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REVISION OF THE WOLF SPIDERS OF THE GENUS *ARCTOSA* C. L. KOCH IN NORTH AND CENTRAL AMERICA (ARANEAE:LYCOSIDAE)

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ABSTRACT

The genus *Arctosa* C. L. Koch, 1848 (= *Arkalosula* Roewer, 1960, new synonym) is revised for North and Central America. Twelve species are described or redescribed, illustrated, keyed, and mapped: *A. raptor* (Kulczynski, 1885), new combination (= *Lycosa quinaria* Emerton, 1894, new synonym); *A. emertoni* Gertsch, 1934; *A. rubicunda* (Keyserling, 1877) (= *A. imperiosa* Gertsch, 1933, new synonym); *A. virgo* (Chamberlin, 1925); *A. lama*, new species; *A. alpigena* (Doleschall, 1852); *A. insignita* (Thorell, 1872); *A. perita* (Latreille, 1799); *A. minuta* F. Pickard-Cambridge, 1902 (= *A. cheluncata* Petrunkevitch, 1925, new synonym); *A. sanctaerosae* Gertsch and Wallace, 1935; *A. littoralis* (Hentz, 1844) (= *A. trifida* F. Pickard-Cambridge, 1902 and *A. panamana* Petrunkevitch, 1925, new synonyms); *A. serii* Roth and Brown, 1976.

INTRODUCTION

Wolf spiders of the genus *Arctosa* are of medium to large size, with overall length (excluding legs) of 4.5 - 16.0 mm. They are swift runners, and possess relatively keen eyesight. Most dwell in sandy places such as seashores or the banks of rivers and lakes, though some occupy heath or lichen habitats in high mountains or arctic tundra. The principal body colors are gray, off-white, and tawny brown, in keeping with habitat. Females usually attend their eggs in silk-lined burrows rather than carry them about, and most species appear to be nocturnal. Two members of the genus, *A. variana* C. L. Koch and *A. perita* (Latreille), have achieved notability for their skill in returning to the home stream bank when carried some distance away on water; they appear to orient themselves by means of the sun's (or moon's) position in the sky and of an internal clock (Papi and Tongiorgi 1963, Tongiorgi 1970).

The genus *Arctosa* was established by C. L. Koch (1848) for 10 species of European wolf spiders. Some 70 world species were recorded as of 1939 (Bonnet 1955), though a current estimate is about 50 species. Gertsch (1934) reviewed the North American species, and Lugetti and Tongiorgi (1965, 1966) reviewed the central European species.

The 12 North and Central American species of *Arctosa* are here revised. Methods and terminology are those given by Dondale and Redner (1978, 1979). The male palpus and the epigynum of the type-species, *A. cinerea* (Fabricius), are illustrated (Figs. 1-4) for comparison with New World representatives.

Tessarops maritimus Rafinesque, 1821 is unknown to us, and we therefore treat the name as a *nomen dubium.* The species was so vaguely described that we cannot be sure even that it is a spider. Bonnet (1959: 4312) tentatively classified it as a gnaphosid, whereas Kaston (1972) speculated that it is the wolf spider *Arctosa littoralis* (Hentz, 1844). We agree with Kaston that *T. maritimus* may represent an anomalous specimen of *littoralis*, but we also agree that "in the interests of nomenclatorial stability the well known name [*littoralis*] should be retained,. . ."

The group of species exemplified by *Arctosa funera* (Hentz), previously included in *Arctosa*, will be treated separately under the genus *Allocosa* Banks, 1904.

Abbreviations used in the text of this paper for names of lending institutions are explained in the acknowledgments. Measurements are given as the means and standard deviations for samples of ten or more specimens, or as ranges for less than ten.

ARCTOSA C. L. KOCH

Lycosa: C. L. Koch 1837:23 (in part); Chamberlin 1908:220 (in part): Simon 1937:1089 (6th Group).

Arctosa C. L. Koch, 1848:94; Simon 1898:328 (in part, as subgenus of *Lycosa*); 1937:1089 (9th Group); Dahl and Dahl 1927:65 (in part); Petrunkevitch 1928:104 (in part); Gertsch 1934:3 (in part); Holm 1947:19; Kaston 1948:318 (in part); 1978:188; Locket and Millidge 1951:283; Bonnet 1955:640 (in part); Roewer 1955:225 (in part); 1960:591 (in part); Wiebes 1959:26 (in part); Lugetti and Tongiorgi 1965:167; 1966:134; Fuhn and Niculescu - Burlacu 1971:173.

Tricca Simon, 1889:250 (in part, including type-species); Roewer 1955:297 (in part); 1960:950; Bonnet 1959:4684 (in part); Braun 1963:81 (in part); Lugetti and Tongiorgi 1965:209 (in part); 1966:144 (in part).

Allocosa: Roewer 1955:201 (in part).

Crocodilosa: Roewer 1955:238 (in part); 1960:847 (in part).

Arctosella Roewer, 1960:671 (in part, including type-species). Synonymized by Guy 1966:48.

Arkalosula Roewer, 1960:759 (in part, including type-species). Validation of generic name originally proposed without statement of characters by Roewer 1955:231. NEW SYNONYM.

Trochosomma Roewer, 1960:851 (in part, not including type-species).

Citilycosa Roewer, 1960:845 (in part, not including type-species).

Type-species.—Of *Arctosa, Aranea cinerea* Fabricius, 1777 by subsequent designation (Simon 1937:1089). Of *Tricca, Tricca japonica* Simon, 1899 by original designation. Of *Arctosella, Aranea perita* Latreille, 1799 by original designation. Of *Arkalosula, Arctosa sanctaerosae* Gertsch and Wallace, 1935 by original designation.

Description.—Size medium to large (overall length, excluding legs, 4.5 - 16.0 mm). Carapace broad, rather low, approximately uniform in height between dorsal groove and posterior row of eyes, usually glabrous or nearly so, yellow, off-white, or mottled with gray, yellow, or brown. Anterior row of eyes straight or somewhat procurved or recurved, longer than, shorter than, or equal to middle row in length. Promargin of fang furrow with two or three teeth, and retromargin with three teeth. Legs usually pale, robust, lightly scopulate, with dark rings; tibia III with two dorsal macrosetae or with one plus a basal bristle, and with 1-3 retrolateral macrosetae; trochanters usually deeply notched at tip on ventral surface. Abdomen usually pale and mottled like carapace. Terminal apophysis of male palpus (Fig. 9) conspicuous, in two parts or in one part of two different shapes and degrees of sclerotization; embolus (Figs. 7, 9) straight or curved, largely hidden by median apophysis in ventral view, with extensive pars pendula extending nearly to tip; median apophysis (Figs. 7, 9) prominent, sclerotized, elongate, conspicuously

grooved or excavated on distal or dorsal surface (and forming part of functional conductor); tegulum (Fig. 9) with retrolateral prominence bearing small soft area and often bearing small, transparent, cup-shaped process or prominent, sclerotized process, which also form part of functional conductor. Epigynum of female usually with conspicuous atrium divided by median septum, without hood (Figs. 3, 5); copulatory openings located at sides of slender part of median septum; copulatory tubes (Figs. 4, 32) slender to stout, rather short, often curved or sinuous (Fig. 32), sometimes with conspicuous spermathecal organs at lateral margins; spermathecae (Fig. 6) bulbous in outline, without prominences.

Diagnosis.–*Arctosa* is grouped with *Lycosa, Schizocosa, Geolycosa, Alopecosa*, and *Trochosa*, in which the conductor (the structure in which lies the resting embolus of the male palpus) is a secondary one derived partly of a groove or excavation on the distal or dorsal surface of the median apophysis and partly of a process on the retrolateral margin of the tegulum. The members *Arctosa* differ from those of the other genera by having the terminal apophysis neither long and sickle-shaped (compare *Lycosa, Geolycosa, Trochosa*) nor minute and scale like (compare *Schizocosa*) but prominent and usually in two parts with differing degrees of sclerotization (Fig. 9). In addition, the process on the tegulum in *Arctosa* is usually inconspicuous and often concealed (ventral view) by the median apophysis and is only observable by dissection. The mottled body, rather low, glabrous carapace, and the lack of an epigynal hood also have diagnostic value for *Arctosa*.

The presence of a dorsal bristle on distitarsus I, used by some authors to distinguish *Arctosa*, is subject to exception, and the character is also found in representatives of other lycosid genera. The same comments apply to the replacement of the dorsal basal macroseta on tibia III and IV by a bristle.

Comments.–Simon (1889) described the genus *Tricca* for *T. japonica* Simon (the type-species) together with *T. lutetiana* (Simon). The characters on which he established the genus were the exaggerated length of the anterior row of eyes, the recurvature of the same row, and the reduction of macrosetae on legs I and II. Our study of specimens of *T. japonica* (and of all Holarctic species of *Arctosa*) indicates that none of these characters differentiates *Tricca* from *Arctosa*. Moreover, the external genitalia show no significant difference between the two genera. We therefore regard *Tricca* as a junior synonym of *Arctosa*. The status of the European *lutetiana*, however, remains uncertain.

The genera *Arctosella* and *Arkalosula* were established by Roewer (1960) with type-species that we regard as belonging to *Arctosa*.

KEY TO NORTH AND CENTRAL AMERICAN SPECIES OF *ARCTOSA*

1. Carapace uniformly dark, and more than 3.0 mm in width. Male palpus with angular, flat median apophysis (Fig. 7). Median septum of epigynum with transverse piece elongate (Fig. 5) . . . . . *raptor* (Kulczynski)

   Carapace pale (at least in part) or, if uniformly dark, then less than 3.0 mm in width. Male palpus with median apophysis variously shaped but not angular and flat. Median septum of epigynum with transverse piece, if developed, usually short and stout 2

2. Anterior row of eyes distinctly longer than middle row (as in Fig. 8). 3

   Anterior row of eyes not longer than middle row (Figs. 31, 65) 4

3. Legs with dark rings. . . . . *emertoni* Gertsch

   Legs without dark rings . . . . . *rubicunda* (Keyserling)

4. Carapace uniformly dark. Anterior row of eyes shorter than middle row (Fig. 31). Femur I with two dorsal macrosetae 5

   Carapace pale (at least in part). Anterior row of eyes approximately as long as middle row (Fig. 65). Femur I usually with three dorsal macrosetae 6

5. Male palpus with short, rotund median apophysis (Fig. 22). Spermathecae attached mesally to copulatory tubes (Figs. 25, 26) . . . . . *virgo* (Chamberlin)

   Male palpus with elongate median apophysis (Fig. 29). Spermathecae attached laterally to copulatory tubes (Fig. 32) . . . . . *lama* new species

6. Abdominal heart mark densely covered with compound setae (Fig. 37). Pale median area of carapace narrow posteriorly, gradually widening anterior to dorsal groove (Fig. 40) 7

   Abdominal heart mark sparsely covered with simple setae (Fig. 41). Pale median area of carapace widest at level of dorsal groove (Fig. 66), or carapace entirely pale 8

7. Male palpus in retrolateral view with tip of median apophysis distinctly hooked (Fig. 38). Epigynum with broad transverse septum (Figs. 33, 34) . . . . . .*alpigena* (Doleschall)

   Male palpus in retrolateral view with tip of median apophysis straight (Fig. 44). Epigynum with triangular septum (Fig. 42) . . . . . .*insignita* (Thorell)

8. Sternum dark brown or black. Tibia and basitarsus I lacking retrolateral macrosetae (exclusive of any at tip). Anterior median eyes slightly larger than anterior lateral eyes . . . . . .*perita* (Latreille)

   Sternum yellow, orange, or orange brown. Tibia and basitarsus I with one or more retrolateral macrosetae (exclusive of any at tip). Anterior median eyes distinctly larger than anterior lateral eyes (Fig. 65) 9

9. Tibia III with two dorsal macrosetae . . . . . *minuta* F. Pickard-Cambridge

   Tibia III with one dorsal macroseta plus a basal bristle 10

10. Promargin of cheliceral fang furrow with three teeth. Tibia I with one dorsal macroseta . . . . . *sanctaerosae* Gertsch and Wallace

    Promargin of cheliceral fang furrow with two teeth. Tibia I without dorsal macrosetae 11

11. Femur I with two prolateral macrosetae near tip. Tibia III with three retrolateral macrosetae. Legs usually with dark rings . . . . . *littoralis* (Hentz)

Femur I with one prolateral macroseta near tip. Tibia III with two retrolateral macrosetae. Legs without dark rings . . . . . *serii* Roth and Brown

Arctosa raptor (Kulczynski), new combination
Figs. 5-8; Map 1

Pirata raptor Kulczynski, 1885:55, Pl. 11, fig. 61; Schenkel 1930:32, fig. 13; Sytschewskaia 1935:83; Bonnet 1958:3671.

Lycosa quinaria Emerton, 1894:422, Pl. 3, figs. 5, 5a; 1911:400, figs, 1, 1a; 1915:160; 1920:328; Chamberlin 1908:277, Pl. 19, fig. 7. NEW SYNONYM.

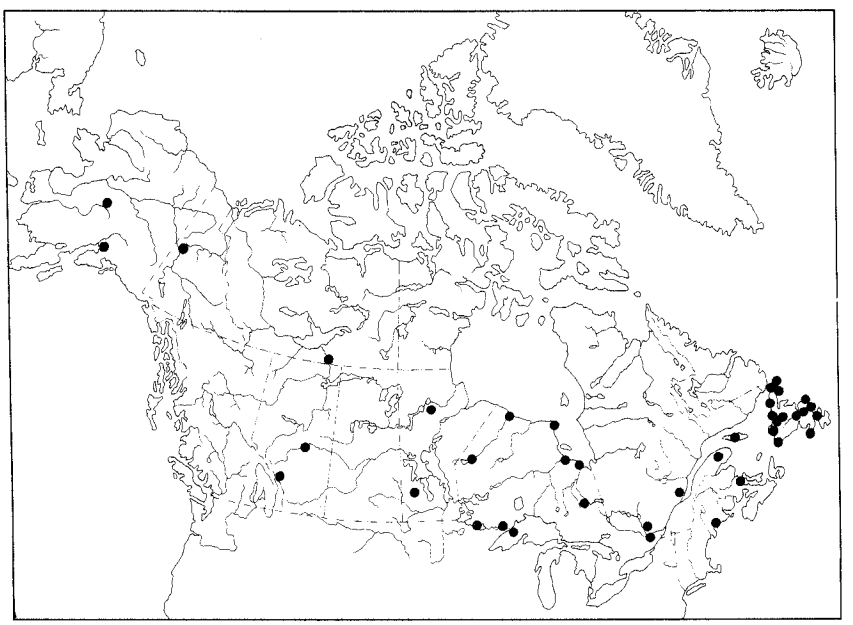
Tarentula raptor: Strand 1906:468.

Arctosa quinaria: Gertsch 1934:5; Chamberlin and Ivie 1947:18, Pl. 2, fig. 10; Hackman 1954:77; Bonnet 1955:659; Roewer 1955:231.

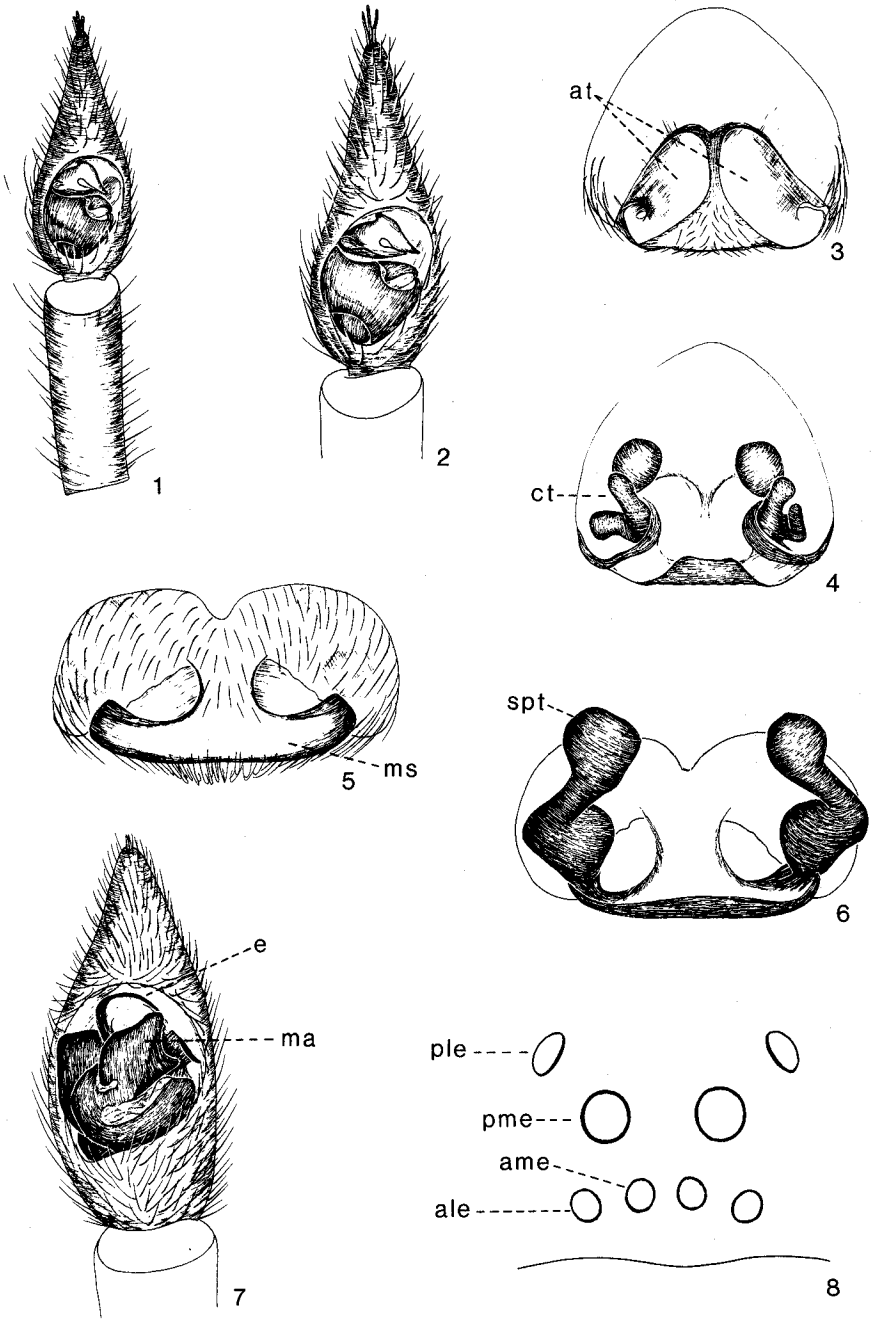
Trochosa raptor: Roewer 1955:299.

Type data.–Female holotype of *raptor* from Petropavlowsk, Kamtchatka (B. Dybowski), in Polish Academy of Sciences, Warsaw, examined. Female holotype of *quinaria* from Lake Louise ("Laggan"), Alberta (Bean), in the MCZ, examined.

Male.–Total length 8.0 - 11.7 mm. Carapace 4.97 ± 0.32 mm long and 3.71 ± 0.26 mm wide; ratio of carapace width to basitarsus IV length 0.63 - 0.77 (20 specimens). Carapace red brown, covered with black setae. Anterior row of eyes procurved, approximately as long as middle row, with eyes uniform in size and spacing. Chelicerae red brown; promargin of fang furrow with three teeth. Legs red brown, without dark rings, with dense scopulae; femur I with three dorsal macrosetae, one or two prolaterals; tibia I with one



Map 1.–Geographical distribution of *Arctosa raptor* (Kulczynski).



Figs. 1-8.–Structures of *Arctosa* spp.: 1-4, *A. cinerea* (Fabricius); 1,2, palpi of male, ventral view; 3, epigynum; 4, spermathecae; 5-8, *A. raptor* (Kulczynski); 5, epigynum; 6, spermathecae; 7, palpus of male, ventral view; 8, eyes, frontal view. *ale*, anterior lateral eye; *ame*, anterior median eye; *at*, atrium; *ct*, copulatory tube; *e*, embolus; *ma*, median apophysis; *ms*, median septum; *ple*, posterior lateral eye; *pme*, posterior median eye; *spt*, spermatheca.

dorsal macroseta, two prolaterals, two retrolaterals; basitarsus I with none or one prolateral macroseta (exclusive of any at tip), none or one retrolateral (exclusive of any tip); tibia III with one or two dorsal macrosetae. Abdomen dusky, with off-white heart mark and a few off-white chevrons; heart mark covered with compound setae. Terminal apophysis of palpus minute; embolus short, curved; median apophysis (Fig. 7) large, angular, flat, with broad excavation on dorsal surface.

Female.–Total length 11.0 - 16.0 mm. Carapace 5.59 ± 0.54 mm long and 4.32 ± 0.52 mm wide; ratio of carapace width to basitarsus IV length 0.81 - 0.90 (20 specimens). General structure and color essentially as in male, but anterior row of eyes usually longer than middle row (Fig. 8), tibia I lacking dorsal and retrolateral macrosetae, and tibia III with basal dorsal macroseta replaced by bristle. Epigynum with short, broad, flat median septum having elongate transverse piece (Fig. 5). Copulatory tubes stout; spermathecae bulbous (Fig. 6).

Diagnosis.–Specimens of *A. raptor* differ from those of other species in the genus by the large size in combination with a uniformly dark carapace having black setae, by the dense leg scopulae, by the minute terminal apophysis and angular, flat median apophysis of the male palpus, and by the elongate, transverse piece of the median septum.

Range.–Alaska to Newfoundland, south to Maine; U.S.S.R.

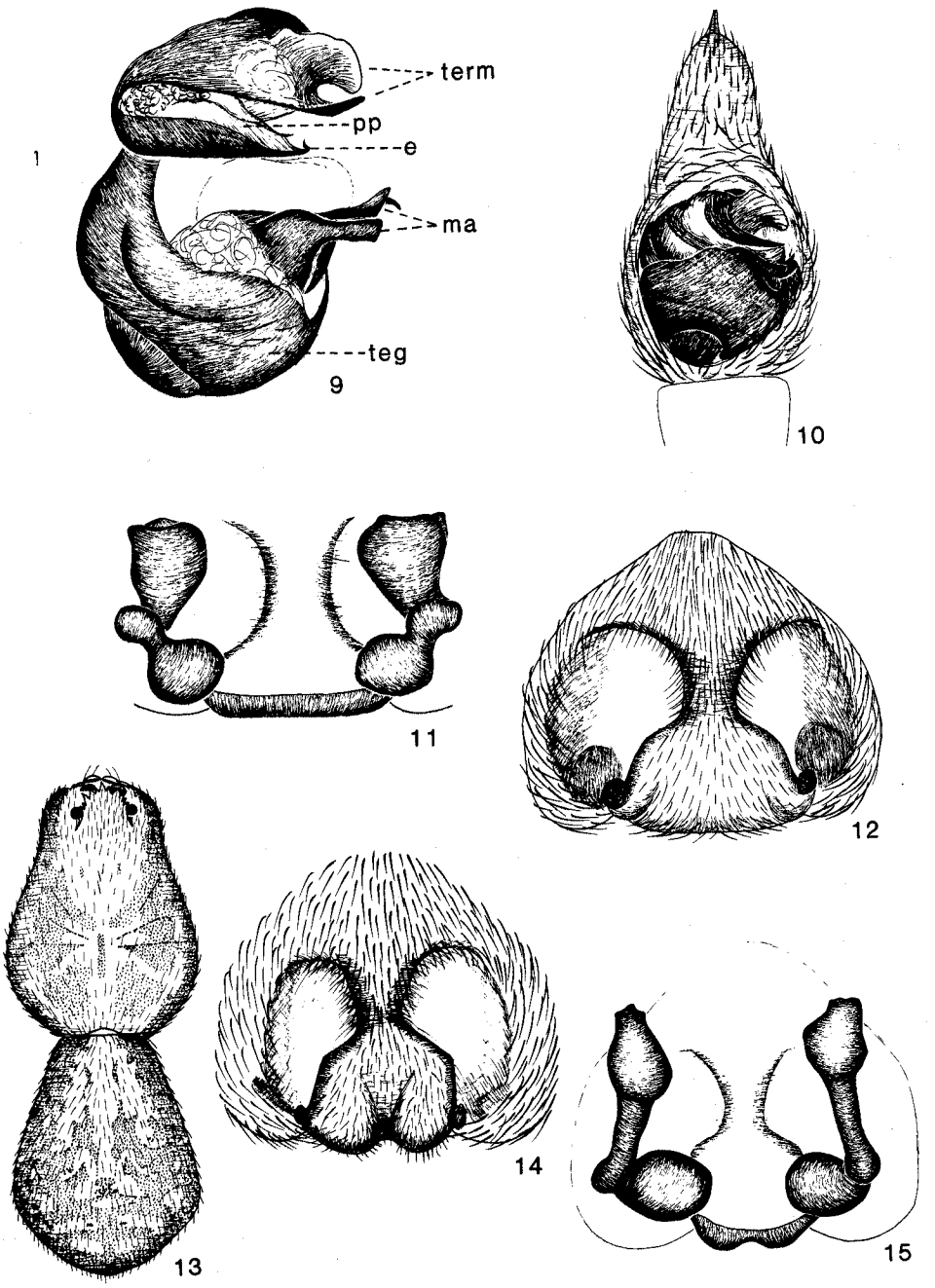
Natural history.–*A. raptor* is an inhabitant of bogs, river banks, wet meadows, and dense coniferous forests (Hackman 1954). Sytschewskaia (1935) found females in burrows at water's edge in sphagnum bogs. A male and female were taken together by the authors on alpine tundra at the summit of Mont Albert, Gaspé Peninsula, Québec. Adults have been collected from June 5 to September 12.

Arctosa emertoni Gertsch
Figs. 9-15; Map 2

Lycosa polita Emerton, 1885:484 (in part, Pl. 46, fig. 2a, not lectotype–see *A. rubicunda*); 1902:70 (in part, fig. 171).
Arctosa emertoni Gertsch, 1934:5; Kaston 1948:319, Pl. 53, figs. 1047-1049; Levi and Field 1954: 455; Bonnet 1955:647.
Crocodilosa emertoni: Roewer 1955:238.
Trochosomma emertoni: Roewer 1960:851.

Type data.–Female from Albany, New York, February 1871 (J. H. Emerton), and female from Arlington Heights, Massachusetts, April 26 1877 (J. H. Emerton) (among specimens of mixed syntype-series of J. H. Emerton, but not lectotype or paralectotypes of *polita*–see *A. rubicunda*), in MCZ, examined. Male holotype and female allotype of *emertoni* from Wacouta Beach, Lake Pepin, Minnesota, May 15 1932 (W. J. Gertsch), in AMNH, examined.

Male.–Total length 6.4 - 9.9 mm. Carapace 4.18 ± 0.41 mm long and 3.06 ± 0.29 mm wide; ratio of carapace width to basitarsus IV length 0.47 - 0.54 (20 specimens). Carapace red brown, mottled laterally with pale spots, paler mesally, darker near eyes, glistening, nearly glabrous (as in fig. 13). Anterior row of eyes straight or slightly recurved, distinctly longer than middle row, with median eyes larger than lateral eyes. Chelicerae red brown; promargin of fang furrow with three teeth. Sternum pale. Legs straw yellow to pale brown, with dark rings on femora and tibiae, with sparse scopulae; femur I with three dorsal macrosetae, one prolateral near tip; tibia I with no dorsal macrosetae, one prolateral, no retrolaterals; basitarsus I with none to 2 prolateral macrosetae (exclusive of any



Figs. 9-15.–Structures of *Arctosa emertoni* Gertsch: 9, expanded bulb of male palpus, ventral view; 10, palpus of male, ventral view; 11, 15, spermathecae; 12, 14, epigyna; 13, body of female, dorsal view. *e*, embolus; *ma*, median apophysis; *pp*, pars pendula; *teg*, tegulum; *term*, terminal apophysis.

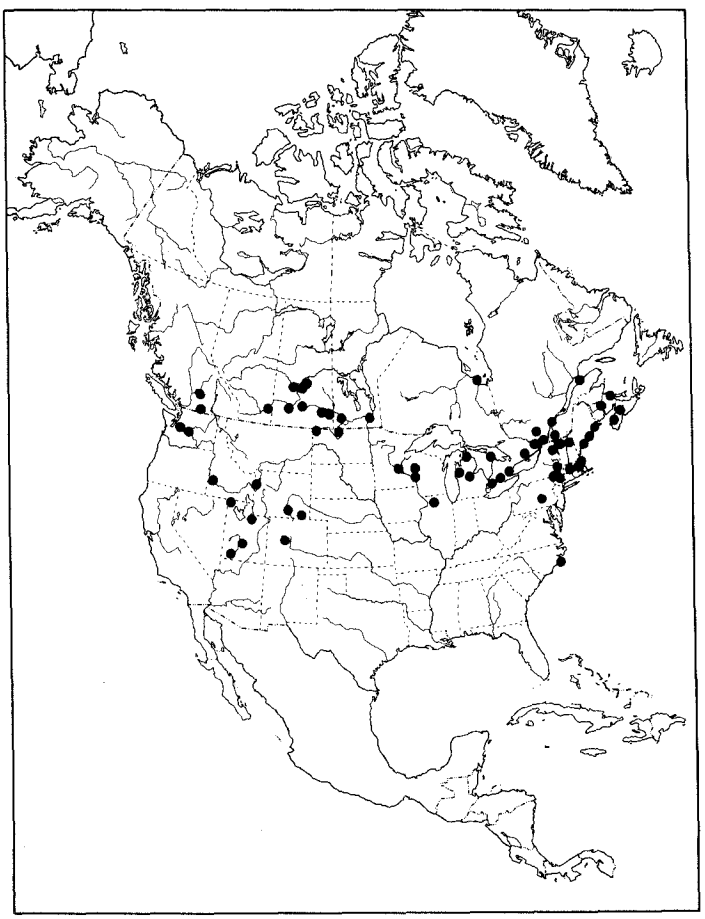
at tip), none or one retrolateral (exclusive of any at tip); tibia III with one dorsal macroseta plus a basal bristle. Abdomen dark brown, mottled extensively with off-white; venter pale. Terminal apophysis of palpus with broad distal part and slender basal part; embolus nearly straight; median apophysis prominent, somewhat curved (ventral view), with stout curved process at tip (Figs. 9, 10).

Female.–Total length 6.9 - 12.0 mm. Carapace 4.44 ± 0.40 mm long and 3.29 ± 0.30 mm wide; ratio of carapace width to basitarsus IV length 0.96 - 1.12 (20 specimens). General structure and color essentially as in male, but tibia I with two prolateral macrosetae. Epigynum with median septum gradually widening posteriad (Figs. 12, 14). Spermathecae bulbous (Figs. 11, 15).

Diagnosis.–Specimens of *A. emertoni* most resemble those of *A. rubicunda* in that the anterior row of eyes is distinctly longer than the middle row; they can be distinguished from *rubicunda* by the possession of dark rings on the legs, by the more distinctly mottled carapace, and by the curved median apophysis (ventral view) of the male palpus.

Range.–Interior British Columbia to Nova Scotia, south to Utah, Colorado, and North Carolina.

Natural history.–*A. emertoni* has been found in shady woodlands and grasslands, and occasionally on bogs or seashores. Adults have been collected from April 5 to October 28.

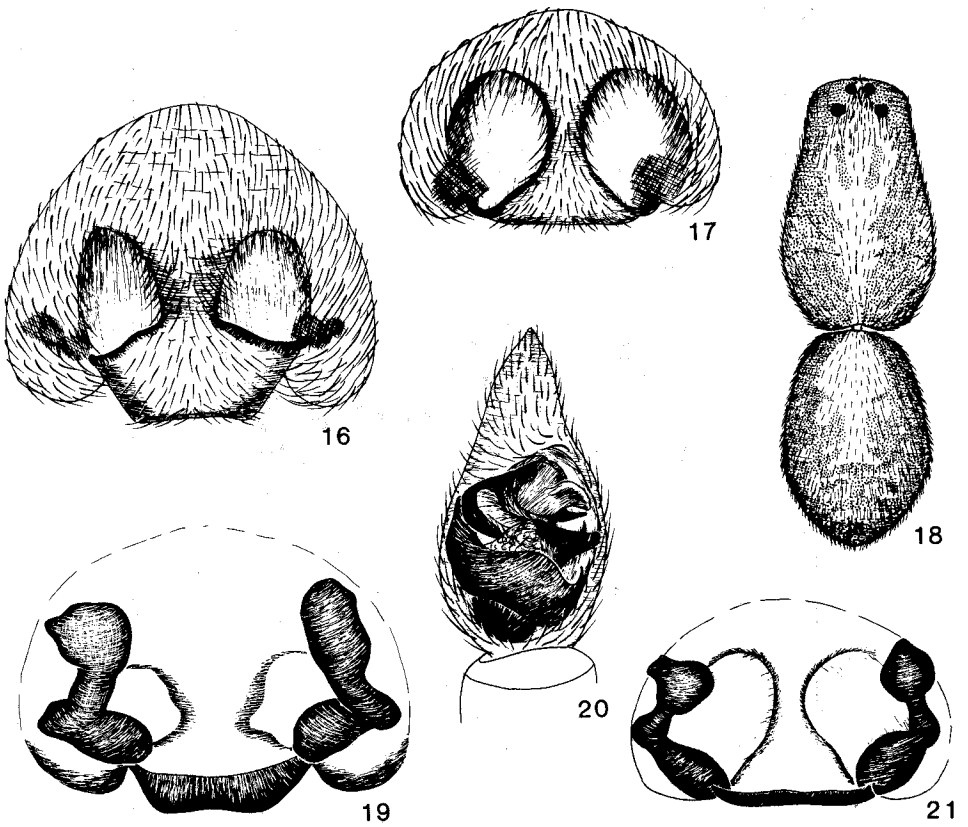


Map 2.–Geographical distribution of *Arctosa emertoni* Gertsch.

Arctosa rubicunda (Keyserling)
Figs. 16-21; Map 3

Trochosa rubicunda Keyserling, 1877: 663, Pl. 8, fig. 40; Montgomery 1904: 307, Pl. 20, fig. 30.
Lycosa polita Emerton, 1885:484 (in part, Pl. 46, figs. 2, 2b, 2c).
Lycosa rubicunda: Simon 1898:33; Chamberlin 1908:278, Pl. 19, fig. 9; Comstock 1940:656.
Arctosa rubicunda: Petrunkevitch 1911:552; Gertsch 1934:5; Kaston 1948:319, Pl. 53, figs. 1044 - 1046; 1978:188, fig. 480; Levi and Field 1954:455; Bonnet 1955:660.
Arctosa imperiosa Gertsch, 1933:13, fig. 17, 1934:5; Bonnet 1955:649. NEW SYNONYM.
Crocodilosa rubicunda: Roewer 1955:238.
Crocodilosa imperiosa: Roewer 1955:238; 1960:847.

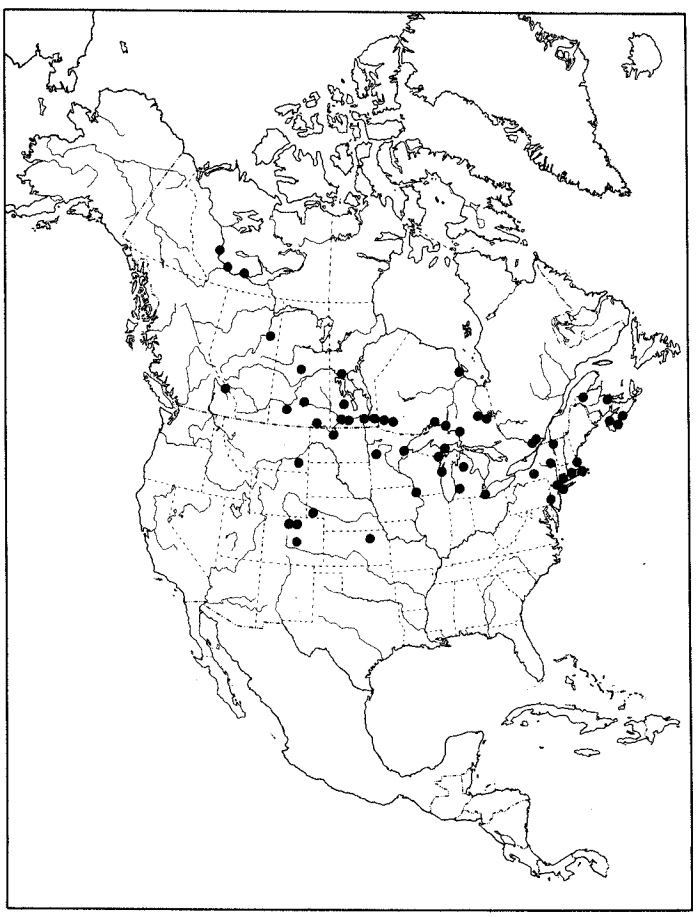
Type data.–Female holotype of *rubicunda* from Baltimore, Maryland, not located; identified from original description and illustration. Female lectotype and one female paralectotype of *polita* from Blue Hills, Boston, Massachusetts, May 18 1877 (J. H. Emerton), in MCZ, examined and here designated; the specimens bear our lectotype and paralectotype labels, respectively. Female paralectotype of *polita* from Albany, New York, February 1871 (J. H. Emerton), in MCZ, examined and here designated; the specimen bears our paralectotype label. Female holotype of *imperiosa* from Colorado Springs, Colorado, July 20 1908, in AMNH, examined.



Figs. 16-21.–Structures of *Arctosa rubicunda* (Keyserling): 16, 17, epigyna; 18, body of female, dorsal view; 19, 21, spermathecae; 20, palpus of male, ventral view.

Male.–Total length 6.6 - 9.3 mm. Carapace 4.24 ± 0.34 mm long and 2.92 ± 0.24 mm wide; ratio of carapace width to basitarsus IV length 0.85 - 1.01 (20 specimens). Carapace dark red brown, with tan median area and with indistinct paler mottling laterally, glistening, nearly glabrous (as in fig. 18). Anterior row of eyes straight, longer than middle row, with median eyes larger than lateral eyes. Chelicerae dark red brown; promargin of fang furrow with three teeth. Sternum pale red brown. Legs red brown, without dark rings, with sparse scopulae; femur I with three dorsal macrosetae, one prolateral near tip; tibia I with no dorsal macrosetae, two prolaterals, no retrolaterals; basitarsus I with 2 prolateral macrosetae (exclusive of any at tip), none or one retrolateral (exclusive of any at tip); tibia III with one dorsal macroseta plus a basal bristle. Abdomen dark brown, mottled, with indistinct heart mark and chevrons; venter pale. Terminal apophysis of palpus with large distal part and slender basal part (Fig. 20); embolus nearly straight; median apophysis long, prominent, nearly straight (ventral view), with stout process at tip (Fig. 20).

Female.–Total length 8.0 - 12.0 mm. Carapace 4.77 ± 0.49 mm long and 3.40 ± 0.39 mm wide; ratio of carapace width to basitarsus IV length 1.00 - 1.14 (20 specimens).



Map 3.–Geographical distribution of *Arctosa rubicunda* (Keyserling).

General structure and color essentially as in male. Epigynum with median septum gradually widening posteriad (Figs. 16, 17). Spermathecae bulbous (Figs. 19, 21).

Diagnosis.–Specimens of *A. rubicunda* most resemble those of *A. emertoni*, both having the anterior row of eyes longer than the middle row; they can be distinguished from the latter by the lack of dark rings on the legs, by the nearly uniform coloring of the carapace, and by the straight median apophysis of the male palpus (ventral view).

Gertsch (1933) described *A. imperiosa* from Colorado; the body size and external genitalia are consistent with these characters in *A. rubicunda*, but the color of carapace and legs is intermediate between *rubicunda* and *emertoni*. Twelve specimens, including both males and females and collected in Nebraska, North Dakota, Montana, Saskatchewan, and western Wisconsin, have been identified as this intermediate form. We are reluctant to accept *imperiosa* as a valid species in the absence of supporting data from behavior, habitat relations, or life history.

Range.–Western Northwest Territories to Nova Scotia, south to Colorado, Kansas, and southern Pennsylvania.

Natural history.–Specimens of *A. rubicunda* have been collected in bogs, meadows, fields, prairies, and deciduous forests, and also at the margins of ponds and salt marshes, and on beaches. Adults were collected from May 20 to October 3. Kaston (1948) records eggs in June and July.

Arctosa virgo (Chamberlin)

Figs. 22-26, 28; Map 4

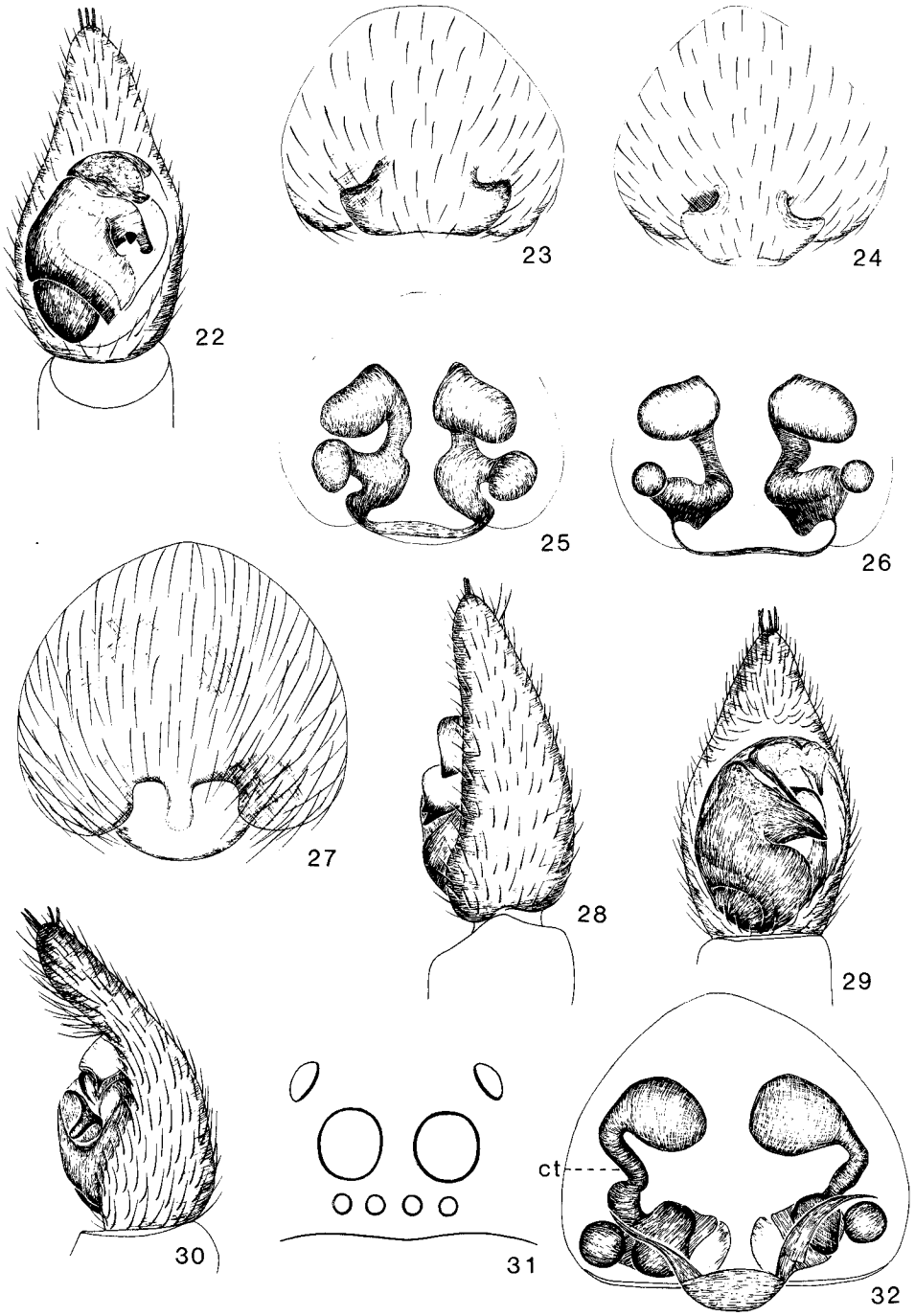
Allocosa virgo Chamberlin, 1925:226; Roewer 1955:201.
Arctosa virgo: Gertsch 1934:7; Kaston 1948:320, Pl. 53, figs. 1051, 1052, Pl. 54, fig. 1053; Bonnet 1955:662.

Type data.–Female holotype and one female paratype from Fairfax, Virginia (R. V. Chamberlin), in MCZ, examined.

Male.–Total length 5.1 - 6.9 mm. Carapace 2.81, 3.32 mm long and 2.04, 2.47 mm wide (2 specimens). Carapace red brown, without pale band or spots. Anterior row of eyes straight to procurved, shorter than middle row, with eyes uniform in size (as in fig. 31). Chelicerae red brown; promargin of fang furrow with two or three teeth. Sternum pale. Legs red brown, with femora and tibiae faintly ringed; femur I with two dorsal macrosetae, one prolateral near tip; tibia I with no dorsal macrosetae, two prolaterals, no retrolaterals; basitarsus I with 1-3 prolateral macrosetae (exclusive of any at tip), no retrolaterals (exclusive of any at tip); tibia III with one dorsal macroseta plus a basal bristle. Abdomen dusky or charcoal gray, with pale yellow heart mark and small paired yellow spots along dorsum; venter pale, with broad dusky longitudinal band. Terminal apophysis of palpus in two parts; embolus short, curved; median apophysis short, rotund (Fig. 22).

Female.–Total length 5.0 - 6.6 mm. Carapace 2.93 ± 0.24 mm long and 2.11 ± 0.21 mm wide (13 specimens). General structure and color essentially as in male. Epigynum with inconspicuous median septum (Figs. 23, 24). Copulatory tubes slender; spermathecae elongate, attached mesally to copulatory tubes (Figs. 25, 26).

Diagnosis.–Specimens of *A. virgo* most resemble those of *A. lama* but are distinguished from the latter by the short, rotund median apophysis of the male palpus and by the mesal attachment of the spermathecae to the copulatory tubes.



Figs. 22-32.–Structures of *Arctosa* spp.: 22-26, 28, *A. virgo* (Chamberlin); 22, 28, palpi of male, 22, ventral view, 28, retrolateral view; 23, 24, epigyna; 25, 26, spermathecae; 27, 29-32, *A. lama* new species; 27, epigynum; 29, 30, palpi of male, 29, ventral view, 30, retrolateral view; 31, eyes, frontal view; 32, spermathecae. *ct*, copulatory tube.

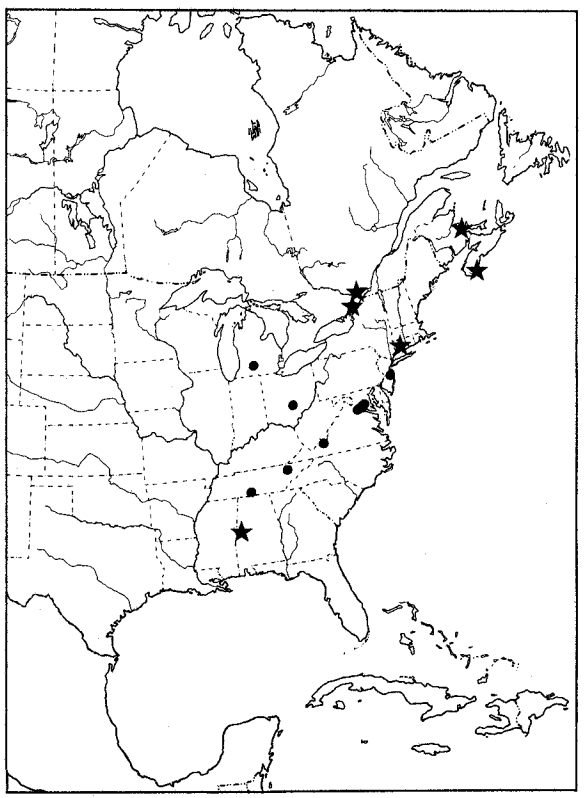
Range.–Southern Michigan to New Jersey, south to Tennessee.

Natural history.–The habitat of *A. virgo* is unknown to us. Adults were collected from May to early August.

Arctosa lama, new species
Figs. 27, 29-32; Map 4

Type data.–Male holotype from Mer Bleue bog, east of Ottawa, Carleton Co., Ont., June 18 1974 (J. H. Redner and C. D. Dondale), in CNC; 27 male and four female paratypes from the type locality, in CNC; 14 male and two female paratypes from Upper Rock Lake, near Chaffey's Locks, Ontario, in CNC; 10 male and seven female paratypes from Kouchibouguac National Park, New Brunswick, in CNC; one female paratype from Lockeport, Nova Scotia, in CNC; one male and two female paratypes from Bethany, Connecticut, in AMNH; 1 female paratype from 4.5 miles east of Gorda, Tuscaloosa County, Alabama, in CNC.

Male.–Total length 4.5 - 5.3 mm. Carapace 2.81 ± 0.14 mm long and 1.98 ± 0.12 mm wide (20 specimens). Carapace red brown, with few short dark setae. Anterior row of eyes straight to procurved, shorter than middle row, with eyes uniform in size (Fig. 31). Chelicerae red brown; promargin of fang furrow with two or three teeth. Sternum pale red brown. Legs red brown, darker distally, without rings, with sparse scopulae; femur I



Map 4.–Geographical distribution of *Arctosa* spp.: *A. virgo* (Chamberlin), circles; *A. lama* new species, stars.

with two dorsal macrosetae, one prolateral near tip; tibia I with no dorsal macrosetae, one or two prolaterals, no retrolaterals; basitarsus I with two or three prolateral macrosetae (exclusive of any at tip), none or one retrolateral (exclusive of any at tip); tibia III with one dorsal macroseta plus a basal bristle. Abdomen dusky, with pale heart mark and with irregular pale spots laterally; venter pale yellow brown. Terminal apophysis of palpus small, fingerlike (Fig. 29); embolus short, curved; median apophysis elongate, curved (Figs. 29, 30).

Female.–Total length 4.8 - 6.4 mm. Carapace 2.81 ± 0.14 mm long and 1.97 ± 0.12 mm wide (19 specimens). General structure and color essentially as in male. Epigynum with indistinct median septum (Fig. 27). Copulatory tubes slender; spermathecae bulbous, attached laterally to copulatory tubes (Fig. 32).

Diagnosis.–Specimens of *A. lama* most resemble those of *A. virgo* but can be distinguished from the latter by the elongate median apophysis of the male palpus and by the lateral attachment of the spermathecae to the copulatory tubes.

Range.–Ontario to Nova Scotia, south to Alabama.

Natural history.–All specimens of *A. lama* for which habitat data are available were collected on sphagnum bogs. Adults were collected from May 25 to August 29.

Arctosa alpigena (Doleschall)
Figs. 33-41; Map 5

Lycosa alpigena Doleschall, 1852:643; Simon 1937: 1112, 1138, figs. 1745, 1746 (in part).
Lycosa superba L. Koch, 1872:316.
Lycosa biunguiculata O. Pickard-Cambridge, 1873;526, Pl. 46, fig. 2.
Lycosa albohastata Emerton, 1894:423, Pl. 3, fig. 3; Chamberlin 1908:275, Pl. 19, fig. 1; Roewer 1955:231.
Arctosa alpigena: Dahl 1908:307, fig. 37; Dahl and Dahl 1927:67, figs. 174-176; Gertsch 1934:4; Braendegaard 1939:6, figs. 2, 4, 5; 1946:10; Palmgren 1939:73, figs. 122-124; Gertsch and Jellison 1939:3; Holm 1947:22, Pl. 4, figs. 46, 47, Pl. 9, fig. 22; Levi and Levi 1951:223, figs. 9, 20; Locket and Millidge 1951:286, figs. 137A, 138E; Hackman 1954:78; Tyschenko 1971:172, figs. 516, 523; Bonnet 1955:641; Roewer 1955:227.
Tricca alpigena: Lugetti and Tongiorgi 1965:212, Pl. 16, figs. 1-3; 1966:145, fig IV (5, 7).
Citilycosa alpigena: Roewer 1960:845.

Type data.–Syntypes of *alpigena* from "Ochsenboden des Schneeberges", Austria (Mann), not located; species identified from original description and from subsequent published descriptions. Nine male, 12 female, and 21 juvenile syntypes of *superba* from Austrian Alps, in BMNH, examined. Male holotype of *biunguiculata* from Braemar, Scotland, not located. One male and one female syntype of *albohastata* from Lake Louise ("Laggan"), Alberta (J. H. Emerton), in MCZ, examined.

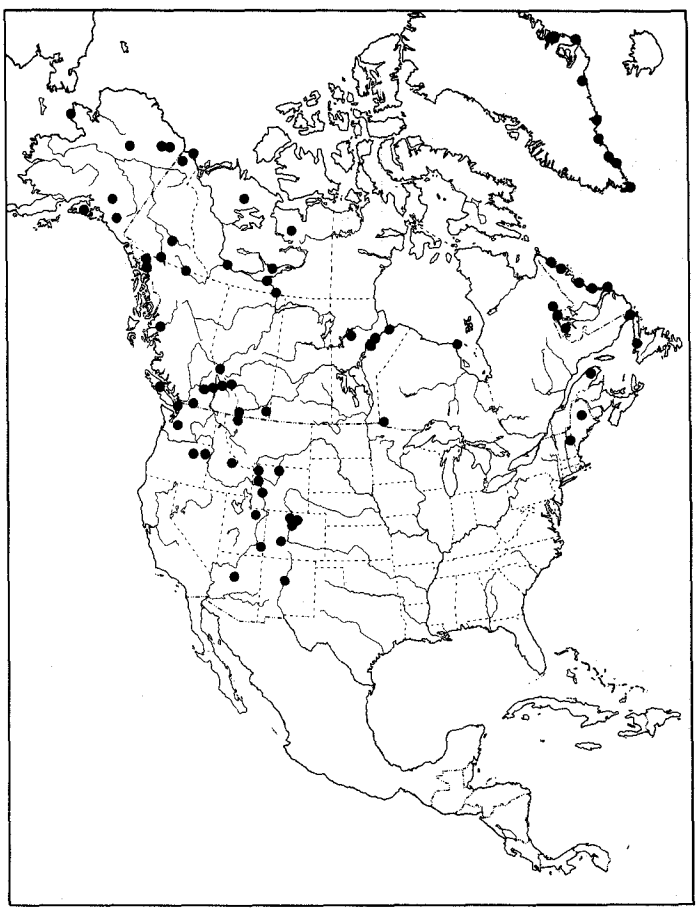
Male.–Total length 4.8-6.4 mm. Carapace 3.34 ± 0.22 mm long and 2.45 ± 0.15 mm wide (20 specimens). Carapace dark red brown, with pale median area gradually widening anterior to dorsal groove (as in fig. 40), with few short pale setae. Anterior row of eyes slightly procurved, nearly as long as middle row, with eyes approximately uniform in size. Chelicerae dark red brown; promargin of fang furrow with three teeth. Sternum dark red brown to black. Legs pale red brown, usually with dark rings on femora and tibiae, with sparse scopulae; femur I with three dorsal macrosetae, one prolateral near tip; tibia I with no dorsal macrosetae, two prolaterals, two retrolaterals; basitarsus I with two or three prolateral macrosetae (exclusive of any at tip), 0-3 retrolaterals (exclusive of any at tip);

tibia III with one dorsal macroseta plus a basal bristle. Abdomen red brown, with dark brown or black reticulations; heart mark white, densely covered with compound setae. (Fig. 37). Terminal apophysis of palpus with soft distal part and slender, hard basal part (Fig. 35); embolus long, slender, sinuous; median apophysis broad, drawn out to fine hooked tip (Figs. 35, 38).

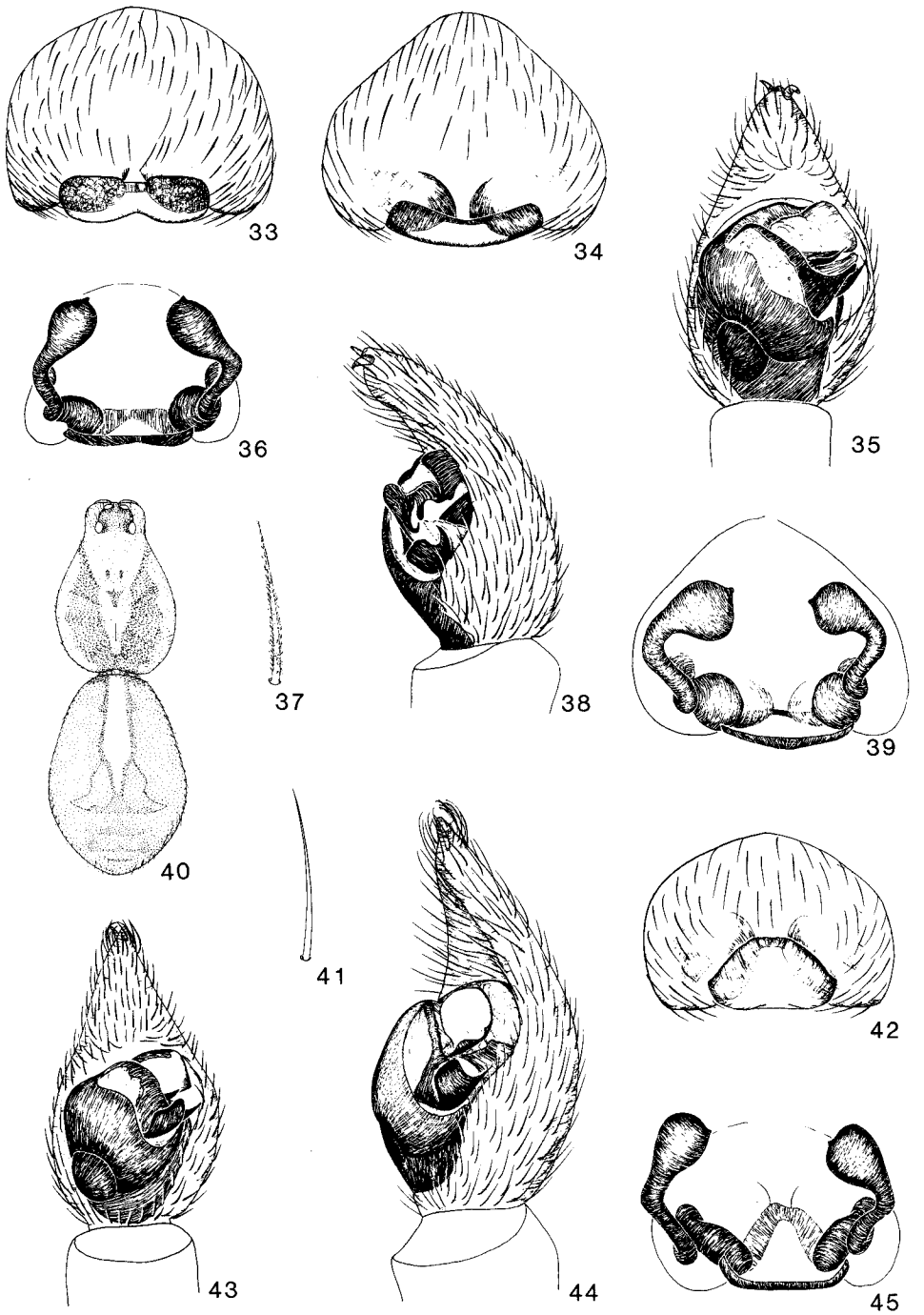
Female.–Total length 6.7-9.3 mm. Carapace 3.65 ± 0.25 mm long and 2.71 ± 0.20 mm wide (20 specimens). General structure and color essentially as in male, but tibia I with one or two prolateral macrosetae and none or one retrolateral macroseta. Epigynum with median septum broad, transverse (Figs. 33, 34). Copulatory tubes slender, curved or slightly sinuous; spermathecae bulbous (Figs. 36, 39).

Diagnosis.–Specimens of *A. alpigena* most resemble those of *A. insignita*, being similar in size, color, and habitat, but can be distinguished by the hooked tip (retrolateral view) of the median apophysis in the male palpus and by the broad transverse median septum in the epigynum.

Range.–Alaska to Labrador, south to Arizona, New Mexico, and New Hampshire; Greenland; Europe and Asia.



Map 5.–Geographical distribution of *Arctosa alpigena* (Doleschall).



Figs. 33-45.–Structures of *Arctosa* spp.: 33-41, *A. alpigena* (Doleschall); 33, 34, epigyna; 35, 38, palpi of male, 35, ventral view, 38, retrolateral view; 36, 39, spermathecae; 37, compound seta; 40, body of female, dorsal view; 41, simple seta; 42-45, *A. insignita* (Thorell); 42, epigynum; 43, 44, palpi of male, 43, ventral view, 44, retrolateral view; 45, spermathecae.

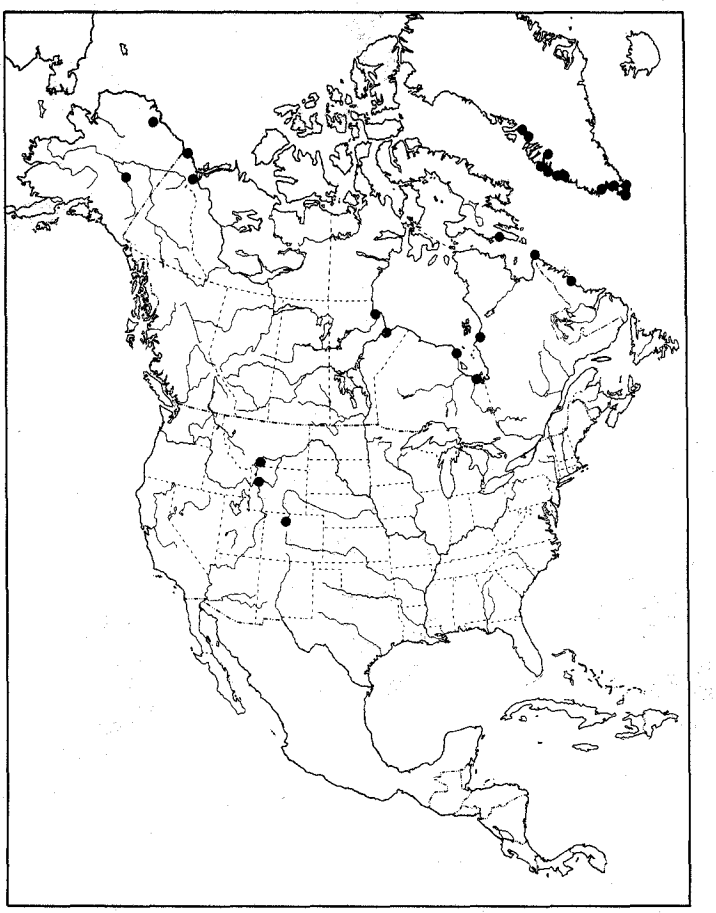
Natural history.–Specimens of *A. apligena* have been collected in sphagnum bogs, lichen- or heath-covered ground in artic and alpine tundra, in lodgepole pine forests, and in alpine meadows. Adults have been collected from early June to September 10.

Arctosa insignita (Thorell)
Figs. 42-45; Map 6

Trochosa insignita Thorell, 1872:160.
Arctosa insignita: Braendegaard 1939:5, figs. 1, 3; Bonnet 1955:649 (in part); Holm 1967:71, figs. 88, 89.
Tricca insignita: Lugetti and Tongiorgi 1966:147, fig. V (1-4).

Type data.–Female holotype from Disko, Greenland (C. Nystrom), in ZIU, examined.

Male.–Total length 5.3-8.3 mm. Carapace 3.55 ± 0.23 mm long and 2.69 ± 0.16 mm wide (20 specimens). Carapace dark red brown, with pale median area gradually widening anterior to dorsal groove, with few pale setae. Anterior row of eyes slightly procurved, nearly as long as middle row, with eyes approximately equal in size. Chelicerae red



Map 6.–Geographical distribution of *Arctosa insignita* (Thorell).

brown, darker distally; promargin of fang furrow with three teeth. Sternum dusky red brown, sometimes with pale median spot in anterior half. Legs red brown, with dark rings on femora and tibiae, with sparse copulae; femur I with three dorsal macrosetae, one prolateral near tip; tibia I with no dorsal macrosetae, two prolaterals, two retrolaterals; basitarsus I with two or three prolateral macrosetae (exclusive of any at tip), 0-3 retrolaterals (exclusive of any at tip); tibia III with one dorsal macroseta plus a basal bristle. Abdomen red brown, with dark brown or black reticulations; heart mark white densely covered with compound setae (Fig. 37); venter pale red brown or pale gray. Terminal apophysis of palpus with soft distal part and hard, slender basal part (Fig. 43); embolus long, slender, sinuous; median apophysis broad, drawn out to fine, straight tip (Figs. 43, 44).

Female.–Total length 6.9-10.9 mm. Carapace 3.69 ± 0.30 mm long and 2.81 ± 0.22 mm wide (20 specimens). General structure and color essentially as in male but tibia I without a dorsal macroseta. Epigynum with median septum approximately triangular in out line (Fig. 42). Copulatory tubes coiled; spermathecae bulbous (Fig. 45).

Diagnosis.–Specimens of *A. insignita* most resemble those of *A. alpigena*, being similar in size, color, and habitat, but are distinguished by the straight tip (retrolateral view) on the median apophysis of the male palpus and by the triangular median septum in the epigynum.

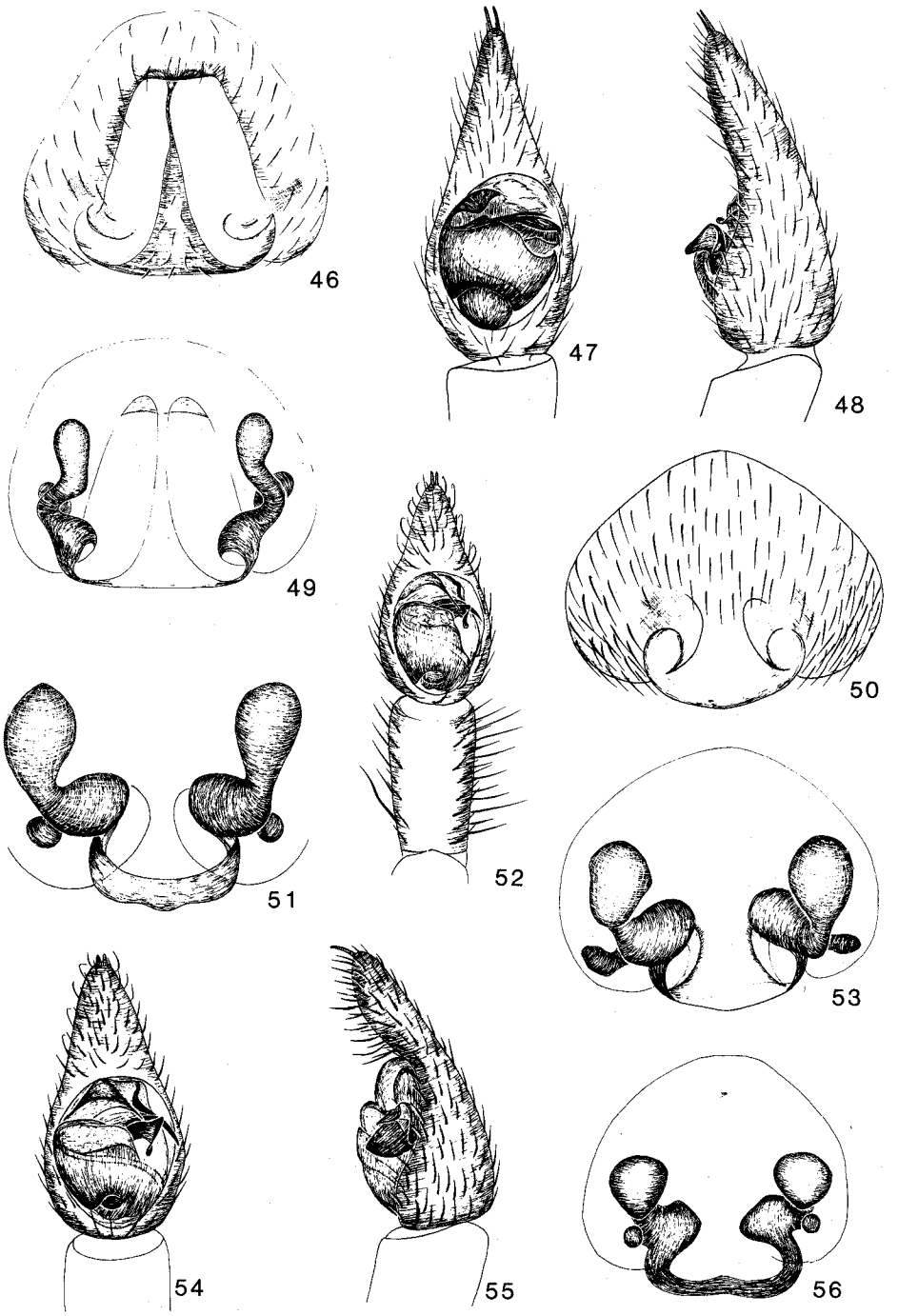
Range.–Alaska to Baffin Island, south to Colorado; Greenland.

Natural history.–*A. insignita* is mainly a spider of the open tundra. Many specimens have been collected by pitfall traps in Greenland and in the Canadian artic; a few are known from alpine tundra in the Rocky Mountains. Adults have been collected from June 8 to the end of August.

Arctosa perita (Latreille)
Figs. 46-49; Map 7

Aranea perita Latreille, 1799:170.
Lycosa perita: Latreille, 1817:297; Simon 1937:1115, 1135, figs. 1754, 1755.
Lycosa picta Hahn, 1831:106, fig. 79.
Arctosa lynx C. L. Koch, 1848:133, fig. 1364.
Lycosa filicata Simon, 1876:277.
Arctosa perita: C. L. Koch 1848:133, figs. 1362, 1363; Dahl 1908:210; Dahl and Dahl 1927:69, 70, 78, figs. 179, 180; Palmgren 1939:74, figs. 120, 121; Holm 1947:20, 21, fig. 6a, Pl. 4, figs. 40, 41, Pl. 9, fig. 20; Locket and Millidge 1951:284, figs. 137B, 138B; Wiebes 1959:32, figs. 38, 47, 53, 54; Roewer 1955:226; Bonnet 1955:656.
Arctosa perita arenicola Simon, 1937:1116, 1138.
Arctosella perita: Roewer 1960:672, figs. 381a, b.
Arctosa perita perita: Lugetti and Tongiorgi 1965:175, Pl. 2, figs. 1-4, Pl. 4, fig. 1; Fuhn and Niculescu-Burlacu 1971:185, figs. 91 a-d.
Arctosa perita latithorax Lugetti and Tongiorgi, 1965:180, Pl. 4, fig. 2, Pl. 5, figs. 1-4.

Type data.–Type(s) of *perita* from France, no longer in existence (Roewer 1960:673); species identified from original description and from subsequent published descriptions. Male and female syntypes of *picta* from Nürnberg, Germany, not located. Three female syntypes of *lynx* from Nürnberg, Germany, not located. Type(s) of *filicata* from France, not located. Type(s) of *arenicola* from Gironde and Landes, France, not located. Female holotype, two male paratypes, and one female paratype of *latithorax* from S. Rossore, Pisa, Italy, May 3 1963 (Tongiorgi), in Museo di Storia Naturale di Genova, not examined.



Figs. 46-56.–Genitalia of *Arctosa* spp.: 46-49, *A. perita* (Latreille); 46, epigynum; 47, 48, palpi of male, 47, ventral view, 48, retrolateral view; 49, spermathecae; 50-56, *A. minuta* F. Pickard-Cambridge; 50, epigynum; 51, 53, 56, spermathecae; 52, 54, 55, palpi of male, 52, 54, ventral view, 55, retrolateral view.

Male.–Total length 5.3-6.3 mm. Carapace 3.01 - 3.40 mm long and 2.15 - 2.59 mm wide (five specimens). Carapace brown or dark brown, with black radiating lines, and with irregular pale median area and pale submarginal spots, sparsely covered with pale setae. Anterior row of eyes straight or slightly procurved, nearly as long as middle row, with median eyes slightly larger than lateral eyes. Chelicerae dark brown; promargin of fang furrow with two or three teeth. Sternum dark brown to black. Legs pale yellow brown, with dark rings on femora, tibiae, and basitarsi, with sparse scopulae; femur I with three dorsal macrosetae, one prolateral near tip; tibia I with no dorsal macrosetae, two prolaterals, no retrolaterals; basitarsus I with one or two prolateral macrosetae (exclusive of any at tip), no retrolaterals (exclusive of any at tip); tibia III with one dorsal macroseta plus a basal bristle. Abdomen dark brown to black, mottled with yellow brown; heart mark pale brown or yellow brown; venter pale brown, sometimes with broad dusky longitudinal band. Terminal apophysis of palpus with basal area sclerotized (Fig. 47); embolus long, nearly straight; median apophysis elongate, not tapered, with deep channel along distal surface (Figs. 47, 48).

Female.–Total length 7.4 - 7.5 mm. Carapace 3.06, 3.31 mm long and 2.22, 2.48 mm wide (two specimens). General structure and color essentially as in male. Epigynum with median septum slender anteriorly and gradually widening posteriad (Fig. 46). Copulatory tubes thick, curved; spermathecae bulbous (Fig. 49).

Diagnosis.–*A. perita* is unique among the American species of *Arctosa* in having a combination of dark sternum, no retrolateral macrosetae on tibia and basitarsus I (exclusive of any at tip of basitarsus), simple setae covering the abdominal heart mark, the anterior median eyes only slightly larger than the anterior lateral eyes, and a gradually widened epigynal septum. The small size is also diagnostic value. *A. perita* appears to have been recently introduced into the American fauna.

Range.–Vancouver, British Columbia; Europe, Asia, North Africa.

Natural history.–In Europe, *A. perita* is found in sand dunes and sandy heaths, where the females make their silk-lined burrows. Wiebes (1959) gives the period of maturity as August to the following May, with mating in April and May. The British Columbia specimens were collected on open ground on Burnaby Mountain in late May.

Arctosa minuta F. Pickard-Cambridge
Figs. 50-56; Map 7

Arctosa minuta F. Pickard-Cambridge, 1902:331, Pl. 31, figs. 26, 27; Bonnet 1955:654; Roewer 1955:230.

Arctosa cheluncata Petrunkevitch, 1925:177, figs. 94-96; Bonnet 1955:643. NEW SYNONYM. *Arkalosula cheluncata*: Roewer 1955: 232.

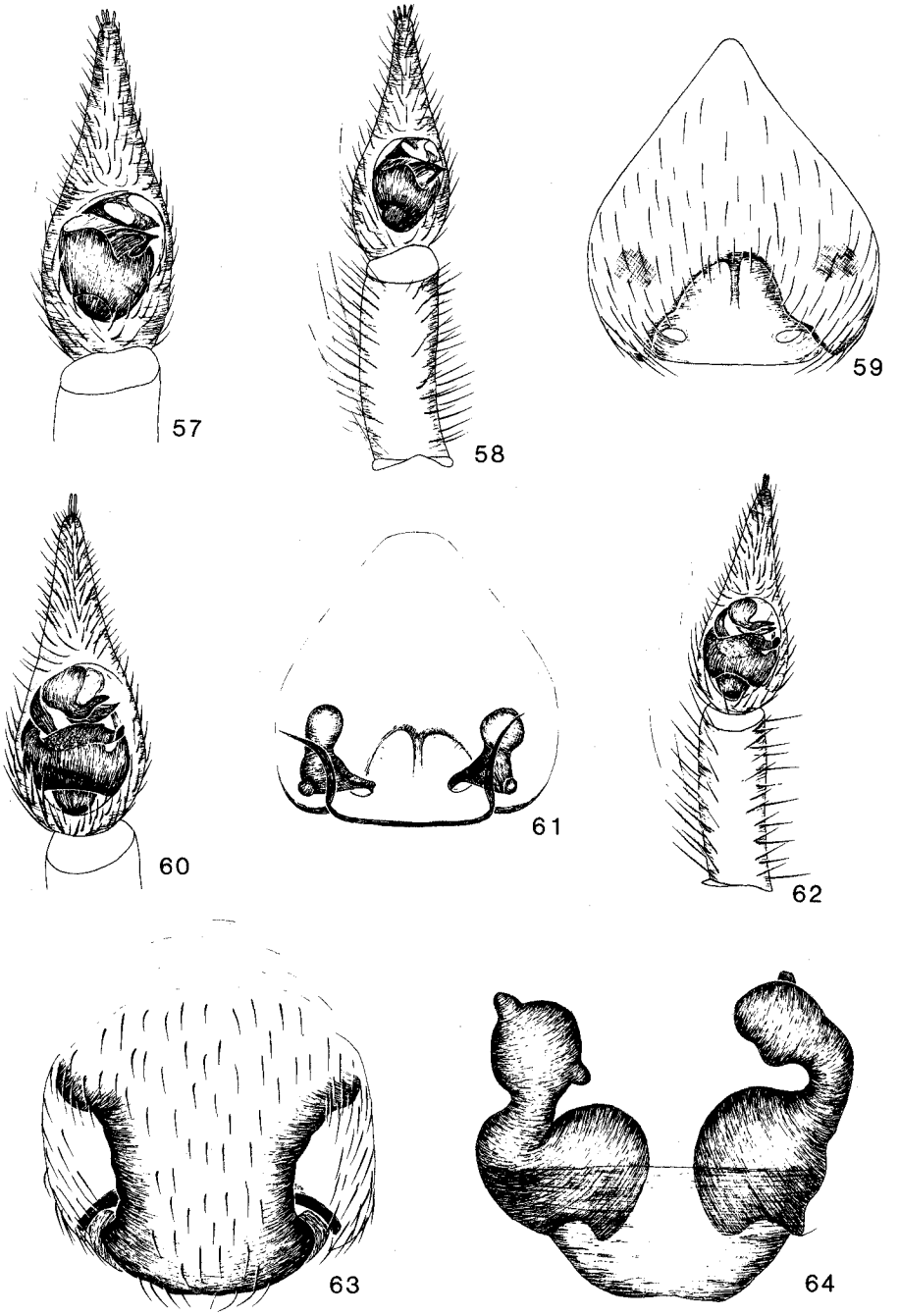
Type data.–Male holotype and female allotype of *minuta* from Guatemala (Sarg), in BMNH, examined. One female syntype of *cheluncata* from Remedios, Panama, in PMNH, examined; two male, three female, and one juvenile syntype of *cheluncata* from Santiago, Panama, in PMNH, examined; one male, one female, and one juvenile syntype of *cheluncata* from Wilcox camp, San Lorenzo River, Panama, in PMNH, examined; one juvenile syntype of *cheluncata* from La Mesa, Panama, in PMNH, examined.

Male.–Total length 4.8 - 8.0 mm. Carapace 3.53 ± 0.40 mm long and 2.66 ± 0.29 mm wide (12 specimens). Carapace pale yellow, mottled with pale to dark brown, with few pale setae. Anterior row of eyes slightly procurved, nearly as long as middle row, with

median eyes larger than lateral eyes. Chelicerae pale to dark brown, often with large pale spot on basal half; promargin of fang furrow with two teeth; fang with prominence on outer surface. Sternum pale yellow. Legs yellow to yellow brown, with brown rings on most segments, with sparse scopulae; femur I with three dorsal macrosetae, one or two prolaterals near tip; tibia I with no dorsal macrosetae, two prolaterals, two retrolaterals; basitarsus I with three prolateral macrosetae (exclusive of any at tip), two or three retrolaterals (exclusive of any at tip); tibia III with two dorsal macrosetae. Abdomen pale yellow to yellow brown, mottled with dusky brown; heart mark and venter pale yellow. Terminal apophysis of palpus with broad distal part and thin, flat, curved basal part (Fig. 54); embolus short, curved; median apophysis with broad, thin process directed ventrad (Figs. 54, 55).

Female.—Total length 7.0 - 9.0 mm. Carapace 4.02 ± 0.36 mm long and 3.09 ± 0.28 mm wide (20 specimens). General structure and color essentially as in male, but anterior row of eyes sometimes straight and equal in length to middle row. Epigynum with short, broad median septum (Fig. 50). Copulatory tubes short, stout; spermathecae bulbous (Figs. 51, 53, 56).

Map 7.—Geographical distribution of *Arctosa* spp.: *A. perita* (Latreille), open star; *A. minuta* F. Pickard-Cambridge, circles; *A. sanctaerosae* Gertsch and Wallace, solid stars; *A. serii* Roth and Brown, triangles.



Figs. 57-64.–Genitalia of *Arctosa* spp.: 57-59, 61, *A. serii* Roth and Brown; 57, 58, palpi of male, ventral view; 59, epigynum; 61, spermathecae; 60, 62-64, *A. sanctaerosae* Gertsch and Wallace; 60, 62, palpi of male, ventral view; 63, epigynum; 64, spermathecae.

Diagnosis.–Specimens of *A. minuta* are distinguished from those of other species by the combination of two well developed dorsal macrosetae on tibia III, the broad, thin process on the median apophysis of the male palpus, and the short, broad median septum of the epigynum.

Range.–Southern Texas through Mexico and Central America to Colombia and Guyana.

Natural history.–The type-series was collected under stones in drying stream beds. Adults were collected from late March to the end of May.

Arctosa sanctaerosae Gertsch and Wallace
Figs. 60, 62-64; Map 7

Arctosa sanctae-rosae Gertsch and Wallace, 1935:5, figs. 23, 24.
Arctosa sanctaerosae: Bonnet 1955:661.
Arkalosula sanctae-rosae: Roewer 1960: 761.

Type data.–Male holotype, female allotype, and male and female paratypes from Santa Rosa Island, Pensacola, Florida, April 5 1934 (H. K. Wallace), in AMNH, examined.

Male.–Total length 8.2 - 13.2 mm. Carapace 5.69 ± 0.44 mm long and 4.12 ± 0.45 mm wide (19 specimens). Carapace pale orange to off-white, not mottled, with few pale setae. Anterior row of eyes straight or slightly recurved, distinctly shorter than middle row, with median eyes twice as large as lateral eyes. Chelicerae pale orange or off-white; promargin of fang furrow with three teeth. Sternum pale orange or off-white. Legs pale orange or off-white, without dark rings, with rather dense scopulae; femur I with three dorsal macrosetae, one prolateral near tip; tibia I with one dorsal macroseta, two prolaterals, two retrolaterals; basitarsus I with three prolateral macrosetae (exclusive of any at tip), three retrolaterals (exclusive of any at tip); tibia III with one dorsal macroseta plus a basal bristle. Abdomen chalk white, with pale orange heart mark; venter white. Terminal apophysis of palpus with large, soft distal part and slender, curved basal part (Fig. 60); embolus long, curved; median apophysis long, with curved tip, and with groove along distodorsal surface.

Female.–Total length 10.9 - 12.0 mm. Carapace 5.44 ± 0.52 mm long and 3.89 ± 0.37 mm wide (19 specimens). General structure and color essentially as in male. Epigynum with large, convex median septum (Fig. 63). Copulatory tubes thick; spermathecae bulbous (Fig. 64).

Diagnosis.–Specimens of *A. sanctaerosae* are distinguished from those of other species of *Arctosa* by the pale orange (or white) body and legs, by the presence of a dorsal macroseta on tibia I, and by the broad, convex median septum and stout copulatory tubes.

Range.–Gulf of Mexico coast from Mississippi to the Florida panhandle.

Natural history.–*A. sanctaerosae* lives on sandy beaches.

Arctosa littoralis (Hentz)
Figs. 65-74; Map 8

Lycosa littoralis Hentz, 1844:388, Pl. 17, fig. 9.
Lycosa maritima Hentz, 1844:389, Pl. 17, fig. 10.
Lycosa cinerea:Emerton 1885:488, Pl. 47, figs. 3, 3a, 3b; 1902:73, figs. 177, 178; Montgomery 1902:555, Pl. 29, figs. 17, 18; Chamberlin 1908:281, Pl. 20, fig. 6.

Trochosa cinerea: Stone 1890:428; Montgomery 1904:305, Pl. 20, fig. 43.
Arctosa trifida: F. Pickard-Cambridge, 1902:330, Pl. 31, figs. 24, 25; Gertsch and Wallace 1935:5; Bonnet 1955:661; Roewer 1955:231. NEW SYNONYM.
Arctosa panamana Petrunkevitch, 1925:179, fig. 97; Banks 1929:83; Bonnet 1955:655. NEW SYNONYM.
Arctosa littoralis: Gertsch 1934:7; 1935:19; Gertsch and Davis 1940:6; Kaston 1948:320, Pl. 53, fig. 1050, Pl. 55, figs. 1070, 1071; 1978:189, fig. 481; Levi and Field 1954:455; Bonnet 1955:653; Roth and Brown 1976:61, figs. 3, 6, 8.
Arctosa cinerea: Roewer 1955:227 (in part).
Arkalosula panamana: Roewer 1955:232.

Type data.–Type(s) of *littoralis* from North Carolina, April, no longer in existence; species identified from original description and illustration. Type(s) of *maritima* from Bear Island, St. Helena Bay, South Carolina and from Salem, Massachusetts, no longer in existence. Male holotype of *trifida* from Teapa, Mexico (H. S.), not located; two female paratypes of *trifida* from Teapa, Mexico, in MBNH, examined; paratypes of *trifida* from Santa Ana and Guatemala City, Guatemala, not located. Female holotype of *panamana* from Remedios, Panama, February 27 1924 (A. and W. Petrunkevitch), in PMNH, examined.

Male.–Total length 9.6 - 12.8 mm. Carapace 6.06 ± 0.63 mm long and 4.69 ± 0.49 mm wide (20 specimens). Carapace pale, with lateral areas mottled and marked with pale longitudinal band and with pale spot near each leg base (as in fig. 66), with few pale setae. Anterior row of eyes straight or slightly procurved, slightly shorter than middle row, with median eyes about twice as large as lateral eyes (Fig. 65). Chelicerae dark red brown; promargin of fang furrow with two teeth; fang with prominence on outer surface. Sternum pale yellow or pale brown. Legs yellow brown, darker distally, usually with faint brown rings, and with sparse scopulae; femur I with three dorsal macrosetae, two prolaterals near tip; tibia I with no dorsal macrosetae, two prolaterals, two retrolaterals; basitarsus I with three prolateral macrosetae (exclusive of any at tip), two or three retrolaterals (exclusive of any at tip); tibia III with one dorsal macroseta plus a basal bristle, and with three retrolaterals. Abdomen yellow to yellow brown, with light brown heart mark and with brown reticulations; venter pale yellow. Terminal apophysis of palpus with long, narrow sclerotized part lying parallel with embolus; embolus long, straight, deeply grooved; median apophysis long, stout, strongly angled basad near tip (Figs. 69, 73).

Female.–Total length 11.2 - 14.7 mm. Carapace 6.08 ± 0.51 mm long and 4.88 ± 0.42 mm wide (20 specimens). General structure and color essentially as in male but chelicerae lacking outer prominence, and leg scopulae more dense (particularly on leg I). Epigynum variable, with median septum usually broad, concave at sides (Figs. 67, 68, 70, 71). Copulatory tubes short, thick; spermathecae bulbous (Figs. 72, 74).

Diagnosis.–Specimens of *A. littoralis* resemble those of *A. minuta, A. sanctaerosae,* and *A. serii* in having the anterior median eyes distinctly larger than the anterior lateral eyes. They differ from those of *minuta* by possessing only one dorsal macroseta (plus a basal bristle) on tibia III, from those of *sanctaerosae* by having only two teeth on the promargin of the cheliceral fang furrow, and from those of *serii* by having two prolateral macrosetae near the tip of femur I, three retrolateral macrosetae on tibia III, and (usually) dark rings on the legs. Males of *littoralis* further differ from those of the other species mentioned by the long narrow terminal apophysis on the palpus, and females further differ by the broad, laterally-concave median septum of the epigynum.

Range.–Interior British Columbia to Nova Scotia, south to Panama.

Natural history.–Specimens of *A. littoralis* are found, at night, running on beaches; Stone (1890) observed them in the wake of retreating breakers in New Jersey. They

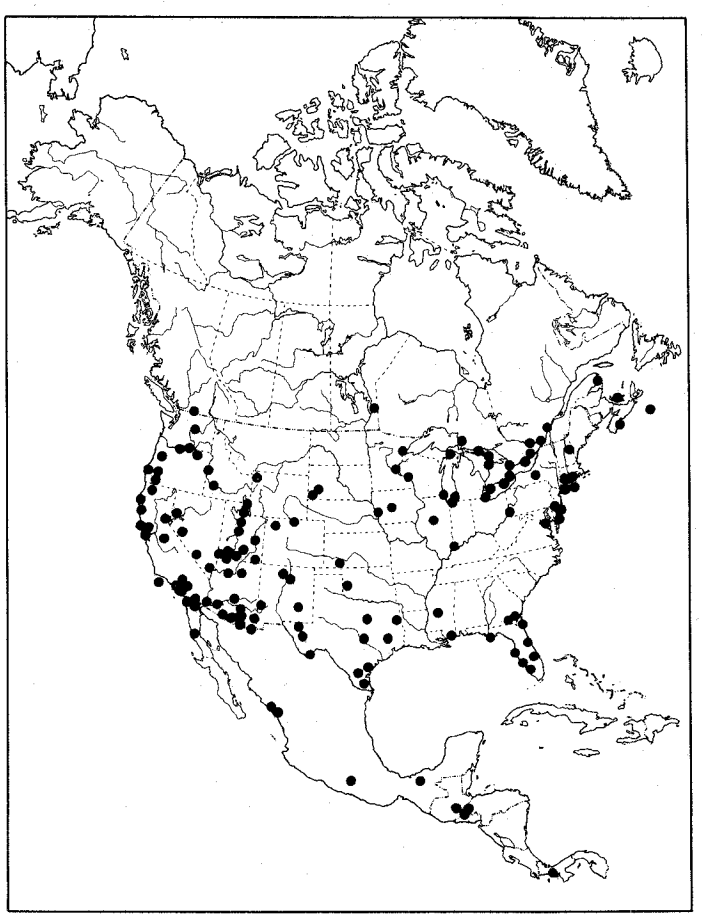
ensconce themselves under driftwood during daylight hours. Kaston (1948) observed the burrows, which are 15-25 cm deep. Adults have been collected from February to November.

Arctosa serii Roth and Brown
Figs. 57-59, 61; Map 7

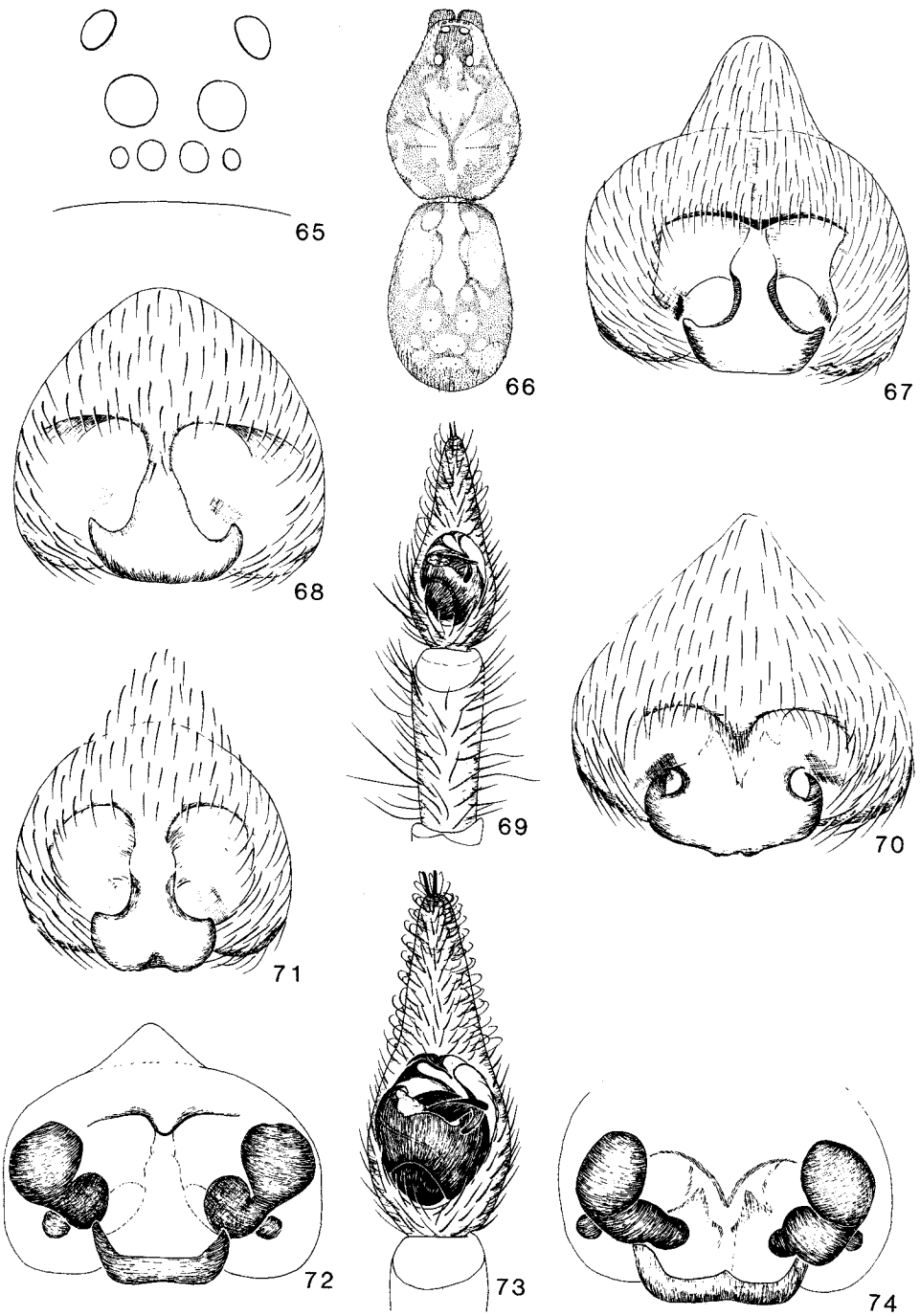
Arctosa littoralis: Chamberlin 1924:673 (in part).
Arctosa serii Roth and Brown, 1976:61, figs. 1, 2, 4, 5, 7.

Type data.–Male holotype, female allotype, and male and female paratypes from El Desemboque, Sonora, Mexico, March 4 1974 (H. Flanders), in AMNH, examined; paratypes from San Pedro Bay, Sonora, in AMNH, examined.

Male.–Total length 11.0 - 12.0 mm. Carapace 6.46 ± 0.39 mm long and 4.79 ± 0.35 mm wide (11 specimens). Carapace pale yellow to orange, with few darker radiating lines, sometimes with faint brown mottling on lateral areas, with few pale setae. Anterior row of eyes straight or slightly procurved, somewhat shorter than middle row, with median eyes about twice as large as lateral eyes. Chelicerae dark red brown; promargin of fang



Map 8.–Geographical distribution of *Arctosa littoralis* (Hentz).



Figs. 65-74.–Structures of *Arctosa littoralis* (Hentz): 65, eyes, frontal view; 66, body of female, dorsal view; 67, 68, 70, 71, epigyna; 69, 73, palpi of male, ventral view; 72, 74, spermathecae.

furrow with two teeth; fang with prominence on outer surface. Sternum pale yellow to yellow brown. Legs straw yellow, without dark rings, with sparse scopulae; femur I with three dorsal macrosetae, one prolateral near tip; tibia I with no dorsal macrosetae, two prolaterals, two retrolaterals; basitarsus I with three prolateral macrosetae (exclusive of any at tip), three retrolaterals (exclusive of any at tip); tibia III with one dorsal macroseta (lacking basal bristle), two retrolaterals. Abdomen pale to bright yellow, with pale brown heart mark and a few brown or dusky lateral marks; venter pale yellow. Terminal apophysis of palpus broad, bladelike, tapered abruptly at tip (Fig. 57); embolus long, broad, grooved; median apophysis long, stout, strongly angled near tip (Fig. 57).

Female.—Total length 12.0 - 14.4 mm. Carapace 6.39 ± 0.53 mm long and 4.79 ± 0.42 mm wide (20 specimens). General structure and color essentially as in male, but cheliceral fang lacking prominence on outer surface. Epigynum with incomplete median septum (Fig. 59). Copulatory tubes broad, swollen on lateral side; spermathecae bulbous (Fig. 61).

Diagnosis.—Specimens of *A. serii* resemble those of *A. minuta, A. sanctaerosae*, and *A. littoralis* in having the anterior median eyes distinctly larger than the anterior lateral eyes. They differ from those of *minuta* in having only one dorsal macroseta on tibia III, from those of *sanctaerosae* by having only two teeth on the promargin of the cheliceral fang furrow, and from those of *littoralis* in having only one prolateral macroseta on femur I, only two retrolateral macrosetae on tibia III, and no dark rings on the legs. Males of *serii* further differ from those of the other species by the broad, bladelike, abruptly - tapered terminal apophysis on the palpus, and females further differ by the incomplete median septum of the epigynum.

Range.—Shores of the Gulf of California.

Natural history.—Roth and Brown (1976) state that *A. serii* is found only at the drift line of beaches.

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