality and with same data as lectotype, described herein as *P. mayana* new species. Banks 1909:219. Gertsch 1934:20 (part; proposed synonymy of *uncatula* with *pauzilla*, later disclaimed by Gertsch and Wallace (1935)). Roewer 1954:190 (part). Bonnet 1958:3427 (part). **NEW SYNONYM.**

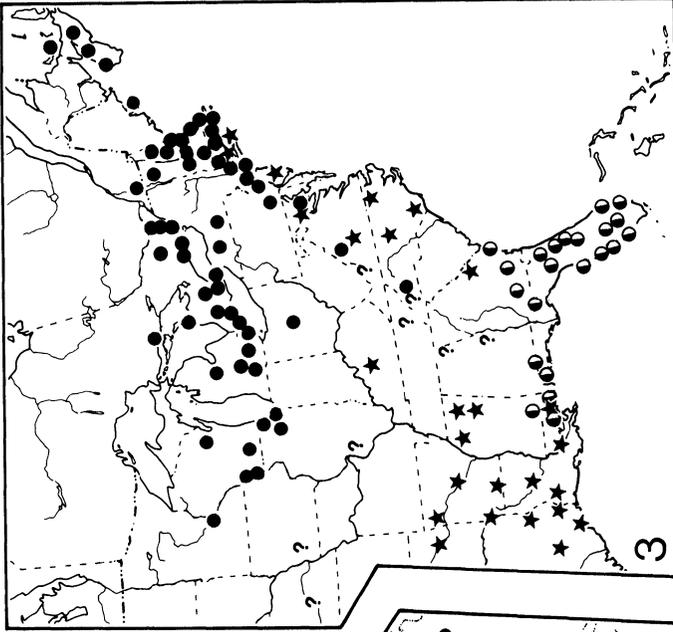
**Male.** Total length  $5.26 \pm 0.39$  mm; carapace  $2.73 \pm 0.22$  mm long and  $2.09 \pm 0.17$  mm wide (20 specimens). Carapace with orange yellow median and submarginal areas, and with paired dark longitudinal bands flanking median area; lateral margins dark. Sternum black, with pale mesal band anteriorly. Chelicerae dark orange, with black lines; retromargin with 3 teeth. Legs yellow orange; femora I and II dark at base; tibia and tarsus I with lateral fringe of long setae. Abdomen black, with dull yellow heart mark; venter yellow, reticulated with black. Terminal apophysis stout, toothlike, connected to mesal swelling by acute angle (ventral view); median apophysis with distal process strongly hooked at tip (Fig. 9); conductor thin, fluted at tip, lacking knoblike process at tip (Fig. 12).

**Female.** Total length  $5.57 \pm 0.54$  mm; carapace  $2.70 \pm 0.23$  mm long and  $2.11 \pm 0.20$  mm wide (20 specimens). General color and structure essentially as in male, but leg I lacking fringe and black pigment, and pale median area of abdominal dorsum extended posteriad as series of chevrons. Median septum with posterior part approximately rectangular (Fig. 52); copulatory tubes stout, diverging (Fig. 53).

**Diagnosis.** Males of *P. fastosa* most resemble those of *P. sagei*, *P. desolatula*, and *P. mayana*, but differ in having the terminal apophysis connected to the swelling lying mesal to that apophysis by an acute angle rather than by a curve, and by the strongly hooked tip of the median apophysis. Females of *fastosa* are anatomically indistinguishable from those of *sagei*, *desolatula*, and *mayana*, but most specimens examined were accompanied by males, or originated in localities from which no males of the other species were known.



Map 2. Collection localities for *Pardosa sagei* (square), *P. fastosa* (circles), *P. desolatula* (half-circles), *P. mayana* (stars).



Map 3. Collection localities for *Pardosa saxatilis* (circle), *P. atlantica* (stars), *P. parvula* (half-circles). Question marks indicate localities for females of uncertain identity; Nebraska locality was confirmed by discovery of males after the paper was submitted for publication.

Range. Costa Rica to Ecuador. The record of *uncatula* from Panama by Petrunkevitch (1925) was not confirmed. The type of *Lycosa fastosa viota* Strand, 1914, was not found.

Natural History. Males have been collected in every month except February and May, and females in every month except May. Females with egg sacs were collected in March, April, July, August, and October to December. Specimens have been recorded from 1,000 to 3,200 meters elevation.

*Pardosa desolatula* Gertsch and Davis  
Figures 10, 13, 54, 55; Map 2

*Pardosa desolatula* Gertsch and Davis, 1940:5, Fig. 22. Holotype male and 1 paratype female from Ciudad Victoria, Tamaulipas, Mexico, 12 June 1936 (L. I. Davis), deposited in AMNH, examined. Allotype female from Tamazunchale, San Luis Potosi, Mexico, 25 November 1938 (A. M. and L. I. Davis), deposited in AMNH, examined. Roewer 1954:186. Vogel 1967:104.

Male. Total length 3.82–4.55 mm; carapace 2.05–2.42 mm long and 1.53–1.87 mm wide (5 specimens). Carapace with yellow orange to orange brown median and submarginal areas, and with paired dark longitudinal bands flanking pale median area; lateral margins pale to dark. Sternum yellow orange. Chelicerae orange brown to brown; retromargin with 3 teeth. Legs orange yellow; femur I dark on basal half to two-thirds. Abdomen dull yellow brown mesally, darker laterally; venter pale. Terminal apophysis connected to mesal swelling by broad curve; median apophysis with marginal swelling broad, and with distal process weakly hooked (Fig. 10); conductor thin, fluted at tip, lacking knoblike process at tip (Fig. 13).

Female. Total length  $4.50 \pm 0.60$  mm; carapace  $2.17 \pm 0.19$  mm long and  $1.65 \pm 0.17$  mm wide (10 specimens). General color and structure essentially as in male, but femur I not black. Median septum with posterior part essentially rectangular (Fig. 54); copulatory tubes stout, diverging (Fig. 55).

Diagnosis. Males of *P. desolatulata* most resemble those of *P. sagei*, *P. fastosa*, and *P. mayana*, but can be distinguished by the broad marginal swelling and weak hook on the median apophysis and by the broad curve by which the terminal apophysis is connected to the mesal swelling. Females are not distinguishable

anatomically from those of *sagei*, *fastosa*, or *mayana*, but all of those examined were accompanied by males, or originated in localities from which no males of the other species were known.

**Range.** San Luis Potosi and Tamaulipas, Mexico.

**Natural History.** Males have been collected in March, June, and November, and females in March, April, September, and November.

*Pardosa mayana* sp.n.

Figures 14, 15, 56, 57; Map 2

*Pardosa uncatula* F. Pickard-Cambridge, 1902:319 (part, not lectotype nor paralectotypes).

**Type Material.** Holotype male from 2 miles north of Fortin de las Flores, 97°01'W, 13°56'N, Veracruz, Mexico, 5 August 1966 (Jean and Wilton Ivie), deposited in AMNH. Three paratypes from La Palma, Costa Rica, deposited in BM(NH). Two paratypes from Honduras and Guatemala, deposited in MCZ. Eighty-seven paratypes from Mexico, Guatemala, and Honduras, deposited in AMNH.

**Male.** Total length  $4.47 \pm 0.26$  mm; carapace  $2.40 \pm 0.11$  mm long and  $1.84 \pm 0.08$  mm wide (20 specimens). Carapace with yellow orange median and submarginal areas, and with paired dark longitudinal bands flanking median area; lateral margins pale or dark. Sternum yellow orange. Chelicerae yellow brown; retromargin with 3 teeth. Legs yellow orange; femur I sometimes black basally; tibiae and tarsi I with fringe of long lateral setae. Abdomen dull yellow brown mesally, darker laterally; venter pale. Terminal apophysis connected to mesal swelling by broad curve; median apophysis with narrow marginal swelling and with distal process weakly hooked (Fig. 14); conductor thin, fluted at tip, lacking knoblike process at tip (Fig. 15).

*Pardosa desolatula* Gertsch and Davis

Figures 10, 13, 54, 55; Map 2

*Pardosa desolatula* Gertsch and Davis, 1940:5, Fig. 22. Holotype male and 1 paratype female from Ciudad Victoria, Tamaulipas, Mexico, 12 June 1936 (L. I. Davis), deposited in AMNH, examined. Allotype female from Tamazunchale,

San Luis Potosi, Mexico, 25 November 1938 (A. M. and L. I. Davis), deposited in AMNH, examined. Roewer 1954:186. Vogel 1967:104.

Male. Total length 3.82–4.55 mm; carapace 2.05–2.42 mm long and 1.53–1.87 mm wide (5 specimens). Carapace with yellow orange to orange brown median and submarginal areas, and with paired dark longitudinal bands flanking pale median area; lateral margins pale to dark. Sternum yellow orange. Chelicerae orange brown to brown; retromargin with 3 teeth. Legs orange yellow; femur I dark on basal half to two-thirds. Abdomen dull yellow brown mesally, darker laterally; venter pale. Terminal apophysis connected to mesal swelling by broad curve; median apophysis with marginal swelling broad, and with distal process weakly hooked (Fig. 10); conductor thin, fluted at tip, lacking knoblike process at tip (Fig. 13).

Female. Total length  $4.50 \pm 0.60$  mm; carapace  $2.17 \pm 0.19$  mm long and  $1.65 \pm 0.17$  mm wide (10 specimens). General color and structure essentially as in male, but femur I not black. Median septum with posterior part essentially rectangular (Fig. 54); copulatory tubes stout, diverging (Fig. 55).

Diagnosis. Males of *P. desolatulata* most resemble those of *P. sagei*, *P. fastosa*, and *P. mayana*, but can be distinguished by the broad marginal swelling and weak hook on the median apophysis and by the broad curve by which the terminal apophysis is connected to the mesal swelling. Females are not distinguishable anatomically from those of *sagei*, *fastosa*, or *mayana*, but all of those examined were accompanied by males, or originated in localities from which no males of the other species were known.

Range. San Luis Potosi and Tamaulipas, Mexico.

Natural History. Males have been collected in March, June, and November, and females in March, April, September, and November.

*Pardosa mayana* sp.n.

Figures 14, 15, 56, 57; Map 2

*Pardosa uncatula* F. Pickard-Cambridge, 1902:319 (part, not lectotype nor paralectotypes).

Type Material. Holotype male from 2 miles north of Fortin de las Flores, 97° 01'W, 13° 56'N, Veracruz, Mexico, 5 August 1966 (Jean

and Wilton Ivie), deposited in AMNH. Three paratypes from La Palma, Costa Rica, deposited in BM(NH). Two paratypes from Honduras and Guatemala, deposited in MCZ. Eighty-seven paratypes from Mexico, Guatemala, and Honduras, deposited in AMNH.

Male. Total length  $4.47 \pm 0.26$  mm; carapace  $2.40 \pm 0.11$  mm long and  $1.84 \pm 0.08$  mm wide (20 specimens). Carapace with yellow orange median and submarginal areas, and with paired dark longitudinal bands flanking median area; lateral margins pale or dark. Sternum yellow orange. Chelicerae yellow brown; retro-marginal with 3 teeth. Legs yellow orange; femur I sometimes black basally; tibiae and tarsi I with fringe of long lateral setae. Abdomen dull yellow brown mesally, darker laterally; venter pale. Terminal apophysis connected to mesal swelling by broad curve; median apophysis with narrow marginal swelling and with distal process weakly hooked (Fig. 14); conductor thin, fluted at tip, lacking knoblike process at tip (Fig. 15).

Female. Total length  $4.86 \pm 0.53$  mm; carapace  $2.40 \pm 0.17$  mm long and  $1.89 \pm 0.15$  mm wide (20 specimens). General color and structure as in male, but leg I lacking dark pigment and fringe. Median septum with posterior part approximately rectangular (Fig. 56). Copulatory tubes rather stout, diverging (Fig. 57).

Diagnosis. Males of *P. mayana* most resemble those of *P. sagei*, *P. fastosa*, and *P. desolatula*, but can be distinguished by the narrow marginal swelling and weakly hooked distal process on the median apophysis, and by the broad curve by which the terminal apophysis is connected to the mesal swelling. Females are not anatomically distinguishable from those of *sagei*, *fastosa*, and *desolatula*, but all of those examined were accompanied by males, or originated in localities from which no males of the other species were known.

Range. Hidalgo, Mexico to Costa Rica.

Natural History. Males and females have been collected in every month except November to January. Females with egg sacs were collected in March and July.

Derivation of Specific Name. The name is derived from that of the Maya Indians.

*Pardosa saxatilis* (Hentz)

Figures 16, 19–21, 58, 59; Map 3

- Lycosa saxatilis* Hentz, 1844:392, Figs. 9, 10 (pl. 18). Syntype females from "The mountains of North Alabama", August, destroyed. Hentz 1875:34, Figs. 9, 10 (pl. 4).
- Lycosa minima* Keyserling, 1877:614, Fig. 3 (pl. 7). Holotype male from Peoria, Illinois, deposited in BM(NH), examined. Banks 1891:193.
- Pardosa albopatella* Emerton, 1885:497, Fig. 2, 2a, 2b (pl. 49). Four syntype males and 1 juvenile syntype male from New Haven, Connecticut, 20 May 1884 (J. H. Emerton), deposited in MCZ, examined; syntypes from Ipswich and Roxbury, Massachusetts (May and June), not found. Banks 1892:70. Barrows 1918:314.
- Pardosa annulata* Banks, 1892:68, Fig. 41 (pl. 1). Two syntype females from Ithaca, New York, deposited in MCZ, examined.
- Pardosa minima*: Banks 1895:91. Montgomery 1902:571, Figs. 35, 36 (pl. 30); 1904:273.
- Pardosa saxatilis*: Chamberlin 1908:174, Figs. 1, 2 (Pl. 13). Chickering 1933:517. Comstock 1940:661, Fig. 732d. Kaston 1948:335, Fig. 1104 (pl. 56), 1124, 1125 (pl. 58), 1139 (pl. 59); 1978:191, Fig. 487 (part). Levi and Field 1954:456. Roewer 1954:194 (part). Bonnet 1958:3420 (part). Wolff 1981:66, Figs. 10, 18.
- Pardosa platta* Chamberlin and Ivie, 1942:31, Fig. 72 (pl. 7). Holotype female from 10 mi. west of Grand Island, Hall Co., Nebraska, 6 June 1933 (W. Ivie), in AMNH, examined. Roewer 1954:194. Vogel 1967: 105. **NEW SYNONYM.**

**Male.** Total length  $4.24 \pm 0.40$  mm; carapace  $2.27 \pm 0.18$  mm long and  $1.71 \pm 0.14$  mm wide (20 specimens). Carapace (Fig. 20) with dark orange or dark yellow median and submarginal areas, and with paired dark, indistinct, longitudinal bands flanking median area; margins pale or with series of dark spots. Sternum dark orange suffused with black. Chelicerae dark brown, streaked with black; retromargin usually (about 85%) with 2 teeth, more rarely with 3. Legs orange yellow; femur I dark. Abdomen dark orange mottled with brown and black mesally, darker laterally; venter dark orange brown. Terminal apophysis small, blunt; median apophysis long, slender, curved (Fig. 19); conductor sinuous along basal margin, with dark, shiny knob near tip (Fig. 21); patella covered dorsally with reflective white setae, and remaining palpal segments dark (Fig. 16).

**Female.** Total length  $4.48 \pm 0.38$  mm; carapace  $2.27 \pm 0.14$  mm long and  $1.75 \pm 0.14$  mm wide (20 specimens). General color and structure as in male but pale areas on carapace more extensive and more distinct, femur I lacking dark area, rings on distal segments of legs more distinct, and retromargin of chelicera with 2 teeth in

approximately 55% of specimens. Median septum extending anteriorly approximately one-half length of epigynum; hood continuing posteriorly at sides where it defines a raised, tapered median area (Fig. 58); copulatory tubes short, slender, with distinct lateral swellings (Fig. 59).

**Diagnosis.** Specimens of *P. saxatilis* most resemble those of *P. atlantica* and *P. parvula* but differ in having the dorsal cover of reflective white setae restricted to the palpal patella. Females are not distinguishable from those of *atlantica* or *parvula* except geographically (see map 3).

**Range.** Nebraska and Minnesota to Nova Scotia, south to northern Alabama and North Carolina. No specimens were available from the type locality of *P. saxatilis*, i.e., northern Alabama, for this study. Thorough collecting there would help to confirm our position regarding the identity of this species.

**Natural History.** Males have been collected in March, May to September, and November, and females May to September. Females with egg sacs were taken in June, July, and September. The usual habitats are grassy fields or meadows but a few specimens also come from marshes, bogs, deciduous woods, or sandy beaches. Wolff (1981) gives life history and related data in Michigan.

### *Pardosa atlantica* Emerton

#### Figure 7; Map 3

*Pardosa* sp. near *saxatilis*: Banks 1899:189.

*Pardosa atlantica* Emerton, 1913:258, Fig. 7, 7a (pl. 48). Syntype male and female from Lakehurst, New Jersey, 1 May 1912 (J. H. Emerton), deposited in MCZ, examined; three syntype males from the same locality (same data), deposited in AMNH, examined. Syntype from Fire Island beach, Long Island, New York, not found. Chamberlin and Ivie 1944:147.

*Pardosa saxatilis*: Gertsch 1934:22 (part). Roewer 1954:194 (part). Bonnet 1958:3420 (part).

*Pardosa saxatilis* var. *atlantica*: Kaston 1938:184; 1948:335. Howell and Pienkowski 1971:164.

**Male.** Total length  $3.53 \pm 0.27$  mm; carapace  $1.89 \pm 0.15$  mm long and  $1.42 \pm 0.12$  mm wide (20 specimens). Carapace with dark orange or dark yellow median and submarginal areas, and with paired dark, indistinct, longitudinal bands flanking median area; margins

pale or with dark spots. Sternum dark orange suffused with black. Chelicerae dark brown, streaked with black; retromargin usually (about 67%) with 3 teeth. Legs orange yellow; femur I dark basally. Abdomen dark orange mottled with brown and black mesally, darker laterally; venter dark orange brown. Terminal apophysis small, blunt; median apophysis long, slender, curved; conductor sinuous along basal margin, with dark, shiny knob near tip; patella, tibia, and small basal area of cymbium covered dorsally with reflective white setae, and remaining palpal segments dark (Fig. 17). Female. Total length  $4.03 \pm 0.50$  mm; carapace  $1.94 \pm 0.20$  mm long and  $1.48 \pm 0.19$  mm wide (20 specimens). General color and structure as in male, but pale areas on carapace more extensive and more distinct, femur I lacking dark area, dark rings on distal segments of legs more distinct, and retromargin of chelicera with 3 teeth in 75% of specimens. Median septum extending antieriad approximately one-half length of epigynum; hood continuing posteriad at sides where it defines a raised, tapered, median area; copulatory tubes short, slender, with distinct lateral swellings.

**Diagnosis.** Males of *P. atlantica* most resemble those of *P. saxatilis* and *P. parvula* but differ in having a dorsal cover of reflective white setae on the patella, tibia, and small basal area of the cymbium of the palpus. Females are not distinguishable from those of *saxatilis* or *parvula* except geographically (see map 3).

**Range.** Eastern Oklahoma and eastern Texas to Long Island, New York and Connecticut. The range may extend westward to Kansas, but the westernmost records are based on females, which we are at present unable to distinguish on anatomical characters.

**Natural History.** Males have been collected from February to August, and females from April to August. Females with egg sacs were collected from June to August. The few specimens for which habitat data are available were found in pine or pine-oak forests or at the edge of mixed deciduous forests. One specimen was found in a one-year abandoned field, and Howell and Pienkowski (1971) recorded the species from alfalfa at Blacksburg, Virginia. Emerton's (1913) type series was collected on "low sandy ground". Chamberlin and Ivie (1944) found *atlantica* "in company with" *parvula* (reported as *saxatilis*) near Sylvania, Georgia.

*Pardosa parvula* Banks

## Figure 18; Map 3

*Pardosa parvula* Banks, 1904b:114, Fig. 24 (pl. 6). Holotype male from Altoona, Florida (Dobbin), deposited in MCZ, examined. Banks 1910:59.

*Pardosa saxatilis*: Petrunkevitch 1911:574 (part). Chamberlin and Ivie 1944:149. Muma 1973:180.

**Male.** Total length  $3.37 \pm 0.21$  mm; carapace  $1.84 \pm 0.09$  mm long and  $1.41 \pm 0.08$  mm wide (19 specimens). Carapace with dark orange or dark yellow median and submarginal areas, and with paired dark, longitudinal bands flanking median area; margins pale or dark. Sternum dark orange suffused with black. Chelicerae dark brown, streaked with black; retromargin with 3 teeth. Legs orange yellow; femur I dark basally. Abdomen dark orange mottled with brown and black mesally, darker laterally; venter dark orange brown. Terminal apophysis small, blunt; median apophysis long, slender, curved; conductor sinuous along basal margin, with dark, shiny knob near tip; patella, tibia, and basal half of cymbium covered dorsally with reflective white setae, and remaining palpal segments dark (Fig. 18).

**Female.** Total length  $3.84 \pm 0.43$  mm; carapace  $1.95 \pm 0.15$  mm long and  $1.53 \pm 0.12$  mm wide (20 specimens). General color and structure as in male but pale areas on carapace more extensive and more distinct, femur I lacking dark area, and dark rings on distal segments of legs more distinct. Median septum extending anteriad approximately one-half length of epigynum; hood continuing posteriad at sides where it defines a raised, tapered, median area; copulatory tubes short, slender, with distinct lateral swellings.

**Diagnosis.** Males of *P. parvula* most resemble those of *P. saxatilis* and *P. atlantica* but differ in having a dorsal cover of reflective white setae on the palpal patella, tibia, and basal half of the cymbium. Females are not distinguishable from those of *saxatilis* and *atlantica* except geographically (see map 3).

**Range.** Southeastern Louisiana to Florida and southern Georgia.

**Natural History.** Males have been collected from January to April, and in June, July, September, and October, females from January to May, and in August, October, and December. Females with egg sacs were collected in January, March, and December. The

recorded habitats are roadside grass and a mowed field, a sugar cane field, and on the ground in goldenrod and pine flat-woods. Chamberlin and Ivie (1944) found *parvula* (reported as *P. saxatilis*) "in company with" *atlantica* near Sylvania, Georgia.

*Pardosa littoralis* Banks

Figures 22, 25, 60, 61; Map 1

*Pardosa littoralis* Banks, 1896:192. Five syntype males, 2 syntype females, and 1 syntype juvenile from Mill Neck, Long Island, New York, June, deposited in MCZ, examined. Emerton 1909:207, Figs. 5, 5a, 5b (pl. 6); 1930:169.

*Pardosa longispinata* Tullgren, 1901:23, Fig. 13 (pl. 1). Holotype female from Lake Leonore, Orange County, Florida (E. Lonnberg), deposited in Zoological Institute, Uppsala University, not examined. Banks 1904a:121; 1910:59. Chamberlin 1908:209. Petrunkevitch 1911:572. Wallace 1950:77, Figs. 3, 4 (pl. 1). Roewer 1954:189. Bonnet 1958:3381. Muma 1973:180; 1975:86.

*Pardosa floridana* Banks, 1904a:136, Fig. 1 (pl. 7), Fig. 15 (pl. 8). Holotype female from Enterprise, Florida, deposited in MCZ, examined. Banks 1910:59. Gertsch 1934:21. Gertsch and Wallace 1935:5, Figs. 12, 16; 1937:3. Muma 1945:21. Kaston 1948:336, Fig. 1126 (pl. 58), Figs. 1140, 1141 (pl. 59). Bonnet 1958:3369.

*Pardosa banksi* Chamberlin, 1904:175. New name for *Pardosa littoralis* Banks, mistakenly believed to be preoccupied. Chamberlin 1908:182, Fig. 7 (pl. 13). Banks 1910:58. Petrunkevitch 1911:569.

*Pardosa ocala* Bryant, 1935:81, Fig. 12 (pl. 5). Holotype female from Hale's Siding, Alachua County, Florida, 14 October 1933 (Wallace), deposited in MCZ, examined. Paratype female from Lake County, 9 October 1933 (H. K. Wallace), not found.

Male. Total length  $5.07 \pm 0.42$  mm; carapace  $2.66 \pm 0.19$  mm long and  $2.03 \pm 0.16$  mm wide (20 specimens). Carapace with orange or yellow orange mesal and submarginal areas, and with paired dark, longitudinal bands flanking mesal area; lateral margins usually dark. Sternum orange with marginal black spots and dark mesal band or V-shaped mark, rarely entirely black. Chelicerae orange; retromargin with 3 teeth. Legs orange or yellow orange; femur I sometimes dark basally, usually more so in northern specimens. Abdomen black, sometimes with pale heart mark and series of pale spots at midline, or mottled with yellow brown; heart mark with narrow band of white setae; venter dull yellow, sometimes with small dark spots. Terminal apophysis long, stout, tapered, extending to or beyond tip of embolus; median apophysis broad at base, slender and curved at tip (Fig. 22); conductor with single curve on basal margin, directed retrolaterobasad, with dark, shiny knob near tip (Fig. 25).

Female. Total length  $5.87 \pm 0.65$  mm; carapace  $2.83 \pm 0.32$  mm long and  $2.19 \pm 0.32$  mm wide (20 specimens). General color and structure as in male but paler, with the abdominal dorsum having only scattered black spots on a yellowish background. Median septum extending anteriorly nearly to level of hood, rather broad anteriorly (Fig. 60); copulatory tubes short, slender, with lateral swellings (Fig. 61).

Diagnosis. Specimens of *P. littoralis* are unique in the *milvina* group by the greatly elongated terminal apophysis and by the anteriorly broad median septum.

Range. Texas to Florida, northward near the coast to the Bay of Fundy, Nova Scotia; Cuba.

Natural History. Both sexes of *P. littoralis* have been collected in every month in the southern part of its range, and egg sacs were observed in April, June to August, and December. In general it is an inhabitant of salt marshes, though Florida records include beaches, lake shores, pine-oak forests, and swamps. One specimen was collected in a soybean field. Muma (1973) trapped many in pine flatwoods, and lesser numbers in a sand-pine dune or in citrus groves.

Courtship behavior was described (under the name *banksi*) by Kaston (1936). The present authors observed adults running on a salt marsh in Nova Scotia on a warm day at the end of May, 1980. Males and females were seen on or under the mat of dry marsh grasses, particularly at the water's edge where the mud was wet from the previous tide. If overtaken by a wave they either ran on its surface or climbed emergent plant stems.

Comments on Synonymy. This spider has been variously known under five specific names, one of which was proposed on the assumption that the name *littoralis* was preoccupied in *Pardosa*. Chamberlin (1904) apparently did not realize that the name *Lycosa littoralis* Walckenaer, 1805 was a *nomen nudum* and, therefore, not available. He was apparently also unaware of the older available names *Pardosa longispinata* Tullgren, 1901 and *Pardosa floridana* Banks, 1904.

*Pardosa saltonia* sp.n.

Figures 23, 26, 62-64; Map 6

Type Material. Holotype male from Fish Springs, west side of Salton Sea, Imperial County, California,  $116^{\circ} 02' W$ ,  $33^{\circ} 25' N$ , 12 March 1941 (Wilton Ivie), deposited

in AMNH. Two paratype males and 13 paratype females from the type locality (same data as holotype), in AMNH. One paratype female from northeast shore of Salton Sea, 8 October 1963 (Jean and Wilton Ivie), in AMNH. One paratype female from east shore of Salton Sea, 23 September 1957 (Vince Roth), in AMNH. Two paratype males and 1 paratype female from Salton Sea, 26 September 1964 (Vince Roth), in AMNH. One paratype female from Salton, California, in MCZ. Seven paratype males and 5 paratype females from La Choya, Sonora, 12 June 1952 (W. J. Gertsch), in AMNH.

**Male.** Total length  $6.39 \pm 0.35$  mm; carapace  $3.15 \pm 0.13$  mm long and  $2.46 \pm 0.12$  mm wide (12 specimens). Carapace with yellow orange median and submarginal areas, and with pair of dark longitudinal bands flanking median area; margins dark. Sternum orange yellow, suffused with black, or entirely black. Chelicerae orange brown; retromargin with 2 teeth (rarely with small third tooth on one or both chelicerae). Legs dark yellow orange. Abdomen yellow orange mesally, dark laterally; venter pale. Terminal apophysis arched retrolaterally; median apophysis small, occupying only about one-third length of genital bulb (Fig. 23); conductor with single curve on basal margin, with dark, shiny knob near tip (Fig. 26).

**Female.** Total length  $7.54 \pm 1.04$  mm; carapace  $3.39 \pm 0.34$  mm long and  $2.71 \pm 0.27$  mm wide (20 specimens). General color and structure as in male but paler. Epigynum rather short, with ratio of length to greatest width of median septum less than 2:1; septum abruptly narrowed anteriorly from widest point (Fig. 62); copulatory tubes curved to nearly straight, with swelling on ventral or lateral margin (Figs. 63, 64).

**Diagnosis.** Specimens of *P. saltonia* differ from those of the other species in the *milvina* group by the retrolaterally arched terminal apophysis, by the small median apophysis (occupying about one-third the genital bulb length), by the short epigynum and abruptly narrowed median septum (ratio of epigynal length to greatest median septum width less than 2:1), and in part by the presence of 2 teeth on the cheliceral retromargin.

**Range.** Salton Sea area of California; Sonora.

**Natural History.** Males of *saltonia* have been collected in March, June, and December, and females in March, June, September, October, and December. Egg sacs were found in March and September.

Derivation of Specific Name. The name is derived from that of the Salton Sea.

*Pardosa pauxilla* Montgomery  
Figures 24, 27, 65-67; Map 4

*Pardosa pauxilla* Montgomery, 1904:268, Figs. 22, 23 (pl. 19). Lectotype male from Austin, Texas, deposited in AMNH and here designated. One paralectotype female from the type locality, in AMNH. One paralectotype male from the type locality, in MCZ. One female, part of the syntype series, deposited in MCZ, represents *Pardosa delicatula* Gertsch and Wallace. Other syntypes not found. Chamberlin 1908:180, Fig. 9 (pl. 13). Petrunkevitch 1911:574. Gertsch and Wallace 1935:4, Figs. 11, 15. Muma 1945:22; 1973:179; 1975:86. Bonnet 1958:3406. Berry 1970:102. Howell and Pienkowski 1971:164.

*Pardosa uncatula*: Gertsch 1934:20 (part). Roewer 1954:190 (part).

*Pardosa georgiae* Chamberlin and Ivie, 1944:147, Figs. 185, 186 (pl. 13). Holotype female from Savannah Beach, Georgia, 80° 51' W, 32° 0' N, 4 May 1943 (Wilton Ivie), deposited in AMNH, examined. One paratype male from the type locality, same data, in AMNH, examined. One paratype male and 3 paratype females from the type locality, same data, not found. Wallace 1950:78, Figs. 1, 2 (pl. 1). Roewer 1954:191. Vogel 1967:104. **NEW SYNONYM.**

Male. Total length  $4.24 \pm 0.26$  mm; carapace  $2.26 \pm 0.17$  mm long and  $1.67 \pm 0.11$  mm wide (20 specimens). Carapace usually with yellow orange median and submarginal areas, and with paired dark, longitudinal bands flanking median area; margins usually pale. Sternum dark yellow or yellow brown, sometimes with small black spots along margins. Chelicerae pale yellow brown to black; retromargin with 3 teeth. Legs orange yellow; femur I (and sometimes II) often dark on basal three-fourths. Abdomen dull black, sometimes dull yellow mesally; venter pale yellow, sometimes with faint darker median band. Terminal apophysis with mesal swelling toothlike; median apophysis thick throughout most of its length, with basal process swollen (Fig. 24); conductor with single curve on basal margin, with dark, shiny knob near tip (Fig. 27). Female. Total length  $5.05 \pm 0.55$  mm; carapace  $2.39 \pm 0.25$  mm long and  $1.79 \pm 0.13$  mm wide (20 specimens). General color and structure as in male but paler. Median septum distinctly tapered anteriorly, with expanded posterior part concave at lateral margins (Fig. 65); copulatory tubes rather stout, with swellings on ventral surfaces (Figs. 66, 67).

Diagnosis. Specimens of *P. pauxilla* differ from those of the other species in the *milvina* group by the toothlike swelling mesal to the

terminal apophysis, by the large, swollen basal process on the median apophysis, and by the long, distinctly tapered median septum of which the posterior expanded part has concave lateral margins.

Range. Kansas to New Jersey, south to New Mexico, southern Texas, and Florida.

Natural History. Males and females have been collected in every month except December. Egg sacs were collected from March to May and from July to November. The commonest habitat is grassy pastures, but many specimens have been taken at stream or pond margins or in crops such as alfalfa, soybeans, sweet potatoes, and peanuts. Muma (1973) trapped specimens in citrus groves and pine flat-woods in Florida.

*Pardosa portoricensis* Banks

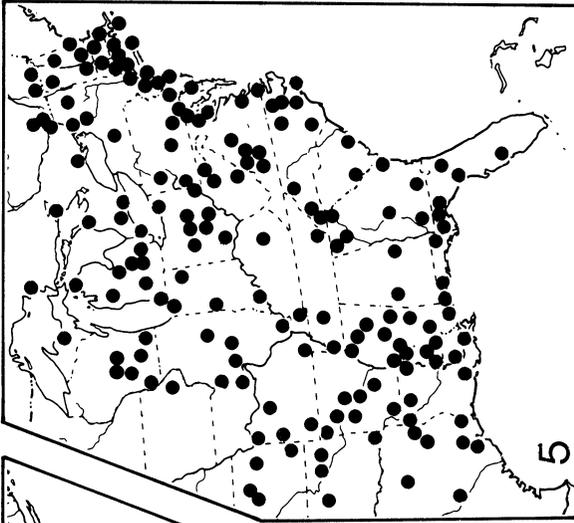
Figures 28, 29, 68, 69

*Pardosa porto-ricensis* Banks, 1902:224, Figs. 2, 3 (pl. 15). Holotype female from San Juan, Puerto Rico, 1–10 January 1899 (August Busck), deposited in USNM, examined.

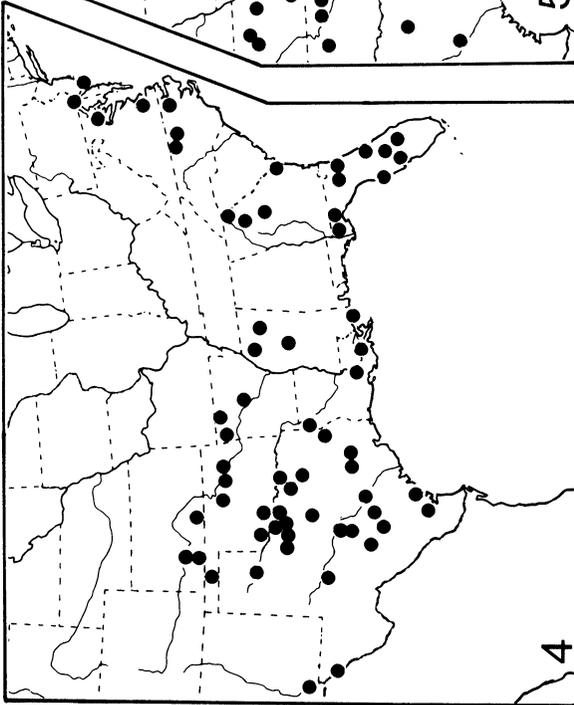
*Pardosa portoricensis*: Petrunkevitch 1911:574; 1929:87, Figs. 74, 75. Roewer 1954:188. Bonnet 1958:3407.

Male. Total length 3.56 mm; carapace 2.00 mm long and 1.56 mm wide (1 specimen). Carapace with orange yellow median and submarginal areas, and with pair of distinct dark, longitudinal bands flanking median area; margins somewhat dark. Sternum pale yellow. Chelicerae pale orange, lightly marked with gray; retro-marginal with 3 teeth. Legs pale yellow. Abdomen pale mesally, with pair of dark longitudinal bands laterally. Terminal apophysis small, pointed; median apophysis with distal process expanded (ventral view, Fig. 28); conductor curved on basal margin, with dark shiny knob near tip (Fig. 29).

Female. Total length  $4.51 \pm 0.70$  mm; carapace  $2.24 \pm 0.26$  mm long and  $1.79 \pm 0.23$  mm wide (16 specimens). General color and structure as in male. Epigynum rather long (ratio of epigynum length to greatest septal width more than 2:1) (Fig. 68); median septum tapered and indistinct anteriorly; copulatory tubes slender, and spermathecae narrowly separated (Fig. 69).



Map 5. Collection localities for *Pardosa milvina*.



Map 4. Collection localities for *Pardosa pauxilla*.

**Diagnosis.** Specimens of *P. portoricensis* differ from those of the other West Indian species in the *milvina* group by the expanded distal process of the median apophysis, by the longitudinally banded abdominal dorsum, by the long epigynum (ratio of epigynal length to greatest septal width more than 2:1), by the anteriorly tapered median septum, and by the slender copulatory tubes and narrowly separated spermathecae.

**Localities.** PUERTO RICO: San Juan; Mayaguez; Martin Pena; Puerto Nuevo Point, near Vega Baja; Embarcadero Point, near Luquillo. VIRGIN ISLANDS: St. Croix: Chistiansted. ANTIGUA: Lignum Vitae Bay; Reed Point, Jolly Beach.

**Range.** Puerto Rico, Virgin Islands, and western Antigua.

**Natural History.** The only available male was collected with females in October. Other females were collected in January to March and in June. Egg sacs were found in June, and one of the October females carried young. Petrunkevitch (1929) collected specimens on the "sandy plains" of the northern coast of Puerto Rico.

*Pardosa milvina* (Hentz)  
Figures 30–32, 70, 71; Map 5

*Lycosa milvina* Hentz, 1844:392, Fig. 8 (pl. 18). Holotype female from Alabama, September, destroyed. Hentz 1875:33, Fig. 8 (pl. 4).

*Lycosa flavipes* Keyserling, 1877:616, Fig. 4 (pl. 7). Syntype female from Peoria, Illinois, deposited in BM(NH), examined. Syntype female from Baltimore, Maryland, not found.

*Pardosa nigropalpis* Emerton, 1885:497, Figs. 1, 1a–1d (pl. 49). Five syntype males and 1 syntype female from New Haven, Connecticut, 25 May 1883 (J. H. Emerton), deposited in MCZ, examined. Syntypes from Massachusetts, not found. Emerton 1902:83, Figs. 202–204. Stone 1890:430. Banks 1892:70; 1893:125. Montgomery 1902:569, Figs. 32–34 (pl. 30); 1904:275. Scheffer 1905a:119; 1905b:191. Bryant 1908:89. Barrows 1918:315. Roewer 1954:193.

*Pardosa milvina*: Banks 1899:189; 1904a:135; 1904b:115, Fig. 6 (pl. 5). Scheffer 1906:126. Chamberlin 1908:177, Figs. 3, 4 (pl. 13). Petrunkevitch 1911:572. Gertsch and Wallace 1935:5, Figs. 19, 20. Comstock 1940:662, Figs. 731i, 732e. Muma 1945:22. Kaston 1948:334, Figs. 1100–1103 (pl. 56), 1138 (pl. 59); 1978:190, Fig. 486. Levi and Field 1954:456. Roewer 1954:192. Bonnet 1958:3388. Fitch 1963:113. Berry 1970:102. Howell and Pienkowski 1971:164. Wolff 1981:64.

*Pardosa scita* Montgomery, 1902:573, Figs. 37, 38 (pl. 30). One syntype male and 1 syntype female from Philadelphia, Pennsylvania, deposited in AMNH, examined. Montgomery 1904:272.

*Pardosa canadensis*: Banks 1910:58 (part); 1916:81 (part). Bonnet 1958:3362 (part).

**Male.** Total length  $4.64 \pm 0.36$  mm; carapace  $2.40 \pm 0.20$  mm long and  $1.91 \pm 0.15$  mm wide (20 specimens). Carapace with yellow orange median and submarginal areas, and with paired black longitudinal bands flanking median area; margins often pale. Sternum yellow to nearly black. Chelicerae pale to dark yellow brown; retromargin with 3 teeth. Legs orange yellow; femur I sometimes black on basal half. Abdomen yellow brown, much mottled with black; venter pale yellow, often lightly spotted or lined with black. Terminal apophysis broad, blunt; median apophysis slender at middle, with distal process slender (Figs. 30, 31); conductor curved on basal margin, with dark, shiny knob near tip (Fig. 32).

**Female.** Total length  $5.77 \pm 0.65$  mm; carapace  $2.73 \pm 0.25$  mm long and  $2.16 \pm 0.19$  mm wide (20 specimens). General color and structure as in male but legs more distinctly ringed and abdominal dorsum sometimes with paired, indistinct longitudinal bands; femur I lacking black area in basal half. Median septum extending anteriorly less than one-half length of epigynum; hood continuing posteriorly at sides where it defines a depressed, non-tapered area (Fig. 70); copulatory tubes rather slender, with lateral swellings (Fig. 71).

**Diagnosis.** Specimens of *P. milvina* are distinguished from those of the other species in the *milvina* group by the combination of terminal apophysis small, broad, blunt, arched mesally, and lacking a toothlike mesal swelling, median apophysis slender at middle and with a slender distal process, short median septum, hood extending posteriorly at sides where it defines a depressed, non-tapered area, and occurrence only north of the Tropic of Cancer (approximately  $23^{\circ} 30'N$ ).

**Range.** Northern Peninsula of Michigan and southern Ontario to southern Québec and Maine, south to Texas and Florida.

**Natural History.** Males of *P. milvina* have been collected from February to August, and females from February to November. Egg sacs were recorded from April to September. The species appears to

reach high densities in moist habitats such as swamps, meadows, mud flats, and edges of creeks and ponds, but is also found in deciduous and cedar woods, lawns, gardens, pastures, and various crops (rice, corn, cotton, sweet potato, soybean, alfalfa). Montgomery (1903) and Kaston (1936) described courtship and copulatory behavior.

***Pardosa guadalajarana* sp.n.**

Figures 33–35, 72, 73; Map 6

**Type Material.** Holotype male from 4 miles southwest of Guadalajara, Jalisco, Mexico, 20 June 1941 (L. I. Davis), deposited in AMNH. Three paratype males and three paratype females from the type locality (same data as holotype), deposited in AMNH. One paratype male and fourteen paratype females from localities other than the type locality, in Mexico and Honduras, deposited in AMNH.

**Male.** Total length 3.03–3.18 mm; carapace 1.62–1.70 mm long and 1.21–1.30 mm wide (5 specimens). Carapace black, with dark orange brown median area. Sternum dark orange brown suffused with black. Chelicerae black, with dull yellow area anteromesally; retromargin with 2 teeth. Legs orange brown, with femora often darkened or with 2 or 3 dark, indistinct rings. Abdomen dark red brown, spotted with black, and with median band of reflective white setae; venter dull yellow, sometimes with small black spots. Terminal apophysis pointed; median apophysis abruptly angled on mesal margin (Figs. 33, 35); conductor with single curve along basal margin, with dark knob near tip (Fig. 34).

**Female.** Total length  $3.96 \pm 0.36$  mm; carapace  $1.86 \pm 0.08$  mm long and  $1.42 \pm 0.11$  mm wide (16 specimens). General color and structure as in male but carapace usually much paler, the carapace with pale median band distinct and margins pale, and abdomen lacking band of reflective white setae. Median septum extending approximately three-fourths length of epigynum; posterior part more or less triangular, concave at lateral margins, and rather narrow (ratio of epigynal length to greatest septum width more than 2:1) (Fig. 72); copulatory tubes slender, with lateral swellings (Fig. 73).

**Diagnosis.** Specimens of *P. guadalajarana* most resemble those of *P. longivulva* and *P. marialuisae* but differ in the abruptly angled median apophysis, in the possession of two retromarginal teeth on the chelicera, and in the small size.

**Range.** Jalisco to the Honduras/El Salvador border.

**Natural History.** Males have been collected in June and July, and females June to August. No habitat data are recorded.

**Derivation of Specific Name.** The name is derived from that of the city of Guadalajara.

*Pardosa longivulva* F. Pickard-Cambridge  
Figures 36–38, 74, 75; Map 6

*Pardosa longivulva* F. Pickard-Cambridge, 1902:318, Figs. 21, 21a, 22 (pl. 30).

Holotype female from Teapa, Tabasco, Mexico (H. H. Smith), deposited in BM(NH), examined. Two paratype males from the type locality (same vial as holotype), in the same institution, examined. One female from the type locality (same vial as holotype and paratypes) is *Pardosa hamifera* F. Pickard-Cambridge. Paratype from Amula, Guerrero, Mexico, not found. Petrunkevitch 1911:572.

*Pardosa longivulvula* Roewer, 1951:440. New name for *Pardosa longivulva*, proposed on the mistaken assumption that the latter was preoccupied.

**Male.** Total length 4.31–4.50 mm; carapace 2.08–2.49 mm long and 1.72–2.03 mm wide (6 specimens). Carapace with orange median and submarginal areas, and with paired dark, longitudinal bands flanking median area; margins black. Sternum dark orange, often with scattered black spots or with median black band. Chelicerae dark orange brown to black; retromargin with 3 teeth. Legs yellow orange; femur I sometimes with black area at base; tibia and basitarsus I with fringe of long, erect, dark setae on prolateral and retrolateral surfaces. Abdomen black to yellow brown, darker laterally; venter off-white to yellow brown, sometimes with many dark dots or with one to three dark longitudinal bands. Terminal apophysis long, rather slender; median apophysis slender at middle, with slender distal process (Figs. 36, 37); conductor with single curve along basal margin, with dark knob near tip (Fig. 38).

**Female.** Total length 4.98–5.47 mm; carapace 2.58–2.80 mm long and 1.96–2.42 mm wide (4 specimens). General color and structure

as in male but carapace with pale areas more extensive and leg I lacking dark area at base and lacking setal fringe. Epigynum rather long (ratio of epigynal length to greatest septal width more than 2:1); median septum with expanded posterior part approximately triangular in outline and concave at lateral margins (Fig. 74); copulatory tubes with small swellings at base (Fig. 75).

**Diagnosis.** Specimens of *P. longivulva* can be distinguished from those of the other species in the *milvina* group by the combination of black carapace margins, presence of a setal fringe on tibia and basitarsus I of males, rather long and slender terminal apophysis, long epigynum (ratio of epigynal length to greatest septal width more than 2:1), small swellings at base of copulatory tubes, and occurrence restricted south of the Tropic of Cancer.

**Range.** Tabasco, Mexico to Guatemala.

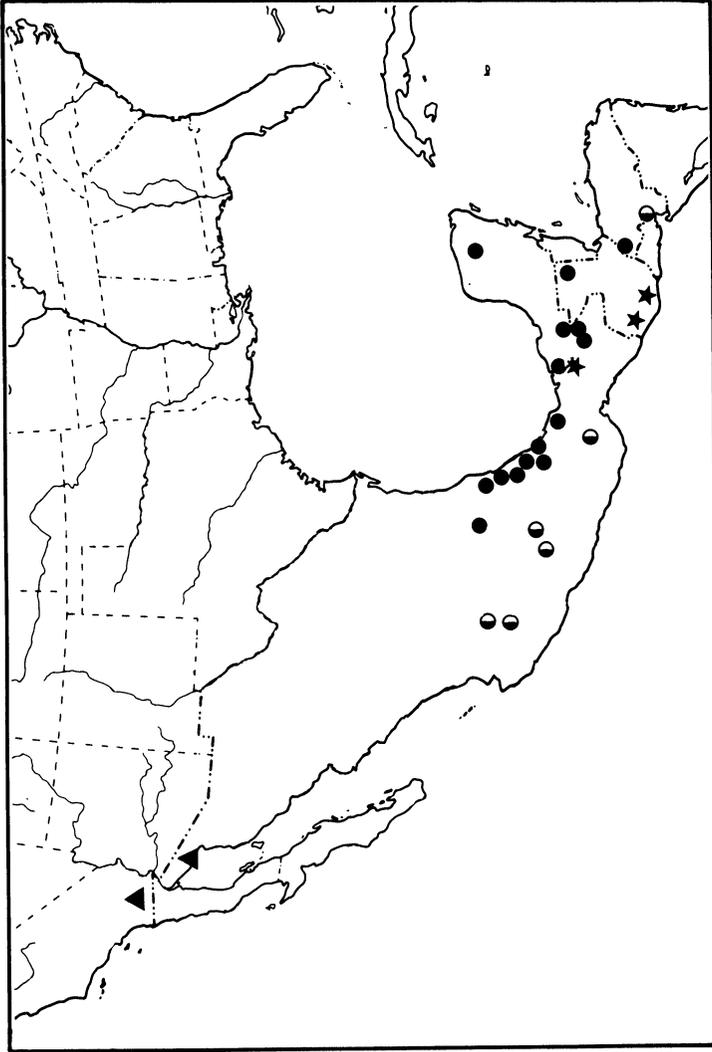
**Natural History.** Adults have been collected in February, March, and June. One of the females collected in February had an egg sac. Habitat is not recorded.

***Pardosa marialuisae* sp.n.**

Figures 39, 40, 42, 76, 77; Map 6

**Type Material.** Holotype male from Pico de Oro, 93°30'W, 17°58'N, Tabasco, Mexico, 12 August 1966 (Jean and Wilton Ivie), deposited in AMNH. Paratype female from the type locality (same data as holotype), in AMNH. Twenty-four paratype males and 33 paratype females from Mexico and Honduras, deposited in AMNH. Five paratype males and 17 paratype females from Guatemala, deposited in MCZ.

**Male.** Total length  $3.85 \pm 0.20$  mm; carapace  $2.04 \pm 0.10$  mm long and  $1.57 \pm 0.12$  mm wide (20 specimens). Carapace usually black, with margins alone pale, but rarely with pale submarginal areas and dark margins. Sternum orange yellow, sometimes with small black spots at posterior and lateral margins. Chelicerae usually black, more rarely yellow orange; retromargin with 3 teeth. Legs yellow orange; femur I sometimes with black area at base. Abdomen yellow orange to black; if pale, then mottled or spotted, and darkest along lateral margins; venter pale yellow, sometimes spotted with black.



Map 6. Collection localities for *Pardosa saltonia* (triangles), *P. quadalajarana* (half-circles), *P. longivulva* (stars), *P. mariatusae* (circles).

Terminal apophysis slender, pointed, rather short; median apophysis slender at middle, with slender distal process (Figs. 39, 42); conductor curved on basal margin, with dark, shiny knob near tip (Fig. 40).

Female. Total length  $4.80 \pm 0.64$  mm; carapace  $2.30 \pm 0.18$  mm long and  $1.88 \pm 0.19$  mm wide (20 specimens). General color and structure as in male but with pale mesal area on carapace, and with front and chelicerae pale. Epigynum long (ratio of total length to greatest median septum width more than 2:1); median septum with expanded posterior part approximately triangular, concave at sides (Fig. 76); copulatory tubes with large swellings at lateral margins (Fig. 77).

Diagnosis. Specimens of *P. marialuisae* can be distinguished from the other members of the *milvina* group by the combination of usually pale carapace margins, lack of a setal fringe on leg I, the possession of a rather short, pointed terminal apophysis, long epigynum (ratio of epigynal length to greatest septal width more than 2:1), large swellings at the sides of the copulatory tubes, and occurrence restricted south of the Tropic of Cancer.

Range. Hidalgo, Mexico to Honduras.

Natural History. Males have been collected from February to August and in October, females from January to August and in October. Egg sacs were collected in May and August. The only habitat recorded on the labels is "along river" at 30 miles southeast of Palenque Aqua Azul, Chiapas, Mexico.

Derivation of Specific Name. The name is derived from that of our friend and colleague Maria-Luisa Jiménez of Universidad Nacional Autónoma de México.

#### ACKNOWLEDGMENTS

The authors are deeply indebted to the following who lent specimens for this study: Mr. J. C. Cokendolpher, Texas Tech University; Dr. G. B. Edwards, Florida State Collection of Arthropods; Dr. J. S. Heiss, University of Arkansas; Mr. G. F. Hevel, United States National Museum (USNM); Dr. N. Horner, Midwestern State University; M. en C. Maria-Luisa Jiménez, Universidad Nacional Autónoma de México; Drs. J. Kekenbosch

and L. Baert, Institut Royal des Sciences Naturelles de Belgique; Dr. H. W. Levi, Museum of Comparative Zoology, Harvard University (MCZ); Dr. Patricia R. Miller, Mississippi Entomological Museum; Mr. A. J. Penniman, Ohio State University; Dr. N. I. Platnick, American Museum of Natural History (AMNH); Dr. C. L. Remington, Peabody Museum of Natural History; Mr. F. R. Wanless and Mr. P. D. Hillyard, British Museum (Natural History) (BMNH).

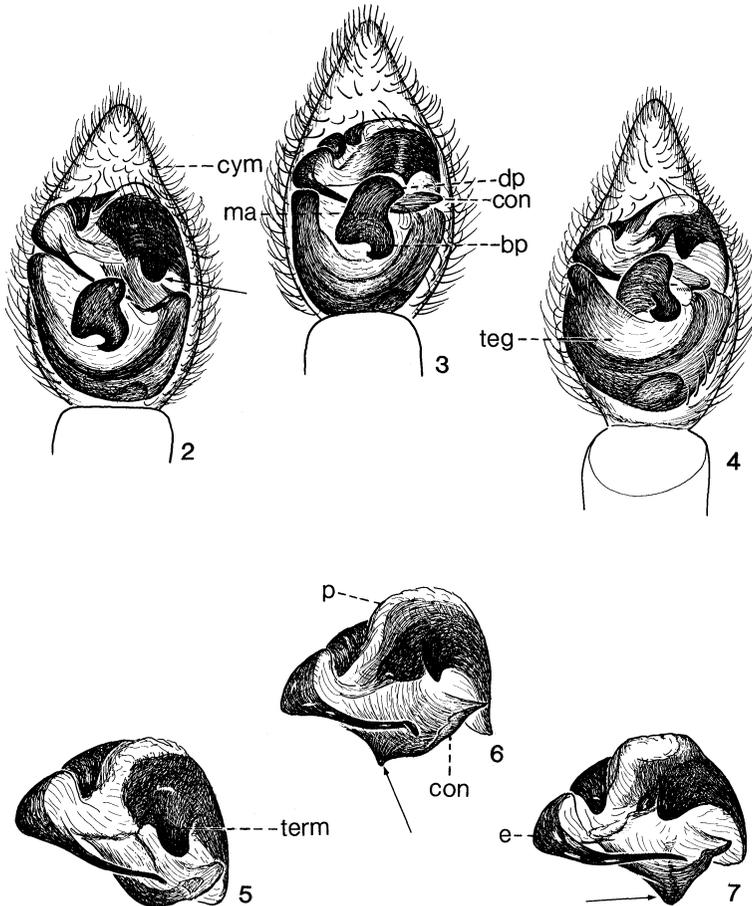
## LITERATURE CITED

- BANKS, N.  
1891 Synonymical notes in spiders. *Ent. News* 2:193.
- BANKS, N.  
1892 The spider fauna of the upper Cayuga Lake basin. *Proc. Acad. Nat. Sci. Philad.* 1892:11-81.
- BANKS, N.  
1893 Notes on spiders. *J. N.Y. Ent. Soc.* 1:123-134.
- BANKS, N.  
1895 A list of spiders of Long Island, with description of new species. *J. N.Y. Ent. Soc.* 3:76-93.
- BANKS, N.  
1896 Additions to the list of Long Island spiders. *J. N.Y. Ent. Soc.* 4:190-192.
- BANKS, N.  
1898 Arachnida from Baja California, and other parts of Mexico. *Proc. Cal. Acad. Sci. (ser. 3)* 1:205-308.
- BANKS, N.  
1899 Some spiders from northern Louisiana. *Proc. Ent. Soc. Wash.* 4:188-195.
- BANKS, N.  
1902 Some spiders and other Arachnida from Porto Rico. *Proc. U.S. Nat. Mus.* 24:217-227.
- BANKS, N.  
1904a The Arachnida of Florida. *Proc. Acad. Nat. Sci. Philad.* 56:120-147.
- BANKS, N.  
1904b New genera and species of Nearctic spiders. *J. N.Y. Ent. Soc.* 12:109-119.
- BANKS, N.  
1909 Arachnida from Costa Rica. *Proc. Acad. Nat. Sci. Philad.* 61:194-234.
- BANKS, N.  
1910 Catalogue of Nearctic spiders. *Bull. U.S. Nat. Mus.* 72:1-80.
- BANKS, N.  
1916 Revision of Cayuga Lake spiders. *Proc. Acad. Nat. Sci. Philad.* 68:68-84.
- BARROWS, W. M.  
1918 A list of Ohio spiders. *Ohio J. Sci.* 18:297-318.

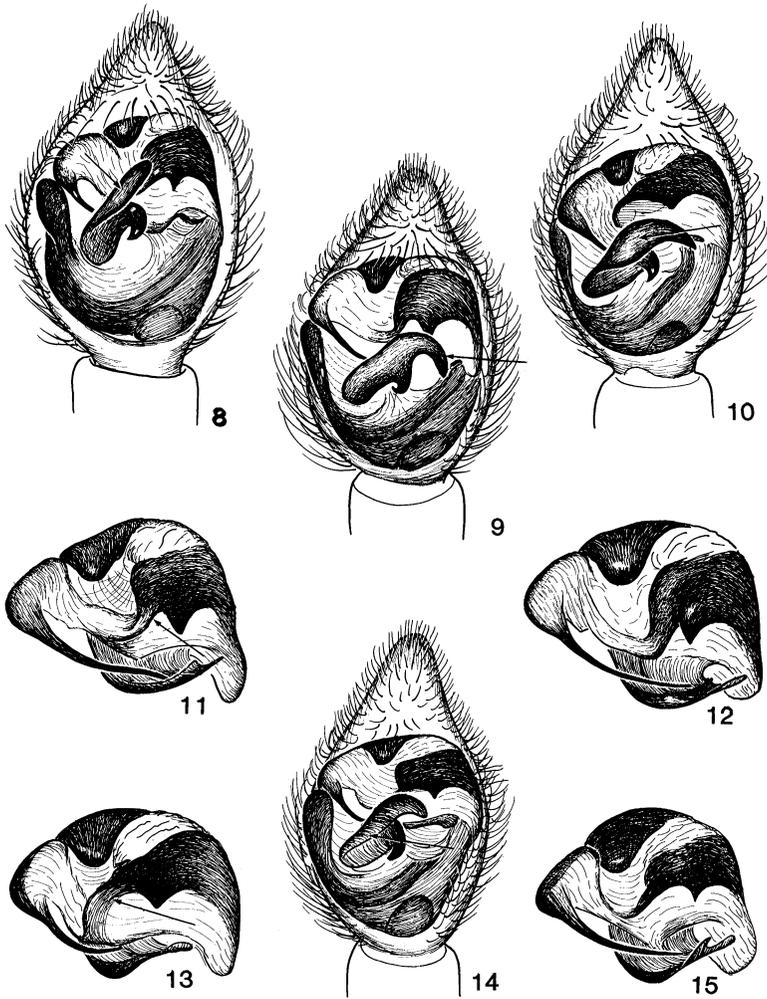
- BERRY, J. W.  
1970 Spiders of the North Carolina Piedmont old-field communities. *J. Elisha Mitchell Sci. Soc.* **86**:97-105.
- BONNET, P.  
1958 *Bibliographia Araneorum*. Tome 2, pt. 4. Imprimerie Douladoure, Toulouse.
- BRYANT, E. B.  
1908 List of the Araneina. In *Fauna of New England*, 9. Occ. Pap. Boston Soc. Nat. Hist. **7**:1-105.
- BRYANT, E. B.  
1935 A few southern spiders. *Psyche* **42**:73-83.
- CHAMBERLIN, R. V.  
1904 Notes on generic characters in the Lycosidae. *Can. Ent.* **36**:145-148, 173-178.
- CHAMBERLIN, R. V.  
1908 Revision of North American spiders of the family Lycosidae. *Proc. Acad. Nat. Sci. Philad.* **60**:158-318.
- CHAMBERLIN, R. V. AND W. IVIE  
1942 A hundred new species of American spiders. *Bull. Univ. Utah. (Biol. Ser.)* **32**(13):1-117.
- CHAMBERLIN, R. V. AND W. IVIE  
1944 Spiders of the Georgia region of North America. *Bull. Univ. Utah (Biol. Ser.)* **35**(9):1-267.
- CHICKERING, A. M.  
1933 Notes and studies on Arachnida. IV. Araneae from the Douglas Lake region, Michigan II. *Pap. Mich. Acad. Sci.* **17**:515-520.
- COMSTOCK, J. H.  
1940 *The spider book* (rev. and ed. by W. J. Gertsch). Comstock Publishing Company, Inc., Ithaca.
- DONDALE, C. D. AND J. H. REDNER  
1978 Revision of the Nearctic wolf spider genus *Schizocosa* (Araneida: Lycosidae). *Can. Ent.* **110**:143-181.
- EMERTON, J. H.  
1885 New England Lycosidae. *Trans. Conn. Acad. Arts Sci.* **6**:481-505.
- EMERTON, J. H.  
1909 Supplement to the New England spiders. *Trans. Conn. Acad. Arts Sci.* **14**:171-236.
- EMERTON, J. H.  
1913 New and rare spiders from within fifty miles of New York City. *Bull. Amer. Mus. Nat. Hist.* **32**:255-260.
- EMERTON, J. H.  
1930 Spiders of Nantucket. *Publ. Nantucket Maria Mitchell Assoc.* **3**: 161-174.
- FITCH, H. S.  
1963 Spiders of the University of Kansas Natural History Reservation and Rockefeller Experimental Tract. *Misc. Publ. Univ. Kansas*, No. 33, pp. 1-202.
- GERTSCH, W. J.  
1934 Notes on American Lycosidae. *Amer. Mus. Novit.*, No. 693, pp. 1-25.

- GERTSCH, W. J. AND L. I. DAVIS  
1940 Report on a collection of spiders from Mexico II. Amer. Mus. Novit., No. 1059, pp. 1-18.
- GERTSCH, W. J. AND H. K. WALLACE  
1935 Further notes on American Lycosidae. Amer. Mus. Novit., No. 794, pp. 1-22.
- GERTSCH, W. J. AND H. K. WALLACE  
1937 New American Lycosidae with notes on other species. Amer. Mus. Novit., No. 919, pp. 1-22.
- HENTZ, N. M.  
1844 Descriptions and figures of the Araneides of the United States. Boston J. Nat. Hist. 4:386-396.
- HENTZ, N. M.  
1875 The spiders of the United States, a collection of the arachnological writings of Nicholas Marcellus Hentz, M. D., edited by Edward Burgess with notes and descriptions by James H. Emerton. Occ. Pap. Boston Soc. Nat. Hist. 2:1-171.
- HOWELL, J. O. AND R. L. PIENKOWSKI  
1971 Spider populations in alfalfa, with notes on spider prey and effect of harvest. J. Econ. Ent. 64:163-168.
- KASTON, B. J.  
1936 The senses involved in the courtship of some vagabond spiders. Ent. Amer. 16:97-167.
- KASTON, B. J.  
1938 Checklist of the spiders of Connecticut. Bull. Conn. Geol. Nat. Hist. Surv. 60:175-201.
- KASTON, B. J.  
1948 Spiders of Connecticut. Bull. Conn. Geol. Nat. Hist. Surv. 70:1-874.
- KASTON, B. J.  
1978 How to know the spiders. 3rd Ed. Wm.C. Brown Company Publishers, Dubuque.
- KEYSERLING, E.  
1877 Ueber amerikanische Spinnenarten der Unterordnung Citigradae. Verh. Zool. Bot. Ges. Wien 26:609-708.
- LEVI, H. W. AND H. M. FIELD  
1954 The spiders of Wisconsin. Amer. Midl. Nat. 51:440-467.
- LOWRIE, D. C. AND C. D. DONDALE  
1981 A revision of the *nigra* group of the genus *Pardosa* in North America (Araneae, Lycosidae). Bull. Amer. Mus. Nat. Hist. 170:125-139.
- MONTGOMERY, T. H., JR.  
1902 Descriptions of Lycosidae and Oxyopidae of Philadelphia and its vicinity. Proc. Acad. Nat. Sci. Philad. 54:534-592.
- MONTGOMERY, T. H., JR.  
1903 Studies on the habits of spiders, particularly those of the mating period. Proc. Acad. Nat. Sci. Philad. 55:59-149.
- MONTGOMERY, T. H., JR.  
1904 Descriptions of North American Araneae of the families Lycosidae and Pisauridae. Proc. Acad. Nat. Sci. Philad. 56:261-323.

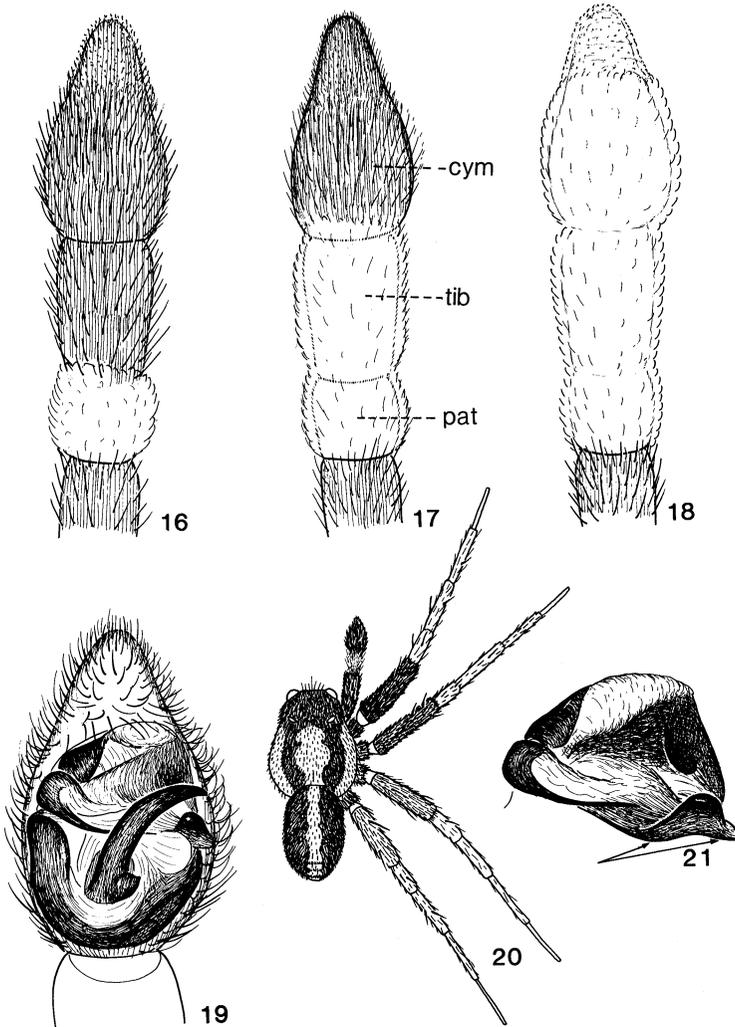
- MUMA, M. H.  
1945 An annotated list of the spiders of Maryland. Bull. Univ. Maryland Agr. Expt. Sta., A38, pp. 1-65.
- MUMA, M. H.  
1973 Comparison of ground surface spiders in four central Florida ecosystems. Fla. Ent. **56**:173-196.
- MUMA, M. H.  
1975 Spiders in Florida citrus groves. Fla. Ent. **58**:83-90.
- PETRUNKEVITCH, A.  
1911 A synonymic index-catalogue of spiders of North, Central and South America...Bull. Amer. Mus. Nat. Hist. **29**:1-791.
- PETRUNKEVITCH, A.  
1925 Arachnida from Panama. Trans. Conn. Acad. Arts Sci. **27**:51-248.
- PETRUNKEVITCH, A.  
1929 The spiders of Porto Rico. Part one. Trans. Conn. Acad. Arts Sci. **30**:1-158.
- PICKARD-CAMBRIDGE, F.  
1902 Arachnida. Araneida 2. Biol. Cent.-Amer., Zool., pp. 313-424.
- ROEWER, C. F.  
1951 Neue Namen einiger Araneen-Arten. Abh. Naturw. Ver. Bremen **32**:437-456.
- ROEWER, C. F.  
1954 Katalog der Araneae. Bd. 2. Institut Royal des Sciences Naturelles de Belgique, Bruxelles.
- SCHEFFER, T. H.  
1905a List of spiders in the entomological collection of the Kansas State University. Bull. Kans. St. Univ. **3**:115-120.
- SCHEFFER, T. H.  
1905b A preliminary list of Kansas spiders. Trans. Kans. Acad. Sci. **19**:182-193.
- SCHEFFER, T. H.  
1906 Additions to the list of Kansas Arachnida. Trans. Kans. Acad. Sci. **20**:121-130.
- STONE, W.  
1890 Pennsylvania and New Jersey spiders of the family Lycosidae. Proc. Acad. Nat. Sci. Philad. **1890**:420-434.
- TULLGREN, A.  
1901 On the spiders collected in Florida by Dr. Einar Lonnberg 1892-93. Bih. Svenska Vet.-Akad. Handl. **27**:1-29.
- VOGEL, B. R.  
1967 A list of new North American spiders 1940-1966. Mem. Amer. Ent. Soc., No. 23, pp. 1-186.
- WALLACE, H. K.  
1950 On Tullgren's Florida spiders. Fla. Ent. **33**:71-83.
- WOLFF, R. J.  
1981 Wolf spiders of the genus *Pardosa* (Araneae: Lycosidae) in Michigan. Gt. Lakes Ent. **14**:63-68.



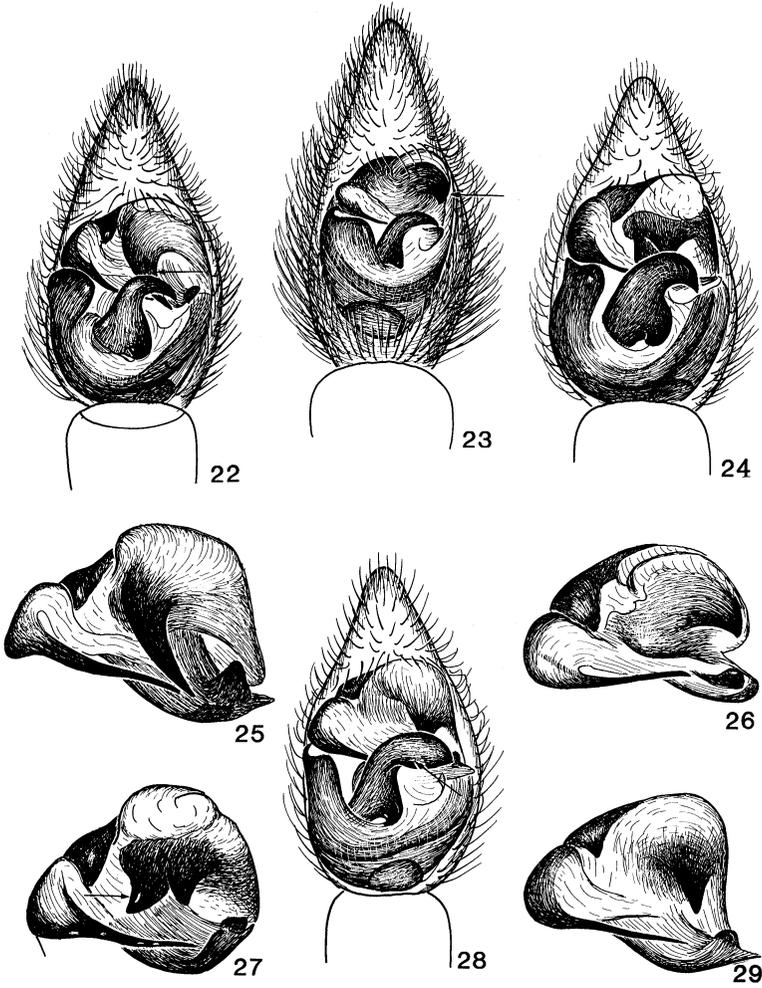
Figs. 2-7. External male genitalia of *Pardosa* spp. 2-4, palpus, ventral view. 5-7, apical division, ventral view. 2,5, *P. bellona* Banks. 3,6, *P. delicatula* Gertsch and Wallace. 4,7, *P. hamifera* F. Pickard-Cambridge. *bp*, basal process of median apophysis. *con*, conductor. *cym*, cymbium. *dp*, distal process of median apophysis. *e*, embolus. *ma*, median apophysis. *p*, palea. *teg*, tegulum. *term*, terminal apophysis.



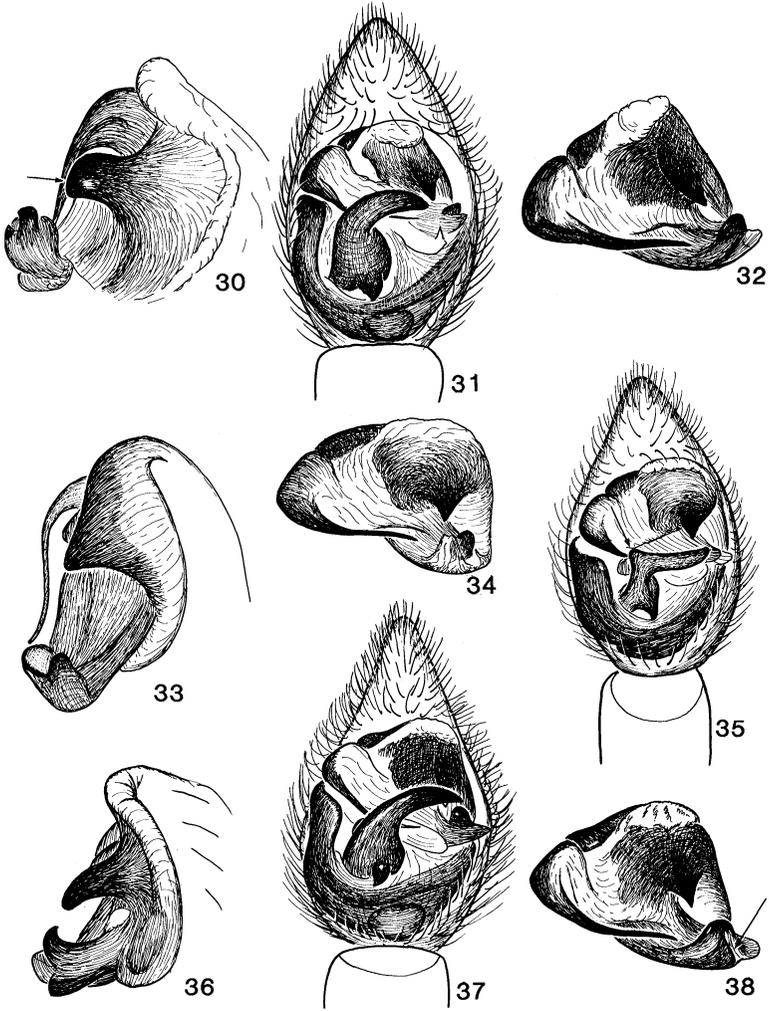
Figs. 8-15. External male genitalia of *Pardosa* spp. 8-10,14, palpus, ventral view. 11-13,15, apical division, ventral view. 8,11, *P. sagei* Gertsch and Wallace. 9,12, *P. fastosa* (Keyserling). 10,13, *P. desolatula* Gertsch and Davis. 14,15, *P. mayana* sp.n.



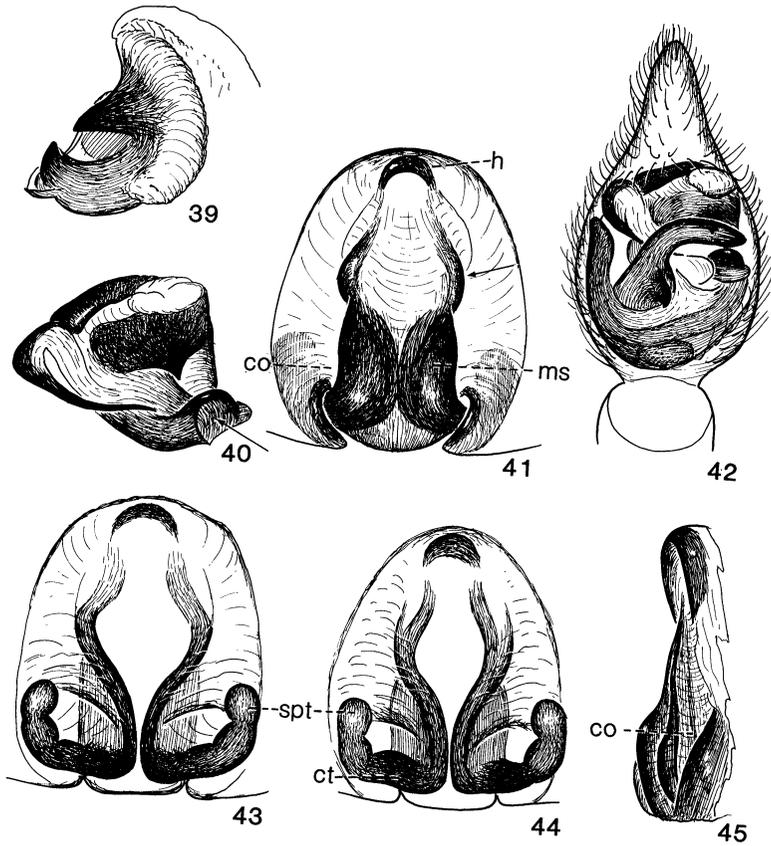
Figs. 16-21. Male structures of *Pardosa* spp. 16-18, palpus, dorsal view. 19, palpus, ventral view. 20, body, dorsal view. 21, apical division, ventral view. 16, 19-21, *P. saxatilis* (Hentz). 17, *P. atlantica* Emerton. 18, *P. parvula* Banks.



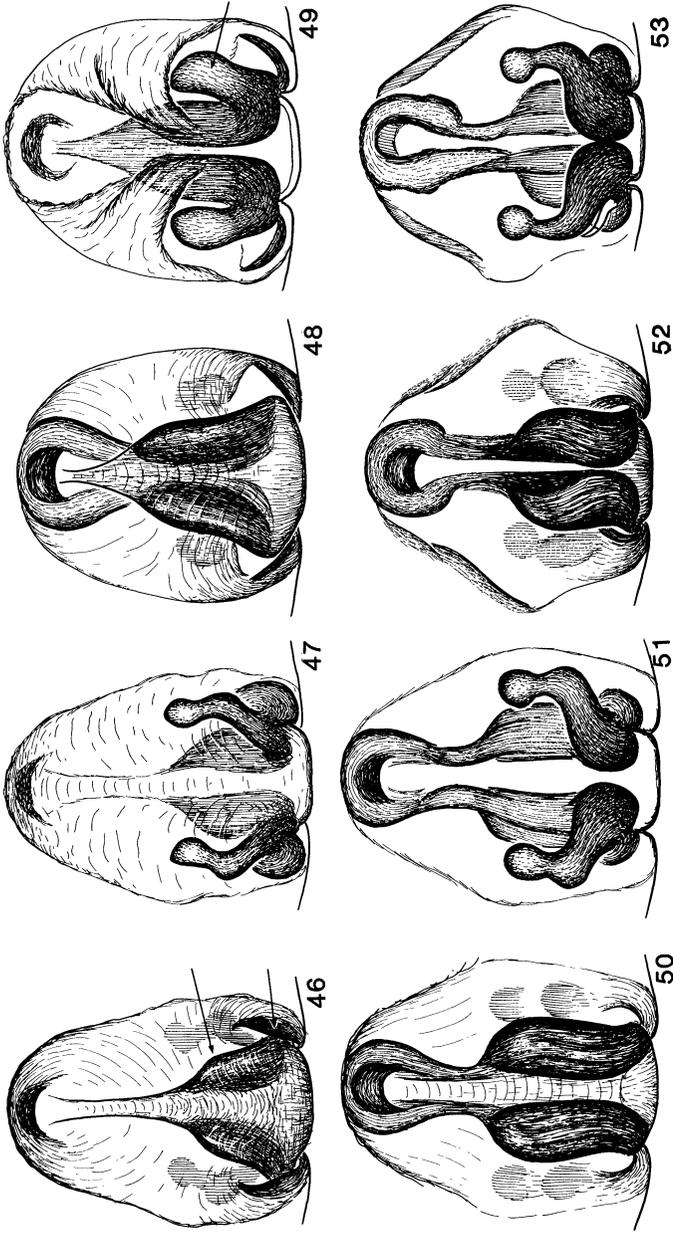
Figs. 22-29. External male genitalia of *Pardosa* spp. 22-24, 28, palpus, ventral view. 25-27, 29, apical division, ventral view. 22, 25, *P. littoralis* Banks. 23, 26, *P. saltonia* sp. n. 24, 27, *P. pauxilla* Montgomery. 28, 29, *P. portoricensis* Banks.



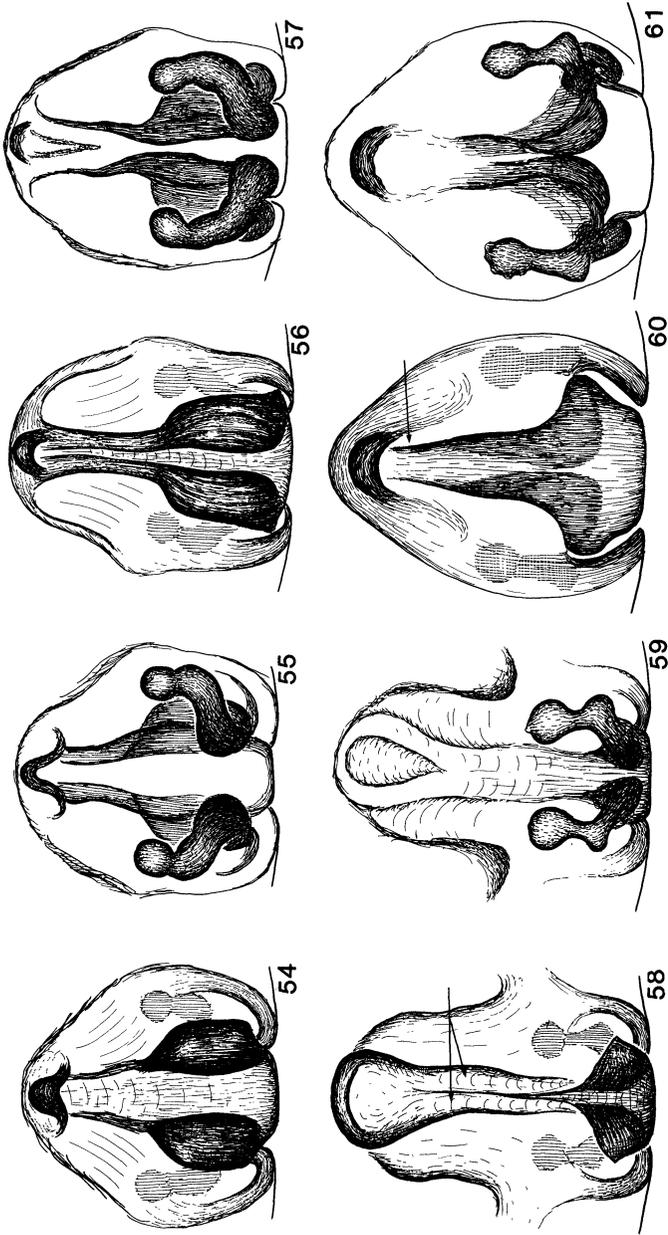
Figs. 30-38. External male genitalia of *Pardosa* spp. 30,33,36, apical division, retrolateral view. 31,35,37, palpus, ventral view. 32,34,38, apical division, ventral view. 30-32, *P. milvina* (Hentz). 33-35, *P. guadalajarana* sp. n. 36-38, *P. longivulva* F. Pickard-Cambridge.



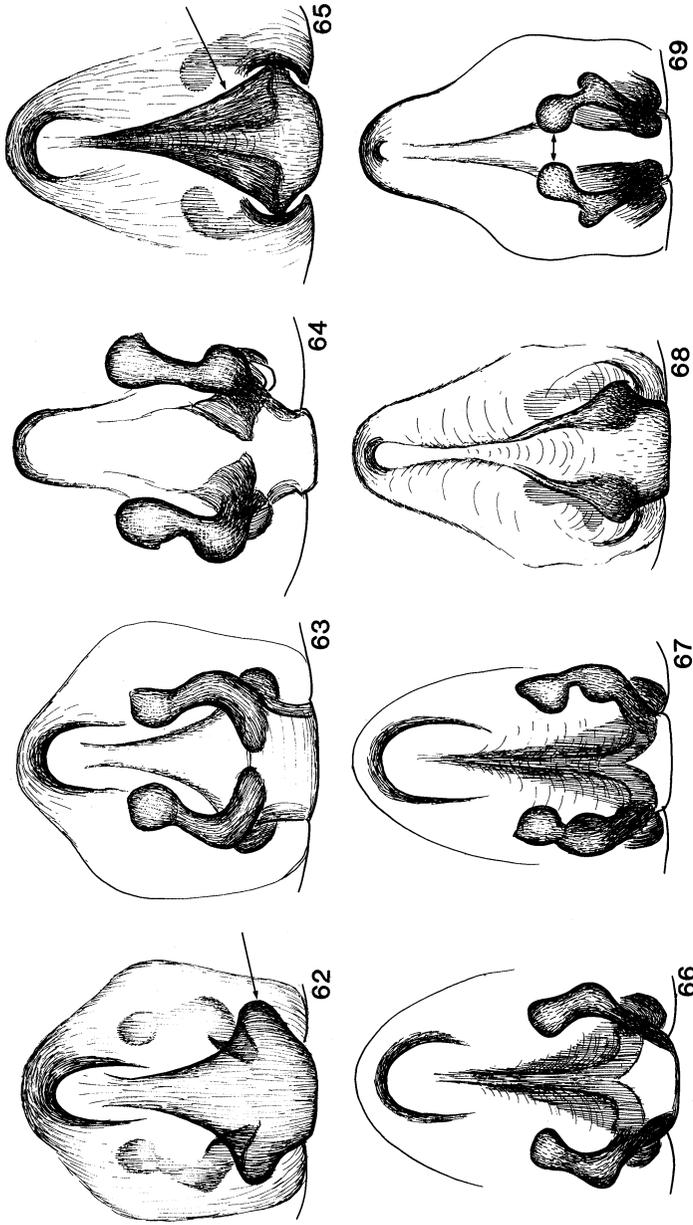
Figs. 39-45. External male genitalia of *Pardosa* spp. 39, apical division, retrolateral view. 40, apical division, ventral view. 42, male palpus, ventral view. 41, 43-45, epigynums. 41, ventral view. 43, 44, dorsal view. 45, lateral view. 39, 40, 42, *P. marialuisae* sp. n. 41, 43, 44, *P. bellona* Banks. 45, *P. delicatula* Gertsch and Wallace. *co*, copulatory opening. *ct*, copulatory tube. *h*, hood. *ms*, median septum. *spt*, spermathecae.



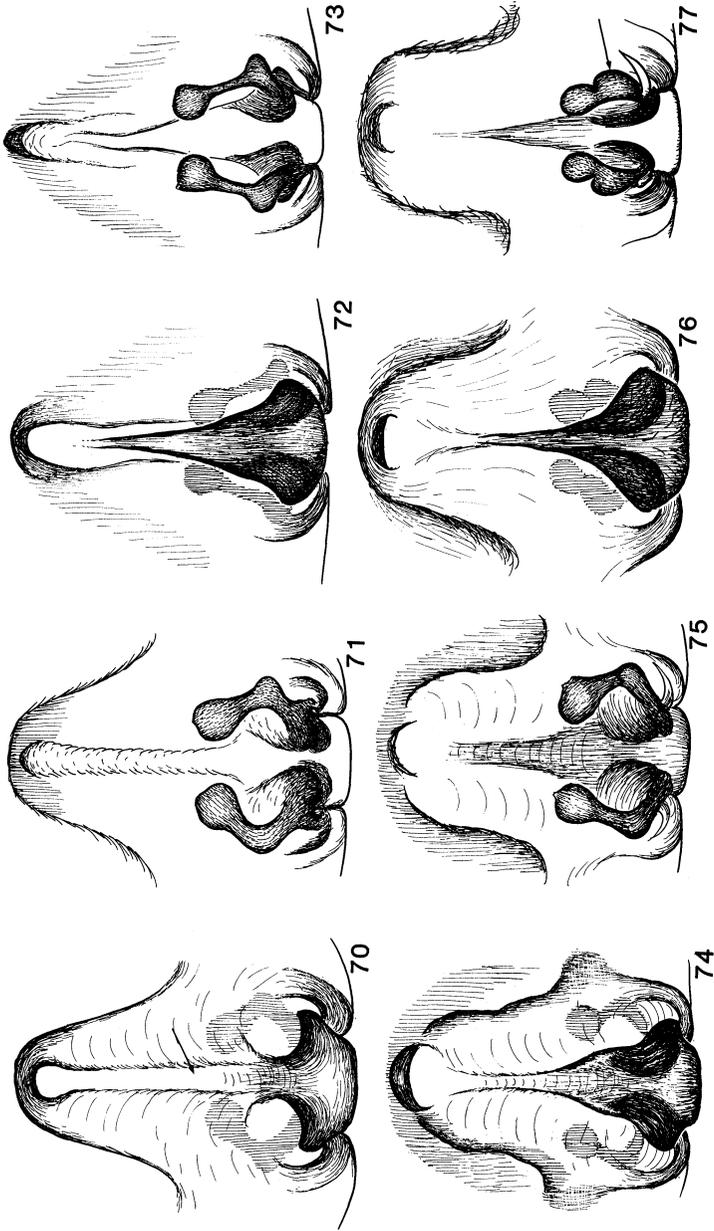
Figs. 46-53. Epigynums of *Pardosa* spp. 46,48,50,52, ventral view. 47,49,51,53, dorsal view. 46,47, *P. delicatula* Gertsch and Wallace. 48,49, *P. hamifera* F. Pickard-Cambridge. 50, 51, *P. sagei* Gertsch and Wallace. 52,53, *P. fastosa* (Keyserling).



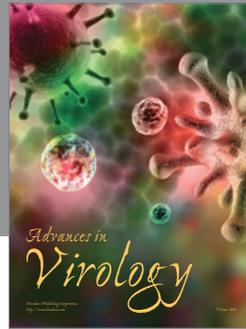
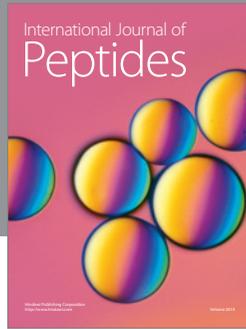
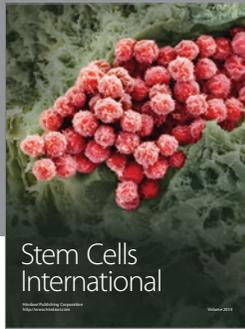
Figs. 54-61. Epigynums of *Pardosa* spp. 54,56,58,60, ventral view. 55,57,59,61, dorsal view. 54,55, *P. desolatula* Gertsch and Davis. 56,57, *P. mayana* sp. n. 58, 59, *P. saxatilis* (Hentz). 60,61, *P. littoralis* Banks.



Figs. 62-69. Epigynums of *Pardosa* spp. 62,65,68, ventral view. 63,64,66,67,69, dorsal view. 62-64, *P. saltonia* sp. n. 65-67, *P. pauxilla* Montgomery. 68, 69, *P. portoricensis* Banks.



Figs. 70-77. Epigynums of *Pardosa* spp. 70,72,74,76, ventral view. 71,73,75,77, dorsal view. 70,71, *P. milvina* (Hentz). 72,73, *P. guadalajarana* sp. n. 74,75, *P. longivulva* F. Pickard-Cambridge. 76,77, *P. maritima* sp. n.



**Hindawi**

Submit your manuscripts at  
<http://www.hindawi.com>

