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Nearctic species of the new genus *Tigrosa* (Araneae: Lycosidae)

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Abstract. The new genus *Tigrosa* is established for five Nearctic species originally described in the genus *Lycosa* Latreille 1804. Four of the species are transferred from *Hogna* Simon 1885: *H. annexa* (Chamberlin & Ivie 1944), *H. aspersa,* (Hentz 1844), *H. grandis* (Banks 1894) and *H. helluo* (Walckenaer 1837). The remaining species, *Allocosa georgicola* (Walckenaer 1837) is transferred from *Allocosa* Banks 1900. The presumed synapomorphy that supports *Tigrosa* is the color pattern on the dorsum of the cephalothorax, which is described and illustrated. In addition to their distinct color pattern, *Tigrosa* species are very similar in characteristics of the male palpus and epigynum, details of the eye arrangement, leg length in relation to body dimensions, as well as foraging habits. Comparisons made between *Hogna,* as defined by the type species *H. radiata,* Latreille 1817, and *Tigrosa,* as defined in this paper, demonstrate distinct differences in dorsal color pattern, structure of the epigynum, dimensions of the eye rows, color pattern of the venter and habitat preferences.

Keywords: *Lycosa*, *Hogna*, systematics, nomenclature, zoogeography

This is the fourth paper in a projected series of systematic studies of the Nearctic Lycosidae, formerly described in the genus *Lycosa* Latreille 1804. Over 50 species of medium to large wolf spiders from the Nearctic region were previously placed in this genus. Dondale & Redner (1990) pointed out that "none of the North American species belong to the genus *Lycosa* (in the restricted European sense)." According to Zyuzin & Logunov (2000) the genus *Lycosa* should be restricted to a group of large burrowing wolf spiders in the Mediterranean region; therefore, the genus *Lycosa* does not occur in North America. Dondale & Redner (1990) placed seven Canadian species, previously recognized as *Lycosa,* in the genus *Hogna* Simon 1885. In that paper they indicated that *Hogna* might eventually need to be separated into two or more genera. *Hogna rabida* (Walckenaer 1837) and *Hogna punctulata* (Hentz 1844), together with three other species originally described in *Lycosa,* were assigned by Brady & McKinley (1994) to *Rabidosa* Roewer 1954. The dorsal color pattern of the cephalothorax and abdomen was the presumed synapomorphy that connected these five species and separated them from other large lycosids. A number of shared characteristics described by Brady & McKinley (1994) also served as a basis for the recognition of *Rabidosa* as a distinct genus.

Since the publication by Dondale & Redner (1990), many of the large lycosids formerly described in the genus *Lycosa* have been considered to belong to the genus *Hogna.* Because of the paramount position of the Mediterranean *Lycosa radiata* Latreille 1817 as the type species of the genus *Hogna,* a clear definition and description of this species is critical to understanding the relationship of this species to many large wolf spiders in North America. Dondale & Redner (1990) distinguished *Hogna* from other genera of lycosids by the following characteristics: "carapace uniform in height; cymbium with 2 or more terminal macrosetae; embolus with large arch at base; terminal apophysis sickle-shaped and often double; and median apophysis with spur at base." Thus, the genus *Hogna* is diagnosed chiefly by characteristics of the male palpus. In the past 25 years of my study of large Lycosidae, primarily from North America, but also including European, Central American, South American and Australian species, I have found that the palpal characteristics used by Dondale & Redner (1990) to define *Hogna* are world wide in distribution and occur in species that are distinctly different in other aspects of their morphology and biology. The structure of the palpus in many large lycosids previously described in *Lycosa* is structurally conservative and consequently plesiomorphic within the subfamily Lycosinae. Therefore, additional morphological characteristics as well as other biological and zoogeographical features need to be examined in order to determine evolutionary relationships and define genera within the Lycosidae.

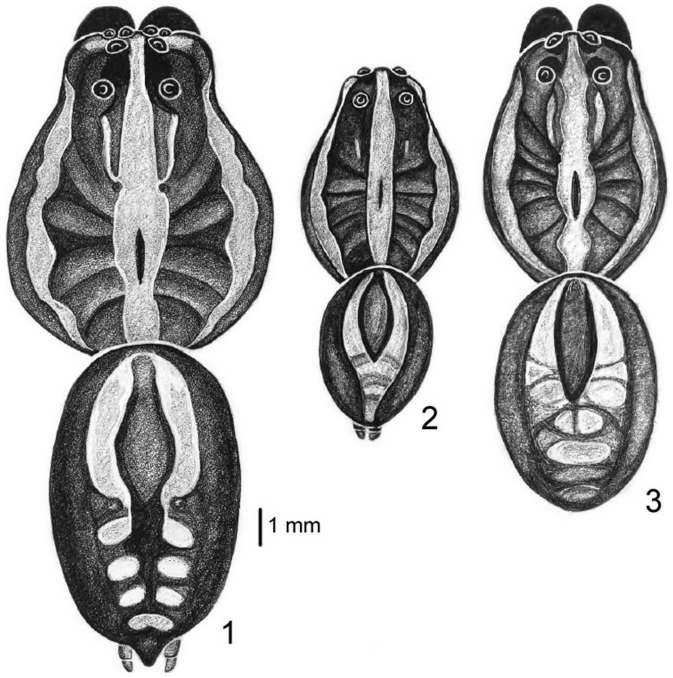
Because of their importance as the type species of *Hogna*, in 2006 I requested specimens of *Lycosa radiata* from the Natural History Museum in London and the Muséum national d'Histoire naturelle in Paris. After carefully examining and drawing a number of these specimens identified as *Lycosa radiata* Latreille, it became apparent that at least two different species were represented in these collections. Ultimately I carefully studied and decided upon ten females and ten males from localities in Western Europe, primarily from France and the Island of Minorca, as representatives of *H. radiata*. These specimens were used for descriptions, measurements and illustrations to present a morphological view of the Mediterranean genus *Hogna* in order to compare it to the North American genus *Tigrosa.* Specimens from Africa and other Mediterranean localities that clearly represented a different species were rejected as examples of *H. radiata.* From my study of the above museum collections, it became very doubtful in my mind that the geographical range of *H. radiata* should include central African specimens, and perhaps even those from central Asia. A thorough study of European, Asian and African specimens now considered as *Hogna radiata,* should definitely reveal at least two distinct species, and probably more. It is not the purpose of this paper to solve this systematic problem, but simply to distinguish the genus *Tigrosa* from *Hogna.* For that purpose 20 specimens identified as *Hogna radiata* from the British Museum of Natural History and the Muséum national d'Histoire naturelle were used to provide a systematic account of this species. It became apparent from this investigation that *Hogna radiata* is not closely related to the species in North America described here as the new genus *Tigrosa*.

The new genus *Tigrosa* embraces five species: *Hogna annexa* (Chamberlin & Ivie 1944), *Hogna aspersa* (Hentz 1844), *Allocosa georgicola* (Walckenaer 1837), *Hogna helluo* (Walckenaer 1837) and *Hogna grandis* (Banks 1894), all previously assigned to *Lycosa*. The primary characteristic uniting these five species and distinguishing them from other species groups formerly described in *Lycosa* and *Hogna* is the dorsal color pattern on the cephalothorax. In addition these five species are alike in characteristics of the female genitalia and male palpus, details of the eye arrangement, color pattern of the venter, body structure (including the ratio of leg length to carapace width) and foraging habits. Except for certain features of the palpal structure, all of these characteristics clearly separate the new genus *Tigrosa* from *Hogna.*

Because of their widespread distribution and geographic variation as well as individual variation within sympatric populations, the genus *Tigrosa* has proven to be a challenge for various investigators. *Tigrosa annexa* and *T. georgicola* were unknown before Chamberlin & Ivie's (1944) paper on the spiders of the Georgia region. Even in later publications there was considerable confusion about the taxonomic identity of the five species representing the genus *Tigrosa.* Although only five species are recognized in this study, the number of specimens represents about 20% of all the thousands of large lycosids examined during the past 25 years. Various investigations of these large lycosids have been hampered by the lack of an understanding of their systematic relationships. One of the primary goals of this investigation has been to clarify these relationships. Another important consideration was to stabilize the nomenclature of the species described here under *Tigrosa*, and to provide illustrations and a key that would allow their correct identification by lay persons and arachnologists interested in ecology and behavior rather than systematics per se.

METHODS

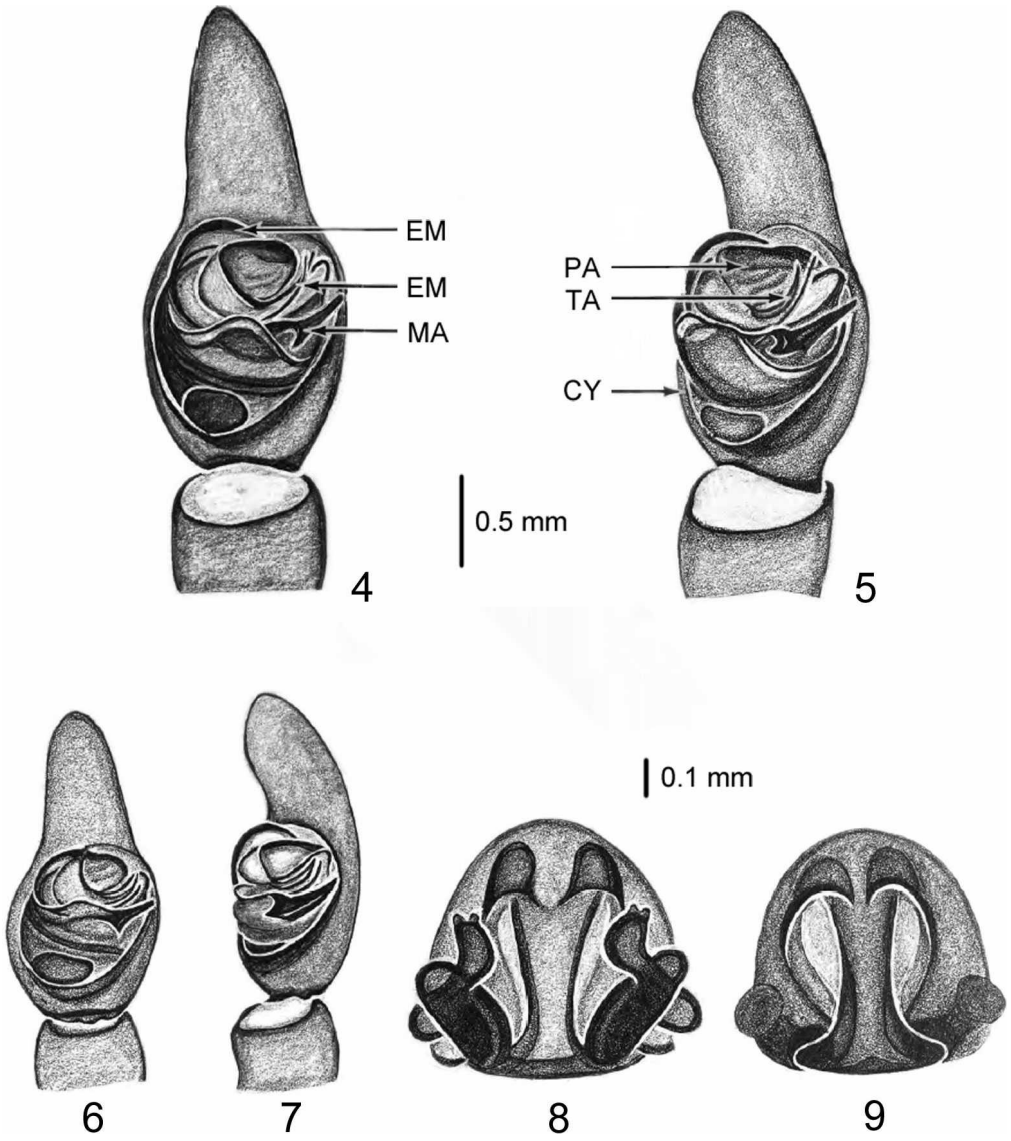
All measurements are in millimeters. Scales for drawings are provided for each illustration. The scales for dorsal views represent 1 mm (Fig. 1), the scales for views of the male palpi represent 0.5 mm (Fig. 4), and the scales for views of the female genitalia represent 0.1 mm (Fig. 8). A net micrometer (1.0 mm) was used in an ocular lens (8×) with a combination of low (1×) and high (4×) power objectives for making measurements. The higher power combination was used to measure the eye rows and was determined to be accurate to 0.2 units of the micrometer grid or 0.066 mm. Therefore, in comparing dimensions of eye rows, the eye rows are considered subequal if they are less than 0.07 mm different. The lower power combination was used in measuring the body dimensions and leg segment lengths and was determined to be accurate to 0.2 units of the micrometer grid or 0.266 mm. Therefore, in comparing body dimensions and leg segment lengths, these structures are considered subequal if they are less than 0.27 mm different. Brady (1979) described in detail the rationale and procedures for measurements and illustrations. Color descriptions and illustrations are based upon observations of specimens preserved and submerged in 75–80% ethanol under low power of a Leitz dissecting microscope. Illumination was provided by a Reichert microscope light. Tibial spination has been found to show little variation within the same sex of congeneric species of large North American lycosid genera that I have examined, and therefore has not been noted in this paper.



Figures 1–3.—Dorsal view of *Tigrosa annexa*: 1. Large male from Washington County Mississippi; 2. Small male from 1 mi. [1.6 km] E of Union, Newton County, Mississippi; 3. Female from 2 mi. [3.2 km] N of Stoneville, Washington County, Mississippi.

Geographic localities.—In order for investigators to navigate distribution records under Species Examined, I have tried to present geographic localities as accurately and concisely as possible. States of North America are listed from North to South and East to West. There are three different types of entries under States exemplified by the following: 1) Single record: Ottawa Co., Grand Haven (43.00°N, 86.23°W), 30 September 1968, W. Defeyter, HCC, 1♀; 2) Multiple records, same locality, same collector: Emmet Co., Bayview (45.39°N, 84.93°W), 21 July 1937, 1♀, 14 July 1938, 1♀, 10 July 1941, A.M. Chickering, MCZ, 1♀, and 3) County only: Washtenaw Co. (42.25°N, 83.84°W) A.M. Chickering, MCZ, 1♀. The geographical coordinates listed for Counties only are those of the county seat.

Abbreviations.—*Collections:* AMNH = American Museum of Natural History, New York; BMNH = The Natural History Museum, London; DMNS = Denver Museum of Nature and Science, Denver, Colorado; FSCA = Florida State Collection of Arthropods, Gainesville; HCC = Hope College Collection, Holland, Michigan; MCZ = Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; MNHP = Muséum national d'Histoire naturelle, Paris; MSST = Mississippi State University Collection, Starkville, Mississippi; MWSU = Midwestern State University, Wichita Falls, Texas. *Morphological*: Eye Arrangement: AME = anterior eyes, ALE = anterior lateral eyes, PME = posterior median eyes, PLE = posterior lateral eyes, POQ = posterior ocular quadrangle. Male: CY = cymbium; EM =



Figures 4–9.—*Tigrosa annexa*: 4, 5. Large male from Washington County, Mississippi; 4. Left palpus, ventral view; 5. Left palpus, retrolateral view. 6, 7. Small male from 1 mi. [1.6 km] E of Union, Newton County, Mississippi; 6. Left palpus, ventral view; 7. Left palpus, retrolateral view. 8, 9. Female from Washington County, Mississippi; 8. Vulva, dorsal view; 9. Epigynum, ventral view.

embolus; MA = median apophysis; PA = palea; TA = terminal apophysis. Female: MS = median septum; LP = longitudinal piece; SP = spermathecae, TP = transverse piece. *Records*: The lower case "i" is used to indicate immature specimens.

SYSTEMATICS

Tigrosa new genus

L*ycosa* Walckenaer 1837:337, 338 (part); Hentz 1844:389; Blackwall 1846: 30; Emerton 1885:482, 487; Stone 1890:423; Banks 1892:66–68, 1894:49; Tullgren 1901:18; Emerton 1902:59; Montgomery 1902:557, 559; 1904:290; Chamberlin 1904:286, 1908:26, 234, 236; Comstock 1913:633, 1940:645; Gertsch 1934:6; Muma 1943:46; Wallace 1950:74; Roewer 1955:210; Bonnet 1957:2621; Griswold 1993:3.

Tarentula Blackwall 1846:30 (part); C.L. Koch 1847:135; Simon 1864:350; Keyserling 1877:634; McCook 1879:xi.

Leimonia Simon 1864:351 (part).

Trochosa Keyserling 1877:659 (part).

Allocosa, Roewer 1955:210 (part).

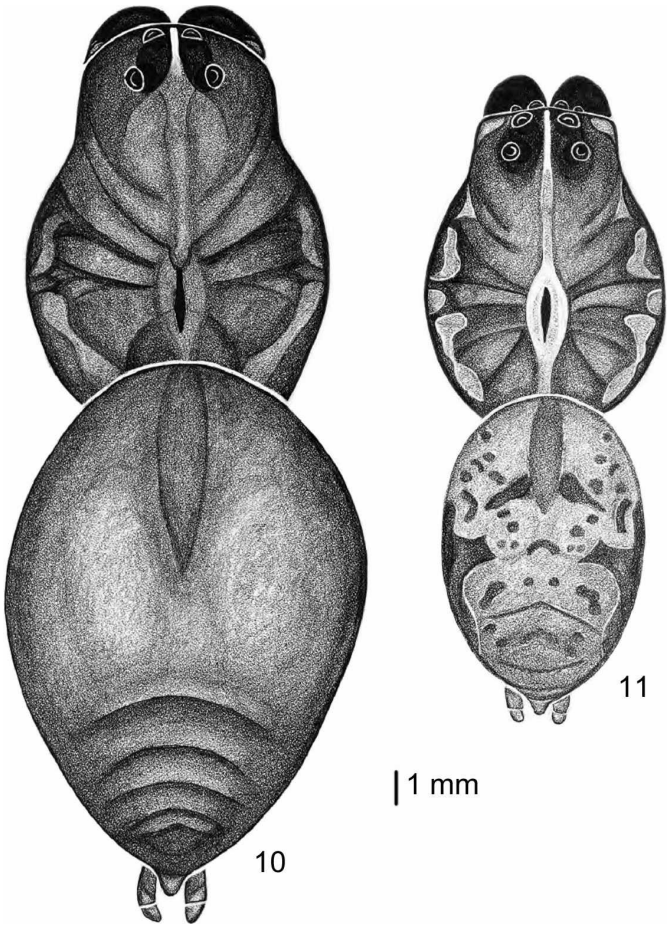
Geolycosa Roewer 1955:244 (part).

Hygrolycosa, Roewer 1955:261 (part).

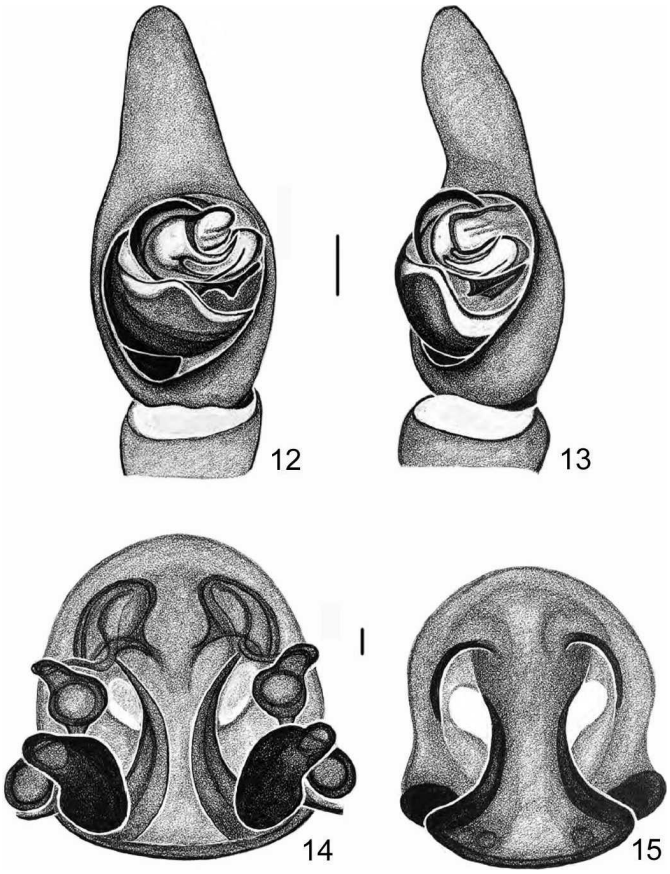
Hogna Roewer 1955:358, 359 (part); Dondale & Redner 1990:49–51; Bennet 1992:42–43; Paquin & Duperre 2003:161; Slowik & Cushing 2009:261; Platnick 2011.

Type species.—*Tigrosa helluo* (Walckenaer 1837)

Etymology.—The generic name is derived from the iconic mammal, the tiger, because of the fierce nature of the species found in *Tigrosa* and in recognition of the stripes on the dorsal surface of the body and contrasting dark and light markings on the legs of most species. According to Don Cameron (2005) the genus name *Lycosa* is the feminine singular present participle of a verb meaning "fierce like a



Figures 10–11.—Dorsal view of *Tigrosa aspersa*: 10. Female from Imboden, Lawrence County, Arkansas; 11. Male from Imboden, Lawrence County, Arkansas.

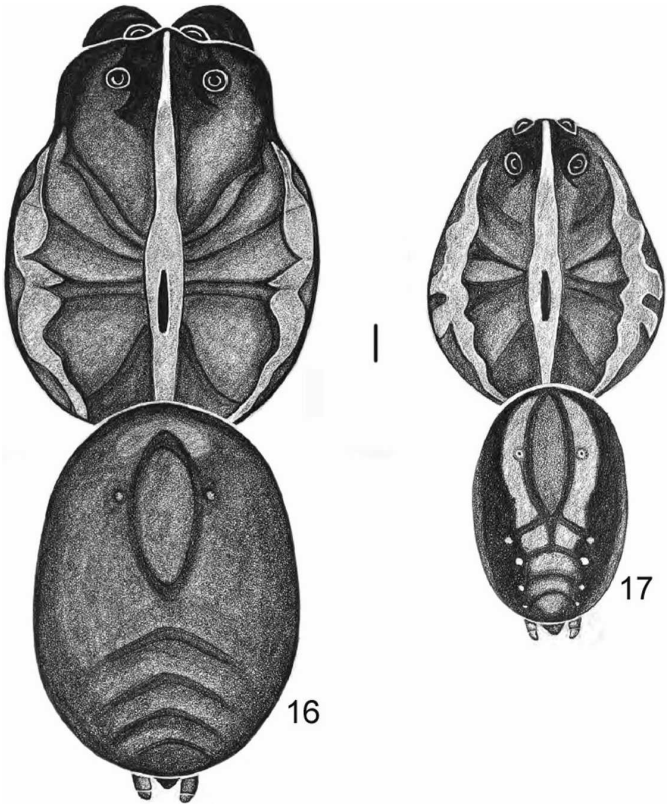


Figures 12–15.—*Tigrosa aspersa*: 12, 13. Male from Imboden, Lawrence County, Arkansas; 12. Left palpus, ventral view; 13. Left palpus, retrolateral view. 14, 15. Female from Imboden, Lawrence County, Arkansas: 14. Vulva, dorsal view; 15. Epigynum, ventral view. Scale bars: palpi, 0.5 mm; epigyna, 0.1 mm.

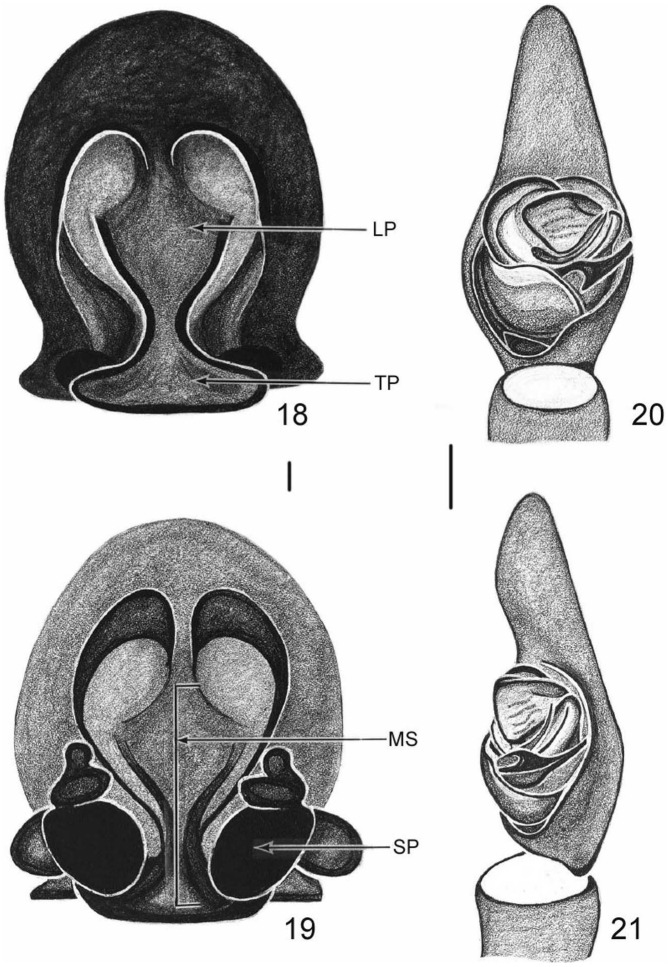
wolf''; therefore, *Tigrosa* can be freely translated as ''fierce like a tiger.''

Diagnosis.—*Tigrosa* is distinguished from other large lycosids by the dorsal color pattern on the carapace that consists of a narrow pale cream to yellow median stripe that extends posteriorly from the AME row to the posterior declivity of the cephalothorax, except in the female of *T. aspersa* where it is limited to the eye region. The median stripe throughout its length is not wider than the space between the PME. In addition broad irregular or scalloped submarginal stripes extend from the posterior cephalic region of the carapace to the posterior declivity. A darker background color on the carapace ranging from light yellowish brown to dark reddish brown provides contrast to the lighter stripes. In addition, distinct black lines radiate from the cephalic groove to the lighter submarginal stripes. The dorsal pattern is best visualized by reference to the illustrations in Figs. 1–3, 10, 11, 16, 17, 22, 23, 28 and 29, which exemplify this synapomorphic feature. *Tigrosa* is also characterized by an inverse T-shaped epigynum, a feature of many lycosine genitalia (Figs. 9, 15, 18, 26, 33) and similar components of the internal female genitalia (Figs. 8, 14, 19, 27, 32). Males of *Tigrosa* all have a well-developed median apophysis with a ventrally directed point or spur. They also exhibit a two-part terminal apophysis, found in many lycosine pedipalps, and similar palea shape (Figs. 6, 7, 12, 13, 20, 21, 24, 25, 30, 31). Species of *Tigrosa* are alike in eye arrangement and are all robust, with stout bodies and long legs (see Tables 1–5). *Tigrosa* differs from *H. radiata*, the type species of *Hogna,* in dorsal color pattern (compare Figs. 1, 10, 16, 22, 28 with Fig. 34), color pattern on the venter (compare Figs. 40–44 with Fig. 45), and certain dimensions of the eye row (compare Tables 1–5 with Table 6).

Remarks.—A brief comparison of *Tigrosa* and *Hogna* is presented here to emphasize differences between these genera. More detailed descriptions of *Hogna* and *Hogna radiata* appear under the diagnosis of *Hogna* later in this paper. In *Tigrosa* the presumed synapomorphy that connects its members is the dorsal pattern on the cephalothorax. It is characterized by a narrow cream to yellow median stripe on the carapace that begins in the AME region and continues to the posterior declivity. This stripe widens in the thoracic area, but its width throughout its length does not exceed the space between the PME (Figs. 28, 29). In *H. radiata* the pale yellow median stripe is much wider, and its width exceeds the space



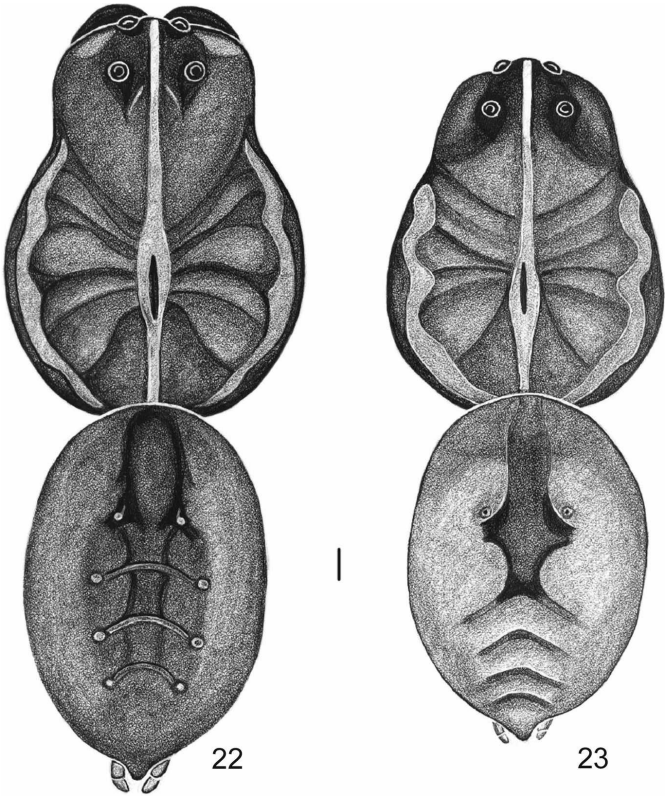
Figures 16, 17.—Dorsal view of *Tigrosa georgicola*: 16. Female from 2 mi. [3.2 km] N of Stoneville, Washington County, Mississippi; 17. Male from 2 mi. [3.2 km] N of Stoneville, Washington County, Mississippi. Scale bar, 1 mm.



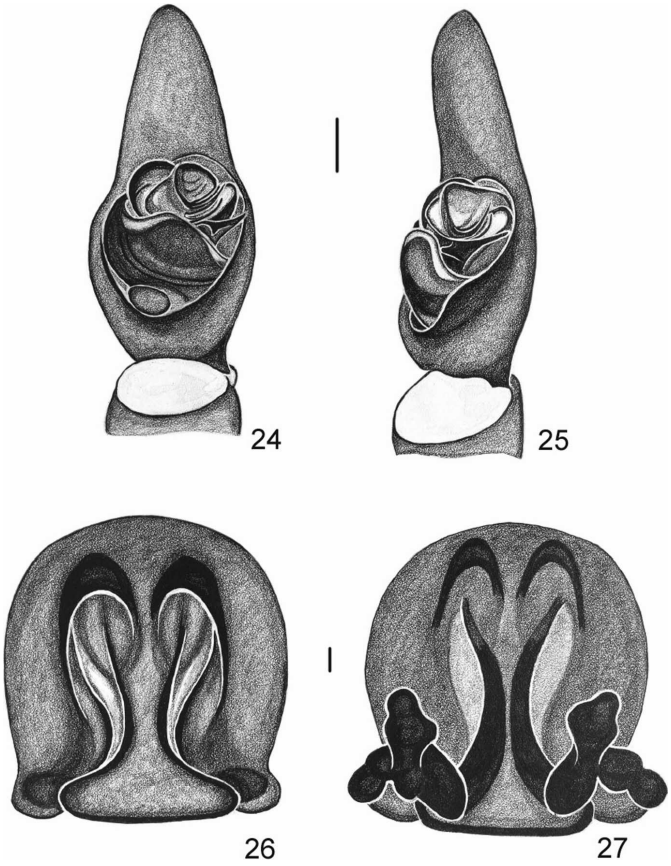
Figures 18–21.—*Tigrosa georgicola*: 18, 19. Female from 2 mi. [3.2 km] N of Stoneville, Washington County, Mississippi. 18. Epigynum, ventral view; 19. Vulva, dorsal view. 20, 21. Male from 2 mi. [3.2 km] N of Stoneville, Washington County, Mississippi. 20. Left palpus, ventral view; 21. Left palpus, retrolateral view. Scale bars: palpi, 0.5 mm; epigyna, 0.1 mm.

between the PME (Figs. 34, 35). *T. helluo* has narrow yellow to yellow-brown submarginal stripes beginning behind the PME row and continuing posteriorly (Figs. 28, 29). In *H. radiata* the pale submarginal stripes begin in the vertical facial area, are broader, and often reach to the margins of the carapace (Figs. 34, 35). The cardiac mark on the dorsum of the abdomen in *T. helluo* is often outlined in dark brown or black (Figs. 28, 29). In *H. radiata* (Figs. 34, 35) the cardiac mark is also outlined in black but includes two distinct black dots along the posterior margin, a condition not found in *Tigrosa.* The ventral surface of the abdomen posterior to the epigastric furrow in *H. radiata* is entirely black (Fig. 45). In *Tigrosa* the venter of the abdomen is usually cream to light brown in overall color with scattered black spots (Figs. 40, 41), without conspicuous black dots or dashes in the central area (Fig. 43), or with spots or dashes arranged in longitudinal rows (Figs. 42, 44). Fundamental differences also occur between *Hogna* and *Tigrosa* in the eye arrangement. For example, the anterior eye row width in *Tigrosa* is subequal to the PME row width (0.17 mm or less difference), but in *Hogna radiata* the anterior eye row width is obviously less than the width of the PME row (0.30 mm or more difference). Also the length of the POQ in *Tigrosa* (with the exception of *T. aspersa*) is equal to the width of the anterior eye row (0.02 mm or less difference), but in *Hogna radiata* the POQ length is greater than the width of the anterior eye row (0.14 mm or more difference). In other words, the eyes in *Tigrosa* are spaced in a different geometric configuration than in *Hogna.* In the epigynum of *H. radiata* (Fig. 39) the LP is longer in proportion to the TP than in *Tigrosa* (Figs. 9, 15, 18, 26, 33), and unlike *Tigrosa*, the sides of the LP are parallel, and there are lateral grooves along the length of the LP.

Description.—Total body length of 100 specimens measured (rounded to mm): females: 10 to 31 mm, males: 11–24 mm; carapace length: females: 6–13 mm, males 6–12 mm; carapace width: females 4–10 mm, males: 4–9 mm. Carapace viewed dorsally: AME row smoothly convex along lateral margins, with posterior margin concave; viewed laterally: essentially the same height from eye region to posterior declivity, highest point at posterior cephalic region in front of dorsal groove with the carapace sloping very slightly anteriorly. Dorsal groove long and distinct. Dorsal color pattern with narrow pale cream to yellow median stripe from PME row to posterior edge of cephalothorax. The pale submarginal stripes have uneven sides with edges scalloped or indented. Lighter stripes surrounded by darker brown to very

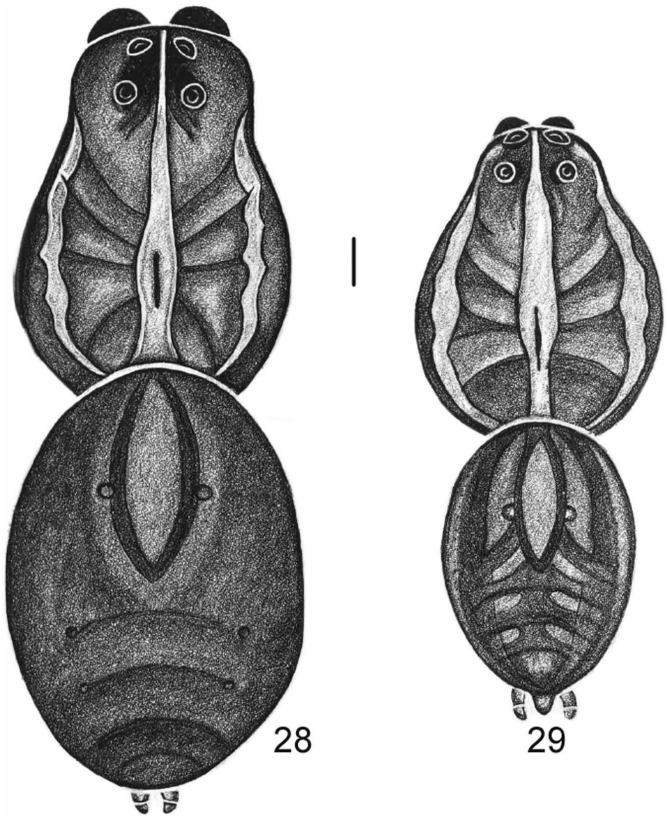


Figures 22, 23.—Dorsal view of *Tigrosa grandis*: 22. Female from Ft. Collins, Larimer County, Colorado; 23. Male from Ft. Collins, Larimer County, Colorado. Scale bar, 1 mm.

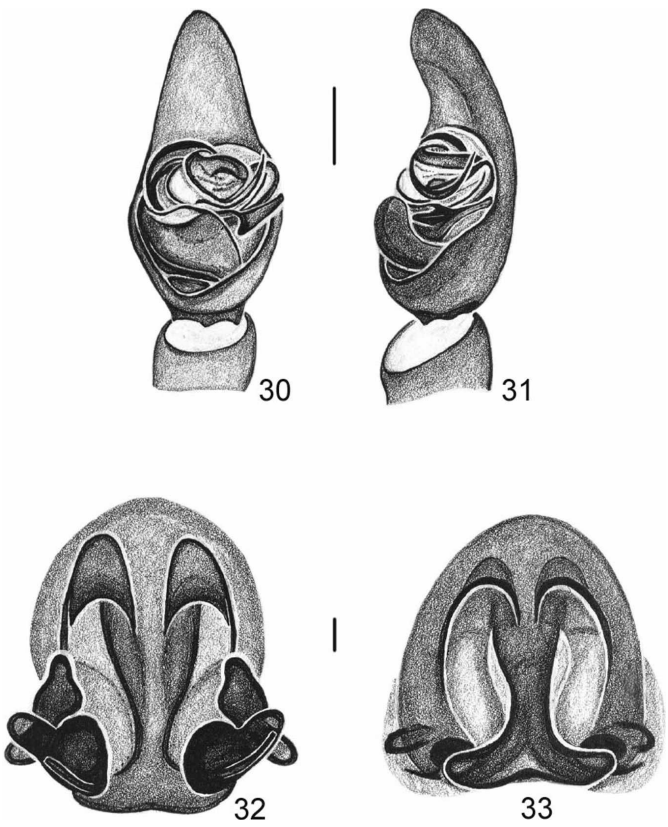


Figures 24–27.—*Tigrosa grandis*: 24, 25. Male from Ft. Collins, Larimer County, Colorado. 24: Left palpus, ventral view; 25. Left palpus, retrolateral view. 26, 27. Female from Ft. Collins, Larimer County, Colorado. 26. Epigynum, ventral view, 27. Vulva, dorsal view. Scale bars: palpi, 0.5 mm; epigyna, 0.1 mm.

dark reddish brown color. AME slightly larger than ALE. AME eye row subequal to PME row. PLE row much the widest. See Tables 1–5 for more precise measurements of selected population samples. Chelicerae dark reddish brown to black; anterior and posterior margins each with three teeth. Posterior teeth are approximately the same size. In the anterior row the central tooth is largest and is adjoined by a very small inside tooth (nearer the midline) and a smaller outside tooth (farthest away from the midline). Background coloration ranges from pale yellow, yellow-orange to brown with distinct irregular dark brown to black bands or annulations that are usually found in *Tigrosa aspera, T. georgicola, T. helluo,* and *T. grandis,* but are absent in *T. annexa.* Order of leg length from longest to shortest is IV-I-II-III. In *Tigrosa* dorsal abdominal and ventral color and patterns are much more highly variable than the color and pattern on the cephalothorax. Features of the abdomen are influenced more by physiological condition (e.g., gravid or starved individuals), hirsuteness of individuals and habitat. Representative patterns were chosen for illustrations of the venter in Figs. 40–44. Dorsum of abdomen generally with a dark cardiac mark, often lanceolate, and outlined in darker color in the midsection. This is bounded laterally by lighter color ranging from cream to light brown created by an admixture of pigment and tufts of hair creating a mottled appearance (Figs. 1–3). The venter of the abdomen ranges from cream to light brown with darker brown spots as in *T. annexa* (Fig. 40) and *T. helluo* (Fig. 41), coalescing spots forming longitudinal rows as in *T. georgicola* (Fig. 42) and *T. aspersa* (Fig. 44), or mottled as in *T. grandis* (Fig. 43). Male palpus with stridulatory file situated retrolaterally at tip of tibia. Cymbium (CY in Fig. 4) with cluster of macrosetae at tip and with stridulatory scraper retrolaterally at base. Male palpal sclerites as seen in ventral view of left palpus: palea (PA in Fig. 5) retrolateral in position, moderately developed and weakly sclerotized; embolus (EM in Fig. 4) originating behind palea, broadly curving in prolateral area of cymbium in a counter clockwise direction, then adjoining the lower sickle-shaped tip (often difficult to see) of the terminal apophysis (TA in Fig. 5) on the retrolateral side and both terminating below the upper portion containing tips of the terminal apophysis and the embolus; median apophysis (MA in Fig. 4) not as strongly developed compared to *Hogna lenta* (Hentz 1875), triangular in shape, projecting laterally toward the border of the cymbium and with a prominent ventrally directed spur (Figs. 4, 5). Epigynum of female shaped like an inverted T with an elongate median septum (MS in Fig. 19) or mid-field consisting of a longitudinal piece (LP in Fig. 18) and terminating in an elliptical or rounded trapezoidal transverse piece (TP in Fig. 18). Spermathecae (SP in Fig. 19) smooth and round to ovoid.



Figures 28, 29.—Dorsal view of *Tigrosa helluo*: 28. Female from Cold Spring Harbor, Suffolk County, New York. 29. Male from Saugerties, Ulster County, New York. Scale bar, 1 mm.



Figures 30–33.—*Tigrosa helluo*: Male from Saugerties, Ulster County, New York. 30. Left palpus, ventral view; 31. Left palpus, retrolateral view. 32, 33. Female from Cold Spring Harbor, Suffolk County, New York. 32. Vulva, dorsal view; 33. Epigynum, ventral view. Scale bars: palpi, 0.5 mm; epigyna, 0.1 mm.

KEY TO SPECIES

Females

1. Carapace with thin cream to yellow stripe beginning at AME row and ending at PLE row (Fig. 10). Transverse process (TP) of epigynum spade shaped; wide from anterior to posterior (Fig. 15). . . . . *Tigrosa aspersa*
   Carapace with thin, cream to yellow median longitudinal stripe beginning at AME row and continuing to posterior declivity (Figs. 3, 16, 22, 28). Transverse process (TP) of epigynum not spade shaped, more narrow from anterior to posterior (Figs. 9, 18, 26, 33) 2
2. Carapace with two short, cream to yellow dashes flanking the median stripe in the cephalic region (Fig. 3). Dorsum of abdomen with dark lanceolate cardiac mark enclosed by conspicuous broad cream to yellow stripes, and with paired cream to yellow dots or chevrons extending posteriorly to base of anal tubercle (Fig. 3). Venter of abdomen cream to pale yellow and without darker markings or with a few scattered spots. (Fig. 40) . . . . . *Tigrosa annexa*
   Carapace without conspicuous white dashes in cephalic area. Dorsum of abdomen more uniformly brown except for darker cardiac mark. Cardiac mark not surrounded by broad white stripes and with less conspicuous white dots or chevrons posteriorly. Venter of abdomen with darker spots or stripes (Figs. 41–43) 3
3. Occurring primarily west of the one hundredth meridian (Map 1). In ventral view the transverse piece (TP) of the epigynum, when measured from anterior to posterior, is greater than the narrow part of the longitudinal piece (LP) (Fig. 26). Internal genitalia (Fig. 27) distinct from *T. georgicola* (Fig. 19) and *T. helluo* (Fig. 32) . . . . . *Tigrosa grandis*
   Occurring primarily east of the one hundredth meridian (Maps 3, 5). In ventral view the TP of the epigynum, when measured from anterior to posterior, is about the same width as the narrow part of the LP (Figs. 18, 33). Internal genitalia (Figs. 19, 32) distinct from *T. grandis* (Fig. 27) 4
4. Large species (average body length over 20 mm). Carapace with broad, yellow to orange-brown, undulating submarginal stripes that often extend to lateral edges (Fig. 16). Venter of abdomen with rows of black to dark brown dots forming lines behind epigastric furrow and converging in front of spinnerets (Fig. 42). LP of epigynum flared outward anteriorly, exceeding half the width of the TP (Fig. 18) . . . . . *Tigrosa georgicola*
   Smaller species (average body length less than 15 mm). Carapace with thin pale yellow to orange submarginal stripes that are clearly separated from lateral edges (Fig 28). Venter of abdomen with scattered black dots (Fig. 41). LP of epigynum (Fig. 33) with sides,not flared outward anteriorly . . . . . *Tigrosa helluo*

Males

1. Carapace with cream to pale-yellow or orange submarginal stripes consisting of discontinuous irregular dashes (Fig. 11). Dorsum of abdomen with dark cardiac mark, not darkly outlined, but surrounded by a lighter background color with dark patches producing a mottled pattern (Fig. 11). Palpus with retrolateral piece of median apophysis not reaching edge of cymbium (Fig. 12) and palea rectangular in retrolateral view (Fig. 13) . . . . . *Tigrosa aspersa*
   Carapace with cream to pale yellow orange submarginal stripes continuous from cephalic region to posterior edge (Figs. 2, 17, 23, 29). Dorsum of abdomen with dark cardiac mark outlined in dark brown to black (Figs. 1, 2, 17, 23, 29). Ventral view of palpus with retrolateral piece of median apophysis reaching edge of cymbium or beyond (Figs. 4, 6, 20, 24, 30). Palea not rectangular in retrolateral view of palpus (Figs. 5, 7, 21, 25) 2
2. Carapace with two conspicuous yellow longitudinal dashes in the cephalic region lateral to median stripe (Figs. 1, 2). Palea triangular in retrolateral view of palpus (Figs. 5, 7) . . . . . *Tigrosa annexa*
   Carapace without conspicuous yellow longitudinal dashes in the cephalic region lateral to median stripe (Figs. 10, 16, 22, 28). Palea with shape in retrolateral view as in Figs. 13, 21, 25, 31. 3
3. Occurring primarily west of the one hundredth meridian (Map 4). Carapace with yellow submarginal stripes beginning posterior to cephalic region and continuing to posterior edge (Fig. 23). Dorsum of abdomen with dark rectangular cardiac mark with posterior half outlined in black and surrounded by light tan color (Fig. 23). Venter of abdomen mottled in appearance without distinct dark brown to black dots or lines (Fig 44). Palea with shape in retrolateral view as in Fig. 25. . . . . *Tigrosa grandis*
   Occurring primarily east of the one hundredth meridian (Maps 3, 5). Carapace with yellow submarginal stripes beginning in cephalic region and continuing to posterior edge (Figs. 17, 29). Dorsum of abdomen with dark lanceolate cardiac mark outlined in brown or black and surrounded by broad yellow stripes and with yellow chevrons or spots posterior to cardiac region (Figs. 17, 29). Venter with distinct dark brown or black spots (Fig. 41) or longitudinal lines of black spots (Fig. 42). Palea in retrolateral view of palpus as in Figs. 21 or 31 4
4. Large species (body length 25.4–33.6 mm). Broad cream to yellow submarginal stripes with uneven margins reaching edge of carapace (Fig. 17). Dorsum of abdomen with cardiac mark outlined in dark brown or black and enclosed by broad cream to yellow stripes (Fig. 17). Three or four dark chevrons posterior to cardiac region accented by light spots laterally. Venter cream to pale yellow with rows of black dots or dashes forming dark longitudinal lines (Fig. 42). Palea in retrolateral view of palpus as in Fig. 21 . . . . . *Tigrosa georgicola*
   Smaller species (Body length 9.6–12.9 mm) Thin cream to yellow submarginal stripes with edges not reaching margins of carapace (Fig. 29). Dorsum of abdomen with cardiac mark darkly outlined, but with lighter surrounding area not as distinct as in *T. georgicola*) and darker chevrons posterior to cardiac region not as sharply defined (Fig. 29). Venter cream to pale yellow with scattered dark brown to black spots (Fig. 41). Palea in retrolateral view of palpus as in Fig. 31 . . . . . *Tigrosa helluo*

Tigrosa annexa (Chamberlin & Ivie 1944)
new combination
Figs. 1–9, 40, Map 1, Table 1

Lycosa helluo Gertsch 1934:6 (misidentified).
Lycosa annexa Chamberlin & Ivie 1944:142.
Hogna annexa Roewer 1955:257; Platnick 2011.

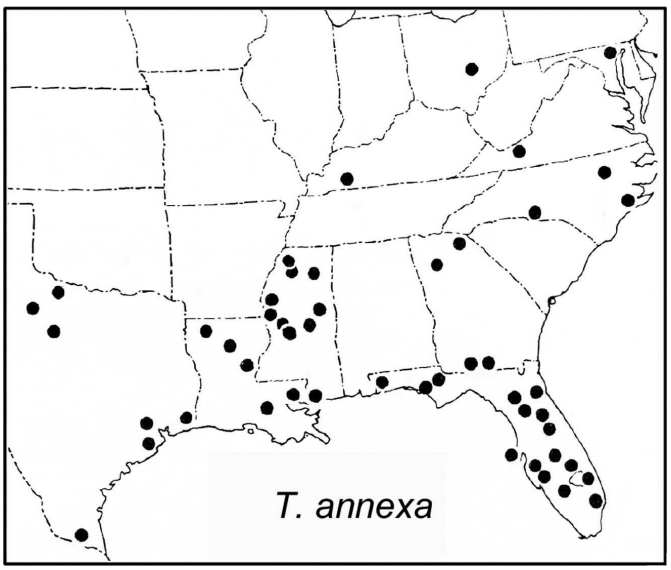
Type material.—Holotype: USA, Florida, Alachua County, Gainesville (29.65°N, 82.32°W), 10 February 1942, female, AMNH, examined.

Other material examined.—USA: *Ohio*, Perry Co., New Lexington (39.71N°, 82.21W°), no date, no name, AMNH, 1♀. *Maryland*, Hartford Co., Bel Air (39.54N°, 76.35W°), 1973, P. Morris, AMNH, 1♂. *Virginia*, Montgomery Co., Wildwood Park (37.14°N, 80.57°W), 4 May 1965, Hoffman, AMNH, 1♂. *Kentucky*, Christian Co., Hopkinsville (36.87°N, 87.49W°), no date, no name, AMNH, 1♂. *North Carolina*, Carteret Co., Duke Marine Laboratory, Piver Island (34.72°N, 76.66°W), 25 November 1981, R.D. Barnes, AMNH, 1♂, 4i; Edgecombe Co., 2 mi. [3.2 km] NW of Tarboro (35.91N°, 77.54°W), 13 June 1979, T.C. Lockley, HCC, 1♂, 2 mi. [3.2 km] NW of Tarboro, 14 June 1979, 2♂, 1i, 24 July 1979, 3♂, 25 July 1979, 1♂, 26 July 1979, 1♂, 8 September 1979, W.H. Cross, MSST, 1♂, 3 mi. [4.8 km] W of Tarboro (35.91°N, 77.54°W), 14 June 1979, 1i, 24 July 1979, 1♂, 1♀, 26 July 1979, 1♂, 8 September 1979, W.H. Cross, MSST, 1♂, 8 mi. [12.9 km] WSW of Tarboro (35.91°N, 77.54°W), 14 June 1979, 6♂, 25 July 5♂, 26 July 1979, W.H. Cross, MSST, 3♂; Union Co., Monroe (34.99°N, 80.55°W), 11 September 1942, Mrs. E.L. Bell, Jr., AMNH, 1♀. *Georgia*, Fulton and DeKalb Cos., Atlanta (33.75°N, 84.39W°), May 1989, no name, AMNH, 1♂; Lowndes Co., Valdosta (30.83N°, 83.28°W), 20–31 July 1916, F.E. Watson, AMNH, 1♀; Rabun Co., Lake Burton (34.86°N, 83.38°W), 29 June 1975, D.A. Rossman, AMNH, 1♂; Thomas Co., Bar M Ranch, 7 mi. [11.3 km] S of Boston (30.80°N, 83.79°W), 30 June 1973, A.R. Brady, HCC, 2♂, 2♀. Leaton Lake near Boston (30.79N, 83.79W), 27 July 1967, W. Sedgwick, MCZ, 1♀. *Florida*, Alachua Co., (29.68°N, 82.35°W), 25 October 1932, H.K. Wallace, AMNH, 1♀, Gainesville (29.65°N, 82.32W°), 14 June 1935, 1♂, 1♀, 3i, W. Ivie & H. K. Wallace, AMNH, 4♂, 1♀, 10 February 1942, 1♂, 12 April 1943, 24 April 1943, 2♂, W. Ivie, AMNH, 2♂, 9 May 1958, H. V. Weems, Jr., AMNH, 1♂, Lake Lochloosa (29.50°N, 82.10°W), 7 April 1973, A. Jung, HCC, 2♂, 2♀; Bay Co., St. Andrews State Park (30.13°N, 85.74°W), 14 May l987, 1♂, 11 May 1989, HCC, 1♂, 1♀; Hollywood (26.01°N, 80.16°W), 14 July 1935, H.K. Wallace, AMNH, 1♀; Dade Co., Miami (25.73N°, 80.24°W), 2 March 1936, S.C. Bishop, AMNH, 2♂, 1i, 5 April 1952, P. Porter, MCZ, 1♂; DeSoto Co., 8 mi. [12.9 km] W of Arcadia (27.22N°, 81.86°W), 31 March 1938, W.J. Gertsch, AMNH, 2♂, 6♀, 4i; Escambia Co., Pensacola (30.42°N, 87.22°W), 26 November 1944, D.C. Lowrie, AMNH, 2♀ with egg sacs; Hendry Co., 8 mi. [12.9 km] S of Moorehouse (26.57°N, 81.78°W), 25 April

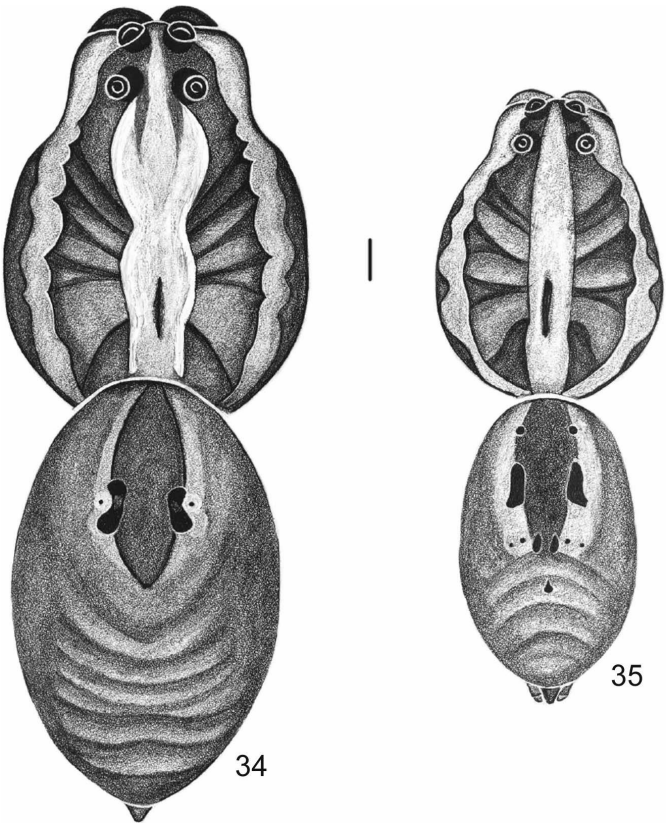
Table 1.—Mean and range of ten females and ten males of *Tigrosa annexa* from Mississippi.

	Mean (range)		Mean (range)
Females			
Anterior eye row	1.19 (1.1–1.3)	Femur I	4.23 (3.9–4.9)
PME width	1.30 (1.2–1.4)	Patella-Tibia I	5.31 (4.7–6.3)
PLE width	1.65 (1.5–1.8)	Metatarsus I	2.77 (2.5–3.1)
POQ length	1.21 (1.1–1.4)	Tarsus I	2.00 (1.9–2.3)
Car. width at PLE	3.00 (2.8–3.3)	Total length I	14.30 (13.0–16.5)
Carapace width	4.64 (4.3–5.2)	Femur IV	4.81 (4.4–5.5)
Carapace length	6.09 (5.6–6.9)	Patella-Tibia IV	5.73 (5.3–6.5)
Body length	12.99 (10.8–15.6)	Metatarsus IV	4.97 (4.4–5.3)
Patella-Tibia II	4.69 (4.3–5.3)	Tarsus IV	2.46 (2.4–2.7)
Patella-Tibia III	4.11 (3.7–4.8)	Total length IV	17.96 (16.5–20.0)
Males			
Anterior eye row	1.24 (1.1–1.4)	Femur I	6.08 (5.1–7.7)
PME width	1.40 (1.2–1.7)	Patella-Tibia I	8.15 (6.4–10.4)
PLE width	1.83 (1.5–2.2)	Metatarsus I	5.51 (4.3–6.9)
POQ length	1.28 (1.1–1.5)	Tarsus I	3.37 (2.7–4.1)
Car. width at PLE	2.95 (2.4–3.6)	Total length I	23.10 (18.4–29.0)
Carapace width	5.37 (4.4–6.7)	Femur IV	6.69 (5.3–8.1)
Carapace length	6.96 (5.6–6.7)	Patella-Tibia IV	8.19 (6.7–l0.2)
Body length	13.38 (10.5–17.4)	Metatarsus IV	7.90 (6.3–10.0)
Patella-Tibia II	7.04 (5.5–8.9)	Tarsus IV	3.39 (2.8–4.1)
Patella-Tibia III	6.09 (4.9–7.7)	Total Length IV	26.17 (21.3–32.1)

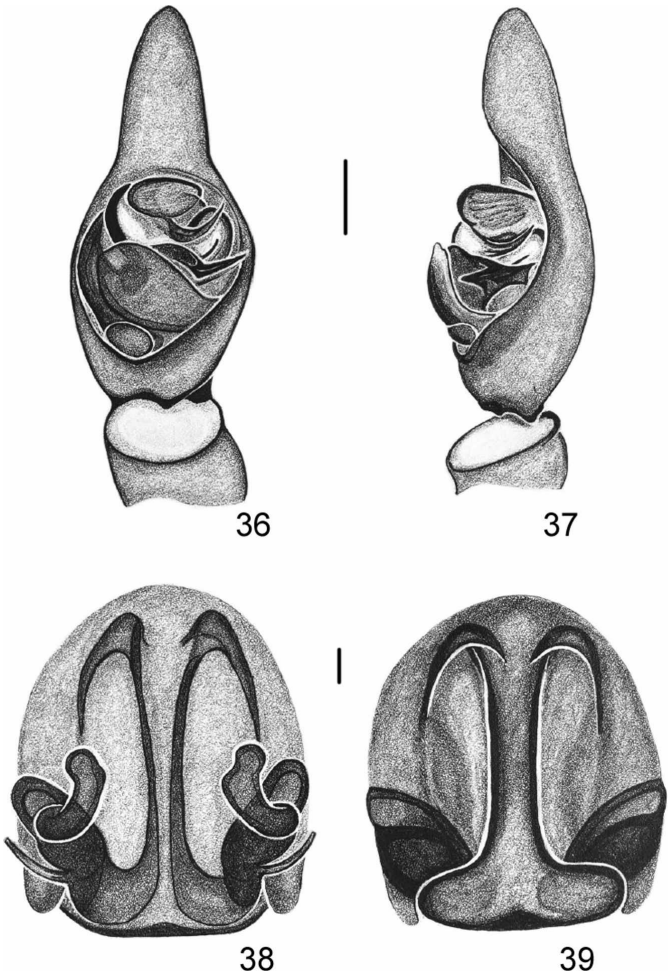
1952, A. Schwartz, MCZ, 1♂; Lee Co., Fort Myers (26.64°N, 81.87°W), 18 March 1954, W. Ivie, AMNH, 1♂, 1♀, 1i; Liberty Co., Torreya State Park (30.57°N, 85.74°W), 23 June 1997, A.R. Brady, K.A. Brewer, A.C. Wyatt, HCC, 1♀; Martin Co., Port Mayaca (26.99°N, 80.61W°), 29 March 1938, W.J. Gertsch, AMNH, 2♂, 5♀, 3i; Okeechobee Co., Okeechobee (27.98°N, 81.54°W), 28 March 1938, 13♂, 19♀, 18i, 29 March, W.J. Gertsch, AMNH, 2♂, 13♀, 1i; Orange Co., Winter Park (28.59°N, 81.35W°), 21 March 1938, W.J. Gertsch, AMNH, 4♀, 2i; Pinellas Co., St. Petersburg (27.77N°, 82.64W°), 30 November 1933, H.K. Wallace, AMNH, 2♂, 2♀; Polk Co., Poe Springs , Santa Fe River (27.66°N, 81.52°W), 17 March 1934, H.K. Wallace, AMNH, 2♂; Putnam Co, Welaka Reserve (29.48°N, 81.67°W), 18 May 1980, 1♂, 2i, 22 May 1987, 1♀, 20 May 1988, 1♀, 19 May 1989, A.R. Brady, HCC, 1♀; Seminole Co., Sanford (28.80°N, 81.28°W), W.H. & L.F. Stickel, AMNH, 5♂, 3i; Volusia Co., Deland (29.03°N, 81.31W°), 25 March 1939, F.E. Lutz, AMNH, 1♀. *Mississippi,* Hancock Co., Bayou La Croix, 3 mi. [4.8 km] N of Waveland (30.31N°, 89.37°W), 12 June 1982, M.W. LaSalle, MSST, 1♂, 4♀; Madison Co., (32.64N°, 90.09°W), 7–8 mi. [11.3–12.9 km] W of Interstate Highway 55 on Gluckstadt Road, 9–12 September 1982, T.C. Lockley, HCC, 1♂; Newton Co., 1 mi. [1.6 km] E of Union (32.57°N, 89.12°W), 29 August 1982, 1♀, 2–4 July 1983, 7♂, 2♀, 3–5 September 1980, T.C. Lockley, HCC, 5♀; Oktibbeha Co., Craig Springs (33.32°N, 88.92°W), 3 October 1979, G.L. Snodgrass, MSST, 1♂, Mississippi State University, Starkville (33.46°N, 88.79°W), 28 July 1983, B. Booth, MSST, 1♂; Panola Co., 11 mi. [17.7 km] WSW of Batesville (34.32°N, 89.95°W), 21 June 1979, W.H. Cross, MSST, 2♂, 1♀, 6 mi. [9.7 km] SW of Como (34.51°N, 89.94°W), 21 June 1979, W.H. Cross, MSST, 2♂, 3 mi. [4.8 km] WSW of Sardis (34.44°N, 89.92°W), 21 June 1979, 1♂, 2 August 1979, W.H. Cross, MSST, 1♂; *Pontotoc Co.*: 1 mi. [1.6 km] SE of Ecru (34.35N°, 89.03°W), 24 April 1980, 1♂, 5 June 1980, 2♂, 1♀, 19 June 1980, 1♀, 3 July 1980, 2♂, 16 July 1980, 1♀, 12 September 1980, 24 October 1980, W.H. Cross, MSST, 1♂; Washington Co. (33.30°N, 90.94°W), 13–14 July 1982, T.C. Lockley, HCC, 2♂; Leroy Percy State Park (33.16°N, 90.94°W), May 1983, T.C. Lockley, HCC, 1♂; 1 mi. [1.6 km] N of Stoneville (33.42°N, 90.92°W), 31 January–2 February 1983, T.C. Lockley, HCC, 1♂, 1♀, 2 mi. [3.2 km] N of Stoneville (33.42°N, 40.92°W), 22 June 1982, 1♂, 13–14 July 1982, 2♂, 17–20 September 1982, 1♂, 24–27 September 1982, 22–24, December 1982, 1i, HCC, 1♂, 3–6 June 1983, 1–6 July 1983, 1♂, T.C. Lockley, HCC, 1♂; Yazoo Co. (32.76°N, 90.36°W), 23 October 1964, 1♀, 20 March 1♀, 15 July 1♂, P.R. Dorris, MSST, 1♂. *Louisiana,* Catahoula Par., Camp Plauche (31.24°N, 92.15°W), 12 February 1944, D.E. Beck, AMNH, 1♂; East



Map 1.—Distribution Map of *Tigrosa annexa*.



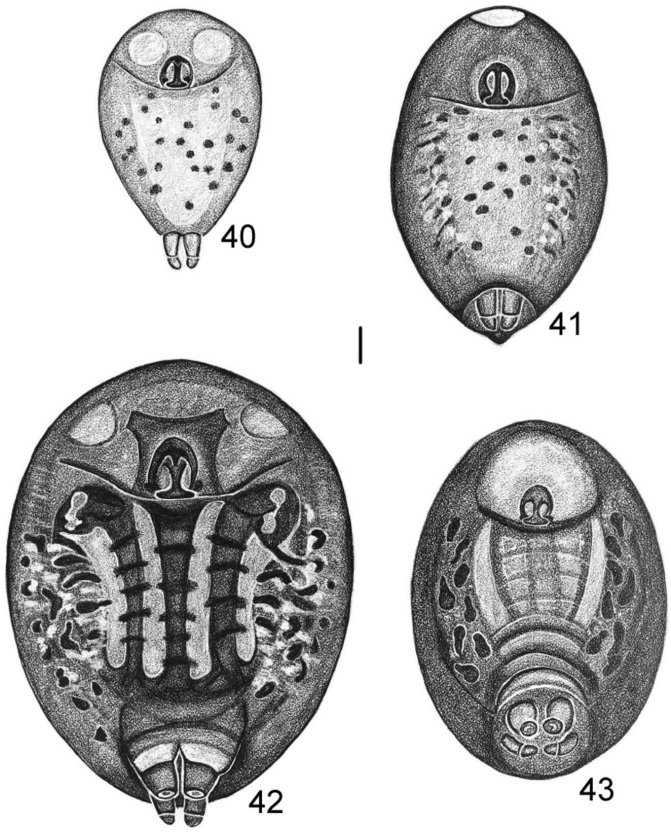
Figures 34, 35.—Dorsal view of *Hogna radiata*: 34. Female from Cerbére, Peyrefite Bay, France; 35. Male from Cerbére, Peyrefite Bay, France. Scale bar, 1 mm.



Figures 36–39.—*Hogna radiata*: 36, 37. Male from Cerbére, Peyrefite Bay, France. 36. Left palpus, ventral view; 37. Left palpus, retrolateral view. 38, 39. Female from Cerbére, Peyrefite Bay, France. 38. Vulva, dorsal view; 39. Epigynum, ventral view. Scale bars: palpi, 0.5 mm; epigyna, 0.1 mm.

Baton Rogue Par., Baton Rogue (30.97°N, 91.52°W), August 1956, no name, AMNH, 2♀, 10 August 1975, F.W. Howard, AMNH, 1♂; Iberville Par., St. Gabriel (30.26°N, 91.10°W), 1 July 1972, 1♂, 1♀, 1i, 13 July 1972 3♂, 2♀ 5i, 22 July 1972, 1♀, 23 July 1972, 1♀, 2i, 1 August 1972, 6♀, 8i, 9 August 1972, 1♂, 9♀, 21 September 1972, 3♀, 6i, 23 July 1972, 2♀, 2i26 September 1972, 2♀, 4 October 1972, 1♂, 2♀, 6i, 21 November 1972, 1♀, 4 December 1972, 1♂, 2♀, 3i, 19 June 1973, 3♂, 2♀, 5i, 17 August 1973, 1♂, 6♀, 4i , 24 August 1973, 1♂, 3♀, 3i, 1 September 1973, F.W. Howard, AMNH, 2♂, 6♀, 1i; Madison Par., Tallulah (32.41N°, 91.19°W), 15 July 1945, no name, AMNH, 1♀; Ouachita Par., Monroe (32.51N°, 92.12°W), no name, AMNH, 1♂; St. Tammany Par., Herbert Natural Preserve (30.97°N, 91.52°W), 23 June 1984, A.R. Brady, HCC, 1♂. *Texas*, Brazoria Co., Brookside Village (27.59°N, 95.31°W), 27 December 1984, no name, MWSU, 1♀; Harris Co., Houston (29.76°N, 95.38°W), June 1954, E. Stude, AMNH, 1♂, Haskell Co., 10 mi. [16.1 km] W of Rochester (33.32°N, 99.85°W), no date, F.D. White, MWSU, 1♀, 12 mi. [19.3 km] W of Rochester (33.32°N, 99.85°W), 17 April 1977, F.D. White, MWSU, 2♀, Hidalgo Co., (26.41°N, 98.22°W), 2 July 1934, S. Mulaik, AMNH, 1♂, 3♀, Edinburg (26.30°N, 98.16°W), 1–10 December 1936, S. Mulaik, AMNH, 1♂, 1♀; Harris Co., Houston (29.36°N, 95.37°W), July 1939, J.H.S., AMNH, 1♀, Edinburg (26.30°N, 98.16°W), 4 December 1935, M. Welch, AMNH, 1♀, 5 December 1936, S. Mulaik, AMNH, 1♂; Jefferson Co., Port Arthur (29.88°N, 93.94°W), 1 May 1944, 2i, 11–18 May 1944, E.D. Palmer, AMNH 1♀; Palo Pinto Co., Palo Pinto (32.77°N, 98.30°W), March 1973, T. Salmon, MWSU, 1♀; Wichita Co., (34.03°N, 98.80°W), 20 July 1975, J. Cokendolpher, MWSU, 1♀, 13 September 1977, N.V. Horner, MWSU, 1♀, 20 February 1981, G.J. Merchant, MWSU, 1i, Lake Wichita (33.84°N, 98.53°W) 7 April 1980, G. J. Merchant, MWSU, 1♀, 20 February 1981, G.J. Merchant, MWSU, 1♀.

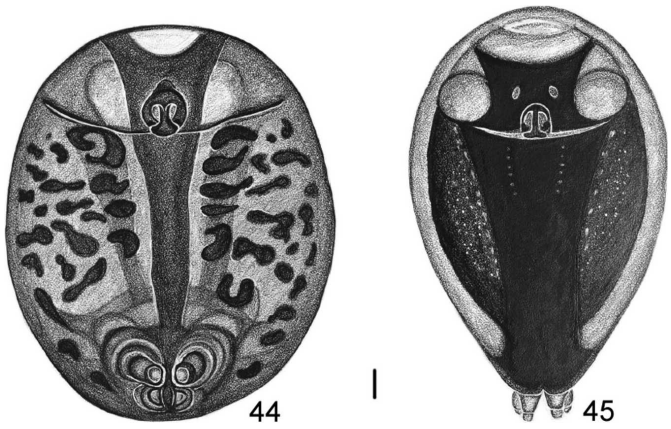
Diagnosis.—*Tigrosa annexa* is most closely related to *T. helluo* in size as well as male and female genitalic characters. The dorsal color pattern on the carapace and abdomen of *T. annexa* readily distinguishes this species from *T. helluo* and *T. georgicola.* There are two white dashes just behind the PME in *T. annexa* (Figs. 1–3) not seen in *T. helluo* (Figs. 28, 29) or *T. georgicola* (Figs. 16, 17). Also in *T. annexa* there are broad white stripes surrounding the dark cardiac mark and a paired series of four large white spots beginning in the cardiac area and extending posteriorly to the base of the spinnerets not seen in *T. helluo* or *T. georgicola.* In addition *T. annexa* is the only species of *Tigrosa* in which the venter of the abdomen is lighter cream colored with only a few insignificant darker spots and no stripes or other markings (Fig. 40).



Figures 40–43.—Ventral view of female abdomens: 40. *Tigrosa annexa* from Bar M Ranch, 7 mi. [11.3 km] S of Boston, Thomas County, Georgia. 41. *Tigrosa helluo* from Horseshoe Bend of Neshaminy Creek, E of Jamison, Bucks County, Pennsylvania; 42. *Tigrosa georgicola* from Torreya State Park, 15 mi. [24.1 km] N of Bristol, Liberty County, Florida; 43. *Tigrosa grandis* from Ft. Collins, Larimer County, Colorado. Scale bar, 1 mm.

Remarks.—Before Chamberlin & Ivie (1944) first described *T. annexa*, this species was often confused with *T. helluo* and *T. georgicola.* Females of *T. georgicola* (body length 16.6–22.2 mm) are much larger than females of *T. annexa* (body length 10.8–15.6 mm) that I have examined. However, among collections of *T. annexa* from Mississippi I have found very large males, which overlap in size with males of *T. georgicola.* It is possible that these large males of *T. annexa* represent a different species, but they are indistinguishable from smaller specimens except in size and I have not identified a comparable larger female.

Color pattern.—*Female:* Dorsal pattern illustrated in Fig. 3. Face with lower part orange-yellow to yellow and upper part dark brown to black. Eye region dark brown to black with a thin yellow line from AME to PLE. Chelicerae orange-brown to dark reddish brown. Carapace brown with narrow median yellow stripe. Two short lighter yellow dashes originating behind PLE and extending to posterior cephalic region. Narrow yellow submarginal stripes with scalloped or uneven margins and more narrow than median stripe in thoracic region. Dorsum of abdomen dark brown with dark lanceolate cardiac mark outlined in black and bordered by lighter yellow color. Lateral areas of abdomen darker brown with pairs of conspicuous paired yellow spots extending from cardiac area to base of anal tubercle. Venter cream to pale yellow without darker markings or with a few scattered dark spots. Legs yellow on dorsal surface with pale yellow to cream ventrally, without darker bands or markings. Labium and endites pale yellow to brown with distal ends lighter yellow to cream. Sternum yellow to brown, often with a lighter median dash.



Figures 44, 45.—Ventral view of abdomen: 44. *Tigrosa aspersa* from Imboden, Lawrence County, Arkansas; 45. *Hogna radiata* from Island of Sardinia, Italy. Scale bar, 1 mm.

Male. Dorsal pattern illustrated in Figs. 1, 2. Face orange-yellow to yellow, darker brown in eye region with nacelles circled in black and line of white hair between PME. Condyles yellow-orange to darker brown. Chelicerae yellow orange to orange brown. Carapace with eyes circled in black, background color brown with black lines radiating from fovea. Narrow median yellow stripe from PLE to posterior declivity. Cephalic region with short yellow dashes from PLE converging on median stripe. Submarginal yellow stripes with uneven edges. Abdomen with dark brown lanceolate cardiac mark outlined in black and accented in yellow. Lateral regions of abdomen medium to dark brown. Median area posterior to cardiac region yellow and traversed by four dark brown chevrons. Venter of abdomen pale yellow to cream with a few scattered small dark spots. Legs yellow to yellow-orange without darker markings; ventral surfaces a shade lighter. Labium and endites cream to pale yellow with distal ends lighter. Sternum cream to yellow with a pair of faint dusky dashes.

Natural history.—*Tigrosa annexa* was described by Gertsch (1934) as a light variety of *T. helluo.* Because *T. annexa* was often confused with *T. helluo* and sometimes even with *T. georgicola*, a much larger species, it was overlooked in collections, and the differences in habitat and behavior of this species were not noted. In collections that I have examined from Mississippi many of the *T. annexa* specimens were taken from pitfall traps in cotton fields or peripheral to cotton fields, and a smaller number from herbage, such as Bermuda grass. Numerous specimens of *T. annexa* collected by F.W. Howard from St. Gabriel, Louisiana, and housed in the AMNH were taken from pitfall traps in Bermuda grass. *Tigrosa helluo* is often found in wetter habitats than *T. annexa*, such as bogs in Michigan or in plant growth near lakes or swampy areas in the southeastern United States.

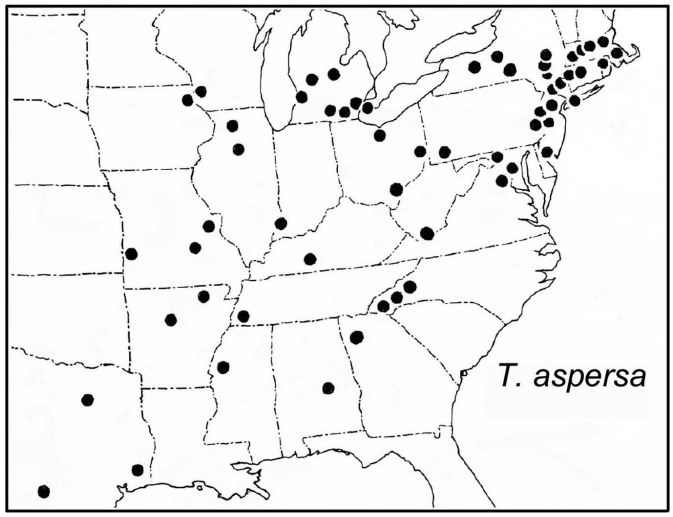
Table 2.—Mean and range of ten females and ten males of *Tigrosa aspersa* from Arkansas.

	Mean (range)		Mean (range)
Females			
Anterior eye row	2.06 (1.9–2.2)	Femur I	8.98 (8.4–9.6)
PME width	2.11 (2.0–2.3)	Patella-Tibia I	11.32 (10.6–12.0)
PLE width	2.95 (2.8–3.2)	Metatarsus I	6.65 (6.0–7.3)
POQ length	1.93 (1.8–2.0)	Tarsus I	3.90 (3.7–4.0)
Car. width at PLE	6.21 (5.6–6.7)	Total length I	30.84 (28.7–32.9)
Carapace width	9.34 (8.5–10.1)	Femur IV	9.88 (9.3–10.5)
Carapace length	12.57 (12.0–13.3)	Patella-Tibia IV	11.37 (10.6–12.1)
Body length	27.86 (25.0–30.5)	Metatarsus IV	10.16 (9.2–11.3)
Patella-Tibia II	10.09 (9.4–11.6)	Tarsus IV	4.16 (3.7–4.7)
Patella-Tibia III	8.66 (7.8–9.3)	Total length IV	35.58 (33.1–38.4)
Males			
Anterior eye row	1.74 (1.7–1.9)	Femur I	8.91 (8.0–9.3)
PME width	1.87 (1.7–2.0)	Patella-Tibia I	11.74 (11.2–12.5)
PLE width	2.47 (2.3–2.6)	Metatarsus I	8.13 (6.9–9.2)
POQ length	1.72 (1.5–1.9)	Tarsus I	4.69 (4.3–5.2)
Car. width at PLE	4.63 (4.1–5.1)	Total length I	33.53 (29.3–36.2)
Carapace width	8.05 (7.2–8.9)	Femur IV	9.70 (8.4–10.6)
Carapace length	10.25 (9.3–11.7)	Patella-Tibia IV	11.70 (10.8–13.0)
Body length	19.87 (18.5–21.3)	Metatarsus IV	11.70 (10.6–12.9)
Patella-Tibia II	10.47 (9.3–11.0)	Tarsus IV	4.99 (4.3–5.7)
Patella-Tibia III	8.96 (8.1–9.8)	Total Length IV	38.12 (34.0–42.3)

Distribution.—T*igrosa annexa* has been found along the Atlantic coast from Delaware south to Big Pine Key, Florida, and westward from southern Ohio to the southern tip of Texas (Map 1).

Tigrosa aspersa (Hentz 1844)
new combination
Figs. 10–15, 44, Map 2, Table 2

Lycosa aspersa Hentz 1844:389; Chamberlin 1908:236; Kaston 1948:323.
Tarentula inhonesta Keyserling 1877:634.
Tarentula tigrina McCook 1879:xi; Stone 1890:423.
Lycosa vulpina Emerton 1885:487.
Lycosa immaculata Banks 1892:67.
Lycosa exitiosa Banks 1892:68.
Lycosa oblonga Banks 1892:68.



Map 2.—Distribution Map of *Tigrosa aspersa*.

Lycosa inhonesta Montgomery 1902:557; 1904:290.
Hygrolycosa aspersa Roewer 1955:261.
Hogna aspersa Dondale & Redner 1990:49; Platnick 2011.

Type material.—Holotype: USA: Alabama: Specimen lost.

Other material examined: CANADA: *Ontario*, Pelee Island (41.77°N, 82.69°W), 4–16 June 1950, W. Ivie & T. E. Kurata, AMNH, 1♀, Windsor (42.32°N, 83.03°W), 1 September 1953, R. Barrett, AMNH, 1♀. USA: *Massachusetts*, Franklin Co., Mount Toby near Sunderland (42.47°N, 72.58°W), H., L. & F. Levi, MCZ, 1♀; Middlesex Co., Cambridge, (42.37°N, 71.11°W), August 1916, C. Mason, MCZ, 1♂, Pepperell (42.67°N, 71.59°W), August 1964, H.W. Levi, MCZ, 1♀, September 1968, H. & L. Levi, MCZ, 1♀, August 1971, H., L. & F. Levi, August 1971, MCZ, 1♀, Townsend (42.67°N, 71.70°W), no date, H.W. Levi, MCZ, 1♀, Woburn (42.48°N, 71.15°W), no date, J.G. Shute, MCZ, 1♀; Plymouth Co., Marshfield (42.09°N, 70.71°W), 18 June 1933, no name, MCZ, 1♂. *Rhode Island*, Providence Co., Providence (41.82°N, 71.41°W), no date, N. Banks, MCZ, 1♀. *Connecticut*, Fairfield Co., New Canaan (41.15°N, 73.49°W), 1–15 September 1950, no name, MCZ, 2♂, 30 September 1950, no name, MCZ, 1♀; Hartford Co., Unionville (41.76°N, 72.89°W), 8 September 1967, D. Goellner, MCZ, 1♀; Litchfield Co., Goshen (41.83°N, 73.23°W), no date, J. H. Emerton, MCZ, 1♂, New Haven Co., Bethany (41.42°N, 73.00°W), 29 May 1933, B.J. Kaston, MCZ, 2♀, 15 August 1939, D.S. Riggs, MCZ, 1♀. *New York*: Albany Co., Rensselaerville (42.52°N, 74.14°W), 4 July 1967, R. & J. Matthews, MCZ, 1♀; Greene Co., Leeds (42.52°N, 74.14°W), September 1931, D.B. Merriam, AMNH, 2♀; Onondaga Co., Syracuse (43.05°N, 76.15°W), no date, J.H. Emerton, MCZ, 1♀; Ontario Co., Canandaigua Lake near Woodville (42.89°N, 77.28°W), 16 September 1939, S.C. Bishop, AMNH, 1♂; Rockland Co., Sloatsburg (41.16°N,

74.19°W), 20 September 1934, W.J. Gertsch, 1♀; Suffolk Co., Port Jefferson (40.95°N, 73.07°W), September 1954, W.J. Gertsch, AMNH, 1♂; Tompkins Co., Ithaca (42.44°N, 74.19°W), September 1954, W.J. Gertsch, AMNH, 1♀, 4 September 1976, G. Dingerkus, AMNH, 2♀, 19 September 1976, G. Dingerkus, W. Dun & D. Denihy, AMNH, 1♀; Ulster Co., Lake Minnewasha (40.74°N, 74.24°W), no date, H.P. Curtis, MCZ, 1 ♀, Lake Minnewasha , Loft Mountain, Camp Shenandoah (41.53°N, 73.79°W), 18 October 1966, F. Beer, AMNH, 1♀; Westchester Co., Hartsdale (41.01°N, 73.80°W), 27 August 1945, W.H. Ingram, AMNH, 1♀, Montrose Point (42.25°N, 73.93°W), 10 September 1948, M. Thurston, AMNH, 1♂, South Berne (42.56°N, 74.10°W), no date, no collector, AMNH, 1♀. *New Jersey*, Bergen Co., Ramsay (40.14°N, 74.73°W), 3 September 1936, W.J. Gertsch, AMNH, 1♂, 18 September 1946,W.J. Gertsch, AMNH, 2♀; Cumberland Co., Vineland (39.49°N, 75.03°W), no date, Treat, MCZ, 1♂; Somerset Co., Neshanic (40.50°N, 74.72°W), no date, E.S. Gaffney, AMNH, 2♀; Warren Co., Washington (40.76°N, 74.98°W), 20 September 1943, E.A. Rose, AMNH, 1♀. *Pennsylvania*, Bucks Co., NE of Jamison (40.16°N, 75.03°W), October 1963, M. Hunting, AMNH, 1♀; Fayette Co., Dunbar (39.98°N, 79.62°W), 30 June 1932, O. Greenwood, AMNH, 1♀. *Maryland,* Frederick Co., Myersville (39.51°N, 77.57°W), 2 September 1915, Hyslop & Parker, MCZ, 1♀; Montgomery Co., Kensington (39.03°N, 77.07°W), 28 May 1944, J.M. Paris, AMNH, 1♀. *Ohio*, Athens Co., Athens (39.33°N, 82.10°W), 24 September 1938, W.C. Stokes, AMNH, ♀. *West Virginia,* Mercer Co., Princeton (37.37°N, 81.10°W), 14 March 1969, N.I. Platnick, AMNH, 1♀; Ohio Co., Wheeling (40.06°N, 80.72°W), August–October 1947, K.W. Haller, 1♀, 20 October 1954, K.W. Haller, AMNH, 1♀. *Virginia,* Falls Church (Independent City) (38.89°N, W80.59°W), no date, E.B. Bryant, MCZ, 1♂. *Kentucky*, Edmunson Co., Bee Springs (37.29°N, 86.28°W), 8 June 1974, Sanborn, MCZ, 1♀. *Tennessee,* De Kalb Co., Shelby Forest State Park (35.83°N, 85.98°W), 9 September 1958, R. Wiley, MCZ, 1♀. *North Carolina,* Buncombe Co., Black Mountain (35.62°N, 82.32°W), no date, N. Banks, MCZ, 1♀; Cherokee Co., Murphy (35.09°N, 84.03°W), 23 July 1903, N. Banks, MCZ, 1♀; Jackson Co., Blue Ridge Parkway at Rattlesnake Mountain (35.62°N, 83.28°W), J. & W. Ivie, 15 October 1965, AMNH, 1♂. *Georgia*, DeKalb County, Roosevelt State Park near Pine Mountain (32.86°N, 84.72°W), no name, 1 August 1960, AMNH, 1♀ with egg sac. *Mississippi,* Washington Co., Greenville (33.41°N, 91.06°W), 15 August 1985, P. Wilcox, AMNH, 1♂. *Alabama,* Montgomery Co., Montgomery (32.37°N, 86.30°W), September 1948, C.V. Lopp, AMNH, 2♂. *Louisiana,* Orleans Par. (30.97°N, 91.52°W), 16 January 1920, H.E. Hubert, AMNH, 1 ♀ with egg sac. *Michigan*, Calhoun Co., Albion (42.25°N, 84.75°W), 2 October 1933, 1♀, September 1935, A.M. Chickering, MCZ, 1♂; Livingston Co., E.S. George Reserve (42.46°N, 83.95°W), 29 May 1955, I.J. Cantrall, FSCA, 1♀; Midland Co., (43.65°N, 84.39°W), 4 August 1942, A.M. Chickering, MCZ, 1♀; Newaygo Co., Manistee National Forest (43.50°N, 82.57°W), 3 October 1974, S. Scholl, HCC, 1♂; Oceana Co., 5 mi. [8.0 km] SE of Whitehall (43.41°N, 86.34°W), July 1938, M. Heifetz, AMNH, 1♀; Ottawa Co., Holland (42.79°N, 86.11°W), September 1986, A.R. Brady, HCC, 1♀; Ivan Buren Co., Van Buren State Park (42.33°N, 86.30°W), 1 October 1930, F.J. Hermann, AMNH, 1♀; Washtenaw Co., Ann Arbor (42.28°N, 83.75°W), 29 September 1932, A.M. Chickering, MCZ, 1♀, Chelsea (42.32°N, 84.02°W), 5 September 1978, J. Hodge, AMNH, 1♂; Wayne Co., Ecore (43.74°N, 83.15°W), September 1933, H.M. Zeerman, MCZ, 1♀. *Indiana*, La Porte Co., Smith (40.44°N, 79.24°W), 27 July 1935, D.C. Lowrie, AMNH, 1♀; Posey Co., New Harmony (38.13°N, 87.93°W), no date, N. Banks, MCZ, 2♂. *Wisconsin*: Crawford Co., Gays Mills (43.32°N, 90.84°W), August 1950, L. Kegel, MCZ, 1♀. *Illinois,* La Salle Co., Tonica (41.22°N, 89.07°W), 4 August 1932, W.J. Gertsch, AMNH, 1♀; Ogle Co. (42.05°N, 89.31°W), June, J.A. Allen, MCZ, 2♀. *Iowa*, Clayton Co., McGregor (43.02°N, 91.18°W), no date, no name, MCZ, 1♀. *Missouri,* Crawford Co., 5 mi. [8.0 km] W. of Berryman (37.92°N, 91.10°W), 2 April 1955, R. Crabill, AMNH, 1♀; St. Louis Co., St. Louis (38.63°N, 90.20°W), September 1961, J. Gerard, AMNH, 1♀; Vernon Co., Nevada (37.84°N, 94.35°W), 16 September, 196l, D. & J. McReynolds, MCZ, 1♂, 17 September 1976, D. Lamore , MCZ, 1♀. *Arkansas*, Lawrence Co., Imboden (36.20°N, 91.17°W), 1935, B.C. Marshall, AMNH, 5♂, 7♀; Van Buren Co., Little Red River (34.75°N, 92.13°W), l8 July 1961, no name, MCZ, 1♀. *Texas*, Bexar Co., San Antonio (29.42°N, 98.49°W), 1936, A. Vick, AMNH, 1♀; Dallas Co., (32.80°N, 96.84°W), 5 June 1944, S.E. Jones, MCZ, 1♀.

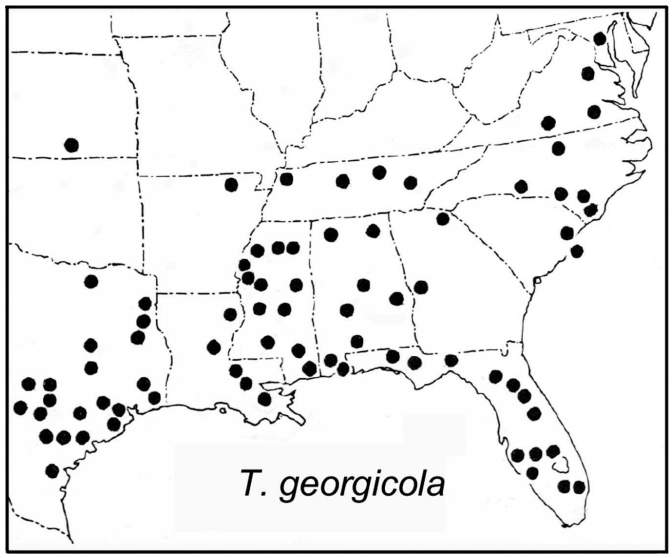
Diagnosis.—*Tigrosa aspersa* can be distinguished from *T. helluo* and *T. annexa* by its larger size. Comparisons of the body lengths of females illustrate these size differences. The mean sizes for the three species are *T. aspersa*, 28 mm; *T. helluo*, 21 mm; *T. annexa*, 13 mm. Size differences can also be seen in carapace widths, dimensions of the eye rows, and leg lengths (Tables 1–3). In *T. aspersa* the restriction of the pale median stripe to the eye region of the cephalothorax in the female (Fig. 10) is a character that distinguishes it from *T. georgicola* (Fig. 16) and *T. grandis* (Fig. 22). In addition the lighter submarginal stripes on the carapace in *T. aspersa* females (Fig. 10) are often broken into shorter segments and appear much less distinct than in females of other species. The LP of the epigynum in *T. aspersa* (Fig. 15) is about as long as the width of the TP, while in *T. georgicola* (Fig. 18) and *T. grandis* (Fig. 26) the LP is longer than the width of the TP. Also the epigynum of *T. aspersa* is spade-shaped and stouter from anterior to posterior than in *T. georgicola* or in *T. grandis*. Male *T. aspersa* have the submarginal stripes on the carapace separated into shorter segments (Fig. 11), unlike *T. georgicola* (Fig. 17) and *T. grandis* (Fig. 23), where they are continuous. The dorsal pattern on the abdomen of *T. grandis* is mottled without distinct chevrons (Fig. 11), while in *T. georgicola* there are broad lighter stripes surrounding the dark cardiac area followed by four to five distinct darker chevrons posterior to the cardiac area (Fig. 17), and in *T. grandis* four to five darker chevrons are usually visible, but lighter markings surrounding the cardiac area are absent. The median apophysis of *T. aspersa* (Fig. 12) is shorter and less developed

Table 3.—Mean and range of ten females and ten males of *Tigrosa georgicola* from Mississippi.

	Mean (range)		Mean (range)
Females			
Anterior eye row	1.63 (1.4–1.9)	Femur I	7.02 (5.9–8.2)
PME width	1.80 (1.6–2.0)	Patella-Tibia I	9.06 (7.4–10.6)
PLE width	2.34 (1.9–2.7)	Metatarsus I	5.36 (4.3–6.1)
POQ length	1.64 (1.4–1.9)	Tarsus I	3.34 (2.7–4.0)
Car. width at PLE	4.43 (3.6–5.7)	Total length I	24.88 (20.2–30.1)
Carapace width	7.13 (5.7–8.6)	Femur IV	7.69 (6.3–9.3)
Carapace length	9.58 (7.6–11.4)	Patella-Tibia IV	9.46 (7.8–10.9)
Body length	20.54 (16.6–22.2)	Metatarsus IV	8.74 (7.7–9.6)
Patella-Tibia II	8.14 (6.7–9.6)	Tarsus IV	3.78 (3.3–4.1)
Patella-Tibia III	6.97 (5.6–8.2)	Total length IV	29.66 (25.1–33.8)
Males			
Anterior eye row	1.32 (1.2–1.6)	Femur I	6.70 (5.3–8.0)
PME width	1.49 (1.3–1.8)	Patella-Tibia I	8.78 (7.2–10.2)
PLE width	1.93 (1.6–2.2)	Metatarsus I	6.26 (5.3–7.2)
POQ length	1.36 (1.2–1.7)	Tarsus I	3.95 (3.3–4.7)
Car. width at PLE	3.21 (2.5–3.9)	Total length I	25.70 (21.1–29.8)
Carapace width	5.64 (4.3–6.8)	Femur IV	7.46 (6.4–8.8)
Carapace length	7.43 (5.6–9.3)	Patella-Tibia IV	8.80 (7.6–10.0)
Body length	14.20 (10.6–17.2)	Metatarsus IV	8.96 (8.0–10.2)
Patella-Tibia II	7.78 (6.4–9.2)	Tarsus IV	3.98 (3.5–4.8)
Patella-Tibia III	6.66 (5.3–8.0)	Total Length IV	29.21 (25.4–33.6)

than in *T. georgicola* (Fig. 20). In *T. aspersa* the palea (Fig. 13) is comparatively smaller than in *T. georgicola* (Fig. 21), and the sclerotized ridges are less prominent in *T. aspersa.*

Color pattern.—*Female:* Dorsal pattern illustrated in Fig. 10. Face reddish brown, ALE row with black nacelles. Chelicerae dark brown to black. Carapace dark reddish brown (mahogany), with black lines radiating from black thoracic groove. Faint lighter brown color forming broken or interrupted submarginal stripes. Dorsum of abdomen brown with only slightly darker stripes surrounding cardiac region. Sometimes with two light spots along anterior region of cardiac area. Four to five slightly darker chevrons on posterior third of abdomen. Venter of abdomen with median longitudinal region light brown. Lateral areas mottled, yellow background covered with dark brown irregular spots (Fig. 44). Legs with prominent dark bands; usually two prominent dark bands on femora, tibiae and metatarsi alternating with two narrow lighter yellowish bands. Thick white scopulae on ventral surfaces of tarsus and metatarsus; dense on legs I and II. Labium and endites dark brown with yellow distal ends. Sternum dark brown without lighter markings. Spinnerets brownish yellow.



Map 3.—Distribution Map of *Tigrosa georgicola.*

Male: Dorsal pattern illustrated in Fig. 11. Face orange to reddish brown. Chelicerae black. Cheliceral condyles orange brown. ALE nacelles black; POQ region black. Thin stripe of white appressed hair from AME to posterior region of PLE. Carapace dark reddish brown with black lines radiating from thoracic groove. Lighter yellow brown submarginal dashes, not forming continuous stripes. Dorsum of abdomen light brown with darker brown markings producing a mottled appearance. Cardiac region with brown lanceolate mark. Two or three faint darker chevrons posteriorly. Venter of abdomen with median area light brown, lateral areas cream to pale yellow, mottled with brown spots, not as distinct as in *T. helluo* and *T. georgicola*. Legs light yellow-brown to yellow, without darker bands as in female, except on leg IV where there are often dusky bands at proximal and distal ends of ventral surfaces. Scopulae on ventral surfaces of metatarsus and tarsus I. Labium and endites brown with yellow distal ends. Sternum brown.

Natural history.—Kaston (1981) reported that this species builds burrows from 5–8.5 inches [12.7–21.6 cm] deep. It comes out at night to hunt, but occasionally during the day it may be found under rocks or in pastures and the edges of woods. In Connecticut males occur in August to October, but females occur from early April to late September. The burrow is often surmounted by a turret of straw and twigs. According to Kaston (1981), mating occurs in the fall, and apparently at least two egg sacs are made each season. Adults probably live

two or three years. Large samples of *T. aspersa* from single localities were not often encountered, suggesting a more sedentary lifestyle than in *T. annexa, T. georgicola, and T. helluo*, but not unlike *T. grandis.* Because of its locally smaller numbers and secretive habits *T. aspersa* is the least common of those species that I have studied.

Distribution.—Ontario, Canada, and Massachusetts in the northeast, southward along the eastern seaboard to North Carolina, and then westward to Kentucky and Tennessee, and in the Midwest from Michigan to Iowa, and then southward to Missouri and Arkansas (Map 2).

Tigrosa georgicola (Walckenaer 1837)
new combination
Figs. 16–21, 42, Map 3, Table 3

Lycosa tarentuloides georgicola Walckenaer 1837:338.
Lycosa riparia Hentz 18*cola* Simon 1864:350.
Lycosa albopunctata Tullgren 1901:18.
Lycosa georgicola Chamberlin & Ivie 1944:143.
Allocosa georgicola Roewer 1955: 210.
Lycosa ripariola Bonnet 1957:2621 (replacement name).

Type material.—USA: *Georgia*, Burke County, specimen lost.

Remarks: Chamberlin (1908) listed *Lycosa georgicola* as an invalid name because the description was based upon the unpublished drawings of John Abbot. However, Chamberlin and Ivie (1944) resurrected the name *Lycosa georgicola* for this species and reproduced Abbot's original drawing #41 as the Type. There has been much controversy over this decision, but subsequent authors, including Roewer (1955), and Platnick (2011) recognized this name as valid. In my opinion Abbot's original drawing, which I have seen and photographed, is an illustration of this species. The only other close relative of *T. georgicola* in the Georgia region that is similar in color pattern is *T. helluo* and this species does not exhibit the banded legs seen in the illustration by Abbot. I have maintained the name *T. georgicola* for the sake of nomenclatural stability.

Other material examined.—USA: *Maryland*, Prince Georges Co., Patuxent Wildlife Refuge (39.07°N, 76.77°W), September 1962, no name, AMNH, 1♂, 3♀. *Virginia*, Fredericksburg [Independent City] (38.30°N, 7746°W), 29 August 1933, W. Ivie, AMNH, 1♂, 1♀; Halifax Co., (36.80°N, 78.88°W), 18 June 1935, no name, AMNH, 1♀ with egg sac; Sussex Co., Stony Creek (36.95°N, 77.40°W), 16 April 1951, Hoffman, AMNH, 1♀. *Tennessee*, Benton Co.(36.12°N, 88.05°W), 7 July 1952, T.J. Walker, Jr., AMNH, 1♀; Davidson Co., Nashville (36.17°N, 86.78°W), 7 May 1955, 1♀ with egg sac, 5 June 1955, 1♀, 20 June 1955, 1♂,1♀, 3 August 1955, 1♀, 22 September 1955, A.R. Laskey, AMNH, 1♂; Jackson Co., Scottsboro (36.22°N, 86.92°W), 1939, A.F. Archer, AMNH, 1♀, 2i; Obion Co., N of Samburg (36.38°N, 89.36°W), 9 July 1936, W.H. Parker, AMNH, 1♀; Roane Co., Kingston (35.88°N, 84.51°W), 12 July 1933, W. Ivie, AMNH, 2♀. *North Carolina*, Bladen Co., White Lake (34.64°N, 78.48°W), 26 March 1933, A.S. Pearse, MCZ, 1♀; Columbus Co., Lake Waccamaw (34.32°N, 78.50°W), 15 April 1933, A.M. Chickering, MCZ, 1♂, 1♀; Durham Co., Chapel Hill Boulevard at New Hope Creek (35.77°N, 79.04°W), 22 August 1963, J.W. Berry, MCZ, 1♂, Duke Forest, Durham (35.98°N, 78.90°W), 3 September 1932, 1♀, 7 July 1933, 1♀ with egg sac, 17–25 April 1935, 2♂, 1♀, 2 May 1938, A.M. Chickering, MCZ, 1♂, New Hope Valley, Durham (35.94°N, 78.95°W), 5 October 1935, A.M. Chickering, MCZ, 1♂; Mecklenburg Co., Davidson (39.50°N, 80.85°W), 20 September 1953, R.D. Barnes, AMNH, 1♀; Orange Co., Barbour Farm, St. Mary's Road (36.10°N, 79.04°W), 22 August 1933, J.W. Berry, MCZ, 1♂; Robeson Co., Maxton (34.74°N, 79.35°W), 15 May 1944, A.B. Klots, AMNH, 2♀. *South Carolina,* Horry Co., Myrtle Beach (33.69°N, 78.89°W), E. Mayr, 15 October 1940, AMNH, 1♂, 2♀, 1i. *Georgia*, Chattahoochee Co., Fort Benning (32.43°N, 84.94°W) 24 October 1943, 2♀, 1i, 6 December 1943, D.E. Beck, AMNH, 1♂; Liberty Co., St. Catherine's Island (31.66°N, 81.15°W) 23–29 April 1982, Rozen & Favreau, AMNH, 1♀; Rabun Co., Clayton (34.88°N, 83.40°W), 12 July 1960, S. & D. Mulaik, AMNH, 1♀. *Florida*, Alachua Co., 8 mi. [12.9 km] W of Gainesville (29.65°N, 82.32°W), 29 March 1957, W.J. Gertsch & R. Forster, AMNH, 1♂, 1♀, Newnan's Lake (29.65°N, 82.32°W), 13 June 1935, W. Ivie, AMNH, 1♀, 18 March 1938, 1♀, 13 April 1938, 1♀, 20 November 1938, W.J. Gertsch, AMNH, 1♀, West shore of Newnan's Lake, Gainesville (29.65°N, 82.32°W), 4 November 1932, 1♀, 22 January 1933, H.K. Wallace, AMNH, 3♂, 21 December 1962, W. Ivie, AMNH, 2♂, Sugarfoot Hammock (29.66°N, 82.30°W), 19 March 1938, W.J. Gertsch, AMNH, 10♂, 15♀, 1 egg sac, 3i; Broward Co, Palm Forest (26.04°N, 80.31°W), 1938, D. Cottam, AMNH, 2♀; Charlotte Co., Punta Gorda (26.93°N, 82.05°W), February 1941, Ramstadt, AMNH, 1♀; Collier Co., Tamiami Trail at Turner River (25.89°N, 81.26°), 18 December 1962, W. Ivie, AMNH, 1♀; Dade Co., Miami (25.79°N, 80.23°W), H.K. Wallace, 1 February 1947, 1♂; Highlands Co., Highlands Hammock State Park (27.46°N, 81.55°W), 24 March 1938, W.J. Gertsch, AMNH, 3♂, 9♀, 6i, 20 April 1973, A.R. Brady, HCC, 1♀; Jackson Co., Spring Lake (30.70°N, 85.29°W), 10 July 1981, W.H. Cross, MSST, 1♂, 3♀; Leon Co., Tall Timbers Research Station (30.49°N, 84.19°W), 9 June 1968, A.R. Brady, MCZ, 1♀; Liberty Co., Blountstown (30.44°N, 85.04°W), 17 April 1938, W.J. Gertsch, AMNH, 1♀, Torreya State Park (30.57°N, 84.95°W), 16 April 1938, W.J. Gertsch AMNH, 2♂, 1♀ with egg sac, 31 March 1964, H.W. Levi, 1♀, 28 March 1965, A.R. Brady, HCC, 1♀, 12 May 1997, C.T. Reif & J.M. Ziter, HCC, 1♀, 13 May 1997, A.R. Brady, HCC, 1♀, 22 June 1997, A.R. Brady, 1♀, 27 December 1997, A. Wyatt, HCC, 1♀; Monroe Co., Key West (24.55°N, 81.80°W), 5 February 1967, no name, AMNH, 1♀; Okeechobee Co., Okeechobee (27.25°N, 80.83°W), 29 March 1938, W.J. Gertsch, AMNH, 1♀; Putnam Co., Welaka Reserve (29.48°N, 81.67°W), 5 May 1973, A. Jung, HCC, 1♀; Sarasota Co., Myakka River State Park (30.49°N, 84.19°W), 7 March 1963, H.& L. Levi, MCZ, 1♀; Seminole Co., Geneva (28.74°N, 81.11°W), 11 April 1938, W.J. Gertsch, AMNH, 3♂; Volusia Co., Deland (29.03°N, 81.30°W), F.E. Lutz, 25 May 1939, AMNH, 1♀, Enterprise (28.87°N, 81.27°W), no date, N. Banks, MCZ, 1♀, 1i. *Alabama*, Baldwin Co., Fish River (30.45°N, 87.80°W), 14 July 1930, S. Creighton, MCZ, 2♀; Coosa Co., Hatchet Creek (32.87°N, 86.32°W), June 1940, A.F. Archer, AMNH, 5i; Dallas Co., Selma (32.41°N, 41.87°W), no date, R.V. Chamberlin, MCZ, 1♀; Escambia Co., Flomaton (31.00°N, 87.26°W), August 1903, A P. Morse, MCZ, 1♀; Humphreys Co., (33.17°N, 90.53°W), 10–30 November 1937, no name, AMNH, 1♂; Jackson Co., Guess' Creek (34.75°N, 86.23°W),

July 1940, A.F. Archer, AMNH, 1♀, Scottsboro (34.67°N, 86.03°W), 1939, A.F. Archer, AMNH, 1♀, 1i; Lawrence Co., Black Warrior National Forest (34.56°N, 87.30°W), June 1939, A.F. Archer, AMNH, 1♀; Lee Co., Auburn (32.61°N, 85.48°W), R.V. Chamberlin, no date, MCZ, 1♀. *Mississippi*, Forest Co., Camp Shelby, Hattiesburg (31.18°N 89.20°W), October–November 1945, C. D. Michener, AMNH, 1♀; Jackson Co., Ocean Springs (31.0°N, 86.86°W), 2 August 1961, G. Gunter, MCZ, 1♀, (86.03°W), 1939, A.F. Archer, AMNH, 1♀, 1i, Vancleave (30.54°N, 88.69°W), no name, 10–30 November 1937, AMNH, 1♂; Lafayette Co., Oxford (34.36°N, 89.52°W), 20 July 1991, A.R. Brady, HCC, 1♂; Lincoln Co., 19 July 1910, R.V. Chamberlin, AMNH, 1♀; Madison Co., 1 mi. [1.6 km] N of Ridgeland (32.43°N, 90.14°W), 3 October 1982, T.C. Lockley, HCC, 1♂; Mobile Co., (34.57°N, 87.30°W), no date, H.P. Loding, MCZ, 1♀; Oktibbeha Co., Craig Springs (33.32°N, 88.92°W), 1 October 1979, 1♂, 3 October 1979, 1♂, 29 October 1979, G. L. Snodgrass, MSST, 3♂, Mississippi State University (33.45°N, 88.79°W), 3 April 1904, no name, AMNH, 1♀, B. Booth, 22 July 1983, MSST, 1♀, Starkville (33.47°N, 88.81°W), 5 June 1980, 1♀, 2 July 1980, 1♀, 3 July 1980, 1♀, 26 September 1980, 2♂, 1♀, 10 October 1980, 2♂, 1i, 2 August 1982, W.H. Cross, MSST, 2♂, 1♀, 18 August 1982, P.R. Miller, MSST, 2i, 25–27 Aug.1982, T.C. Lockley, HCC, 1♀, 29 April–2 May 1983, 1♂, 2–4 May 1983, 1♀, 1–13 May 1983, 1♀, 6–8 June 1983, 2♂, 10–14 June 1983, 1♂, 2♀, 15–17 June 1983, 1♂, 28 June–1 July 1983, 2♂, 1–6 July 1983, 1♂, 11–13 July 1983, 1♀, 21–25 July 1983, 1♀ with egg sac, 22 July 1983, 1♀, 24 August 1983, 1♀, 23–25 August 1983, T.C. Lockley, HCC, 1♀; Panola Co., 11 mi. [17.7 km] SW of Bates (30.72°N, 88.178°W), 1 August 1979, W.H. Cross, MSST, 1♂; Perry Co. (31.17°N, 89.02°W), 24 March 1938, 1♀, 1–11 May 1938, AMNH, S.C. Bishop, 2♀; Pontotoc Co., 1 mi. [1.6 km] SE of Ecru (34.35°N, 89.03°W), 5 June 1980, 1♀, 6 June 1980, 2♂, 17 June 1980, 1♀, 19 June 1980, 2♂, 2 July 1980, 1♀, 3 July 1980, 1♀, 1 August 1980, 1♀, 14 August 1980, 26 September 1980, 2♂, 1♀, 10 October 1980, 2♂, 1i, W.H. Cross, MSST, 1♀, 6 June 1980, P.R. Miller, MSST, 1♂, 1i; Rankin Co., Thompson Field (32.32°N, 89.99°W), 1–3 October 1982, 2♂, 7–9 January 1983, 1♂, 21 April 1983, 1♂, 1i, 9–11 May 1983, 1♂, 13–15 May 1983, 2♂, 8–10 July 1983, 1♂, 7 August 1983, 1♂, 9–11 September 1983, 1♀ with young, T.C. Lockley, HCC, 1♀; Scott Co., Roosevelt State Park (32.31°N, 89.69°W), 26 August 1940, S. & D. Mulaik, AMNH, 1♂; Washington Co., Leland (90.90°N, 33.40°W), 19 June 1982, 1♀, 27 July 1982, 1♂, 17–20 December 1982, 1♂, T.C. Lockley, HCC, 1♂,1i, 15–18 July 1983, 1♀, T.C. Lockley, HCC, 5 mi. [8.0 km] SSE of Leland (90.90°N, 33.40°W), 19–23 August 1982, 1♂, 25–27 August 1982, HCC, T.C. Lockley, HCC, 1♂, 2 mi. [3.2 km] N of Stoneville (33.42°N, 90.92°W), 31 May–2 June 1982, 2♂, 19 August 1982, 1♀, 13–16 August 1982, 1i, 18–20 August 1982, 1i, 23–25 August 1982, 1♀, 25–27 August 1982, 1♀, 27–30 August 1982, 1♀, 8–10 September 1982, 1♂, 15–17 September 1982, 2♂, 24–27 September 1982, 1♂, 27–29 September 1982, 3♂, 29 September–1 October 1982, 3♂, 3 October 1982, 1♂, 1–4 October 1982, 6♂, 20–22 October, 1♂, 1♀, 29 October–1 November, 1i, 1982, 29 November–1 December 1982, 1♂, 4 April 1983, 1i, 30 April–2 May 1983, 1♂, 7 May 1983, 2♂, 6–9 May 1983, 1♂, 1i, 11–13 May 1983, 1♂, 1♀, 31 May–2 June 1983, 1♂, 3–6 June 1983, 4♂, 3i, 6–8 June, 1983, 5♂, 8–10 June, 1983, 1♂, 10–14 June 1983, 1♂, 2♀, 15–17 June 1983, 1♂, 20–22 June 1983, 1♂, 26–28 June 1983, 3♂, 28 June–1 July 1983, 2♂, 1–6 July 1983, 1♂, 11–13 July, 1♀ with young, 13–15 July, 2♂, 21–25 July 1983, 1♀ with egg sac, 25–28 July 1983, 1♂, 27 July 1983, 1♀, 28 July–1 August 1983, 2♂, 1 August 1983, 1♀, 12–13 August 1983, 1♂, 15 August 1983, 1 ♀, 16 August 1983, 1♀, 18–2l August, 1♂, 24 August 1983, 1♀, 1 September 1983, T.C. Lockley, HCC, 1♀; *Louisiana*, Ascension Par., Gonzales (39.24°N, 90.92°W), 31 August 1940, S. & D. Mulaik, AMNH, 2♀, 4i; Catahoula Par., Camp Plauche (31.24°N, 92.15°W), 4 April 1944, D.E. Beck, AMNH, 1♀ with egg sac; East Baton Rogue Par., (30.97°N, 91.52°W), July 1955, no name, AMNH, 1♀; Madison Par., Tallulah (32.41°N, 91.19°W), L.I. Davis, 6 June 1930, AMNH, 2♂, February 1935, J.W.F., AMNH, 1♀; Orleans Par., New Orleans (29.96°N, 90.07°W), 16 January 1920, H.E. Hubert, HCC, 3♀, 8 May 1945, W. Spector, AMNH, 3♀, 14 October 196l, G. Walker, AMNH, 1♂, ♀. *Arkansas*, Lawrence Co., Imboden (36.20°N, 91.17°W), 1935, B.C. Marshall, AMNH, 1♂, 4♀, 1i. *Kansas*, Cowley Co., Winfield (37.24°N, 97.00°W), no date, no name, AMNH, 3♀. *Texas*, Austin Co., Sealy (29.78°N, 96.16°W), 19 April 1942, O. Sanders, AMNH, 1♀; Bastrop Co., Bastrop State Park (30.11°N, 97.26°W), 25 October 1958, A.R. Brady, MCZ, 1♀, 1i; Brazos Co., College Station (30.63°N, 96.33°W), June 1939, H. Menusan, AMNH, 1♀, 2.4 mi. [3.86 km] S of Old Ocean (29.08°N, 95.75°W), 23 December 1961, R.O. Albert, MCZ, 1♀; Caldwell Co., Luling (29.68°N, 97.65°W), 11 April 1948, A. Flury, AMNH, 5♀, 1 egg sac; Comal Co., Honey Creek Ranch (29.81°N, 98.22°W), 29 October 1983, T.C. Lockley, HCC, 1♀; Gonzales Co., Palmetto State Park (29.96°N, 96.16°W), W. F. Blair & K. Baker, AMNH, 1♀, 2 July 1979, A.R. Brady, M.A. Brady & W. Webb, HCC, 3♀, 8i, 3 July 1979, M.A. Brady, HCC, 2♀, 1i, 11–12 July 1993, A.R. Brady, HCC, 1♂, 1 ♀ with young; Grayson Co., Sherman (33.64°N, 96.61°W), 4 July 1964, K.W. Haller, AMNH, 1♀, 17 May 1965, K.W. Haller, AMNH, 1♀; Hardin Co., Saratoga (30.28°N, 94.53°W), 22 November 1958, A.R. Brady, MCZ, 3♀, 1i, 5 mi. [8.0 km] SW of Saratoga (30.28°N, 94.53°W), 2 May 1948, D.L. Jamison, AMNH, 1♀; Harris Co., Houston (29.76°N, 95.37°W), 22 March 1936, no name, AMNH, 1♀, Spring Creek near Houston (29.87°N, 95.66°W), 27 March 1936, no name, AMNH, 1♀; Harrison Co., Caddo Lake State Park (32.68°N, 94.18°W), 22 August 1940, S. & D. Mulaik, AMNH, 1♀; Hays Co., (30.05°N, 98.00°W), 15 April 1939, D. & S. Mulaik, AMNH, 1♂, 3♀, San Marcos (29.88°N, 97.94°W) 22 April 1935, Vogelsang, MCZ, 1♀; Jefferson Co., Beaumont (30.09°N, 94.10°W), April–June 1946, E.D. Palmer, MCZ, 2♀; Jim Wells Co., Alice (27.75°N, 98.07°W), 1–18 June 1961, R.O. Albert, MCZ, 1♀; Karnes Co., San Antonio River near Runge (28.88°N, 97.21°W), 1959, J.C. Bequaert, MCZ, 1♀; Kerr Co., Raven Ranch (30.09°N, 99.46°W), August 1934, D. Mulaik, AMNH, 1♀; Leon Co., Birch Creek near Marquez (31.30°N, 96.32°W), 26 October 1958, A.R. Brady, MCZ, 1♂, 3♀; Nacogdoches Co., Nacogdoches (31.60°N, 94.66°W), 11 August 1964, J. & W. Ivie, AMNH, 1♀; Panola Co., Sabine River, NE of Carthage (32.16°N, 94.34°W), 12 April 1963, W.J. Gertsch, W. Ivie, AMNH, 1♀ with egg sac; San Patricio Co., 8 mi. [12.9 km] SE of Sinton (28.04°N, 97.51°W), 28 April 1960, 2♂, 1i, 26 May 1960, H.E. Laughlin, AMNH, 2♂; Travis Co., Zilker Park,

Austin (30.26°N, 97.77°W), 11 March 1946, A. Flury, AMNH, 1♀.

Diagnosis.—*Tigrosa georgicola* (Figs. 16, 17) most closely resembles *T. helluo* (Figs. 28, 29) in dorsal color pattern, but it tends to be larger than *T. helluo*, for example in average body length *T. georgicola* measures 21 mm, but *T. helluo* measures 17 mm. Dimensions of the eye rows and length of legs also illustrate the size difference (compare Table 3 with Table 5). In addition the legs of *T. georgicola* have dusky bands or markings. The venter of *T. georgicola* (Fig. 42) consists of longitudinal rows of dark spots or dashes that produce a much darker appearance than in the spotted venter of *T. helluo* (Fig. 41). Although *T. georgicola* and *T. aspersa* are similar in size, the median stripe in female *T. georgicola* extends from the PME region to the posterior declivity (Fig. 16), while in *T. aspersa* it is restricted to the eye region (Fig. 10). In male *T. georgicola* the submarginal stripes are clearly visible and extend posteriorly from the cephalic region to the posterior declivity (Fig. 17), but in *T. aspersa* the submarginal stripes are represented by a series of disconnected shorter segments (Fig. 11). In *T. georgicola* the MA of the palpus (Fig. 20) is more strongly developed than in *T. aspersa* (Fig. 12), and the palea in *T. georgicola* is squarer in retrolateral view (Fig. 22) than in *T. aspersa,* where it is smaller and rectangular (Fig. 13).

Remarks.—It is difficult to know why Roewer (1955) placed *T. georgicola* in the genus *Allocosa* (Banks 1900). He did not describe any essential characteristics that *T. georgicola* might share with *Allocosa*, nor did he offer any significant diagnosis of *T. georgicola. Tigrosa georgicola* is much larger than species of *Allocosa* in North America. Body morphology and eye arrangement are different in the two genera. There are also differences with respect to choice of habitat and foraging behavior between representatives of these two genera. Most importantly the characteristics of the male palpus and female genitalia differ significantly between *Tigrosa* and species of *Allocosa.* On the other hand *T. georgicola* is very similar to other species of *Tigrosa* with respect to the taxonomic characteristics explored in this investigation.

Occasionally in *T. georgicola* the dark color covers much of the ventral surface and led Chamberlin & Ivie (1944) to describe the melanic form as *Lycosa wallacei.* Although they indicate differences in the epigyna of these two ''species'', they do not elaborate upon the differences. The males were described as ''essentially the same''. In *Lycosa wallacei* the legs often lack distinct annulations, adding to the color differences, but I am unable to find consistent genitalic differences between those with a black venter and the more common venter described above. Whether one or two species is involved remains to be determined by closer scrutiny of populations by arachnologists in the field.

Color pattern.—*Female:* Dorsal pattern illustrated in Fig. 16. Face reddish brown to dark brown, lighter color lateral to AME row. Chelicerae black, condyles dark reddish brown. Carapace orange brown with dark brown to black lines radiating from thoracic groove. Eye region dark brown to black. Median longitudinal pale-yellow stripe from AME row to posterior declivity, clothed with white to cream colored hair, between PME to PLE. Submarginal pale yellow to orange brown submarginal stripes with uneven margins. In some specimens the submarginal lighter stripes essentially reach the edge of the carapace, separated from the edge by narrow darker margins. Dorsum of the abdomen uniformly brown with dark brown cardiac mark accented by lighter color. Only a very faint suggestion of chevrons or none at all posterior to cardiac area (Fig. 16). Venter of abdomen with three central dark stripes originating at the epigastric furrow and converging at base of spinnerets. Laterally there are dark irregular spots against a lighter brownish yellow background (Fig. 42). Legs light yellow orange to pale yellow brown without distinct darker bands or with three gray bands on dorsal surfaces of femora III and IV. Legs lighter yellow to pale orange ventrally. Labium dark brown to black with yellowish distal ends. Sternum as well as ventral coxae dark brown to black.

Male. Pattern illustrated in Fig. 17. Face brown below anterior eye row; lateral area (cheeks) yellow and darker brown above. Eye region black. Thin white stripe from AME, running between PME. Chelicerae dark brown to black. Carapace orange brown with broad pale yellow marginal stripes with dark outer edges. Thin median pale yellow stripe from PME to posterior declivity, clothed with white hair between AME to PME. Dorsum of abdomen light brown, mottled with darker spots and suffused with white hair. Distinct brownish orange lanceolate shaped cardiac mark bordered by dark brown (Fig. 17). Venter of abdomen pale brown (beige), lighter cream to yellow above epigastric furrow. Three longitudinal rows of darker brown spots, the lateral rows beginning at the corners of the epigastric furrow and converging with the median row in front of the spinnerets. Dark brown spots against cream to light brown in lateral areas (similar to the female in Fig. 42). Legs yellow without dusky bands as in female. Ventral surfaces pale yellow to cream. Labium and endites light brown with yellow distal ends. Sternum light brown with pale yellow dash posterior to labium.

Natural history.—*Tigrosa georgicola* occurs widely in the southeastern United States, where it is found in deciduous woods, often under logs during the day and hunting over leaf litter at night. It occasionally occurs in short herbaceous vegetation at the edge of woods. This species overlaps in distribution with *T. helluo* and *T. annexa.* The former species is found in wetter habitats, such as swamps and bogs, and the latter is found in drier habitats, such as grass or cotton fields. Although *T. aspersa* overlaps in distribution with these three species, it apparently stays closer to its burrow, not wandering far from its retreat in search of food.

Tigrosa grandis (Banks 1894)
new combination
Figs. 22–27, 43, Map 4, Table 4

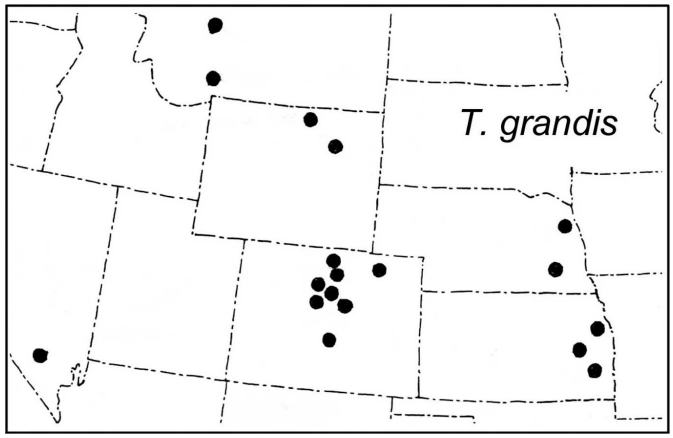
Lycosa grandis Banks 1894:49; Chamberlin 1908:229.
Lycosa permunda Chamberlin 1904:286; Chamberlin 1908:233.
Geolycosa grandis Roewer 1955:244; Platnick 2011.
Hogna permunda Roewer 1955:259; Platnick 2011.
Hogna grandis Slowik & Cushing 2009:261; Platnick 2011.

Type material.—*Holotype:* USA: *Colorado*, Larimer County, Fort Collins (40.35°N, 105.05°W), elev. 1525 m, no date, ♂, MCZ. Examined. *Holotype male* and *paratype female: Lycosa permunda* Chamberlin 1904. USA: *Kansas,* no date. Unable to locate specimens.

Table 4.—Mean and range of ten females and ten males of *Tigrosa grandis* from Colorado.

	Mean (range)		Mean (range)
Females			
Anterior eye row	1.85 (1.6–2.1)	Femur I	7.21 (5.6–8.8)
PME width	1.96 (1.6–2.2)	Patella-Tibia I	9.20 (6.8–10.8)
PLE width	2.67 (2.1–3.1)	Metatarsus I	4.95 (3.7–5.9)
POQ length	1.83 (1.5–2.2)	Tarsus I	3.17 (2.5–3.7)
Car. width at PLE	5.52 (4.1–6.9)	Total length I	24.39 (18.6–28.7)
Carapace width	8.39 (6.4–10.2)	Femur IV	8.09 (6.3–9.7)
Carapace length	11.12 (8.6–13.2	Patella-Tibia IV	9.75 (7.6–11.3)
Body length	22.48 (17.6–28.2)	Metatarsus IV	8.10 (7.2–9.6)
Patella-Tibia II	8.33 (6.3–9.8)	Tarsus IV	3.71 (2.9–4.1)
Patella-Tibia III	7.42 (5.6–8.8)	Total length IV	29.65 (22.6–34.3)
Males			
Anterior eye row	1.87 (1.7–2.1)	Femur I	8.72 (7.8–9.4)
PME width	2.08 (1.9–2.2)	Patella-Tibia I	11.20 (10.2–12.8)
PLE width	2.79 (2.5–3.0)	Metatarsus I	6.93 (6.4–7.8)
POQ length	1.98 (1.7–2.3)	Tarsus I	4.28 (4.0–5.1)
Car. width at PLE	5.47 (4.5.–6.0)	Total length I	31.26 (28.6–35.1)
Carapace width	9.11 (7.8–10.4)	Femur IV	9.67 (8.5–10.6)
Carapace length	11.89 (10.4–13.3)	Patella-Tibia IV	11.62 (10.5–13.0)
Body length	22.22 (20.1–25.3)	Metatarsus IV	10.27 (9.3–12.0)
Patella-Tibia II	10.16 (9.0–11.6)	Tarsus IV	4.43 (4.1–4.9)
Patella-Tibia III	8.92 (8.2–10.2)	Total Length IV	35.99 (32.6–40.0)

Other material examined.—*Nebraska*, Lincoln, W. Clanton (40.81°N, 96.68°W), 28 August 1923, no name, AMNH, 1♂. *Kansas*, Franklin Co. (38.62°N, 95.31°W), 1935, AMNH, 1♂. Linn Co., Parker (38.33°N, 94.99°W), 4 October 1965, B. Reeves, AMNH, 1♀. Wyandotte Co., Mission Grade School, 2 mi. [3.2 km] N of Bonner Springs (39.16°N, 94.83°W), 29 September 1977, R. Hugging, DMNS, 1♂. *Montana*, Cascade Co., Great Falls (47.50°N, 111.30°W), no name, 15 August 1976, AMNH, 1♂, 1♀; Gallatin Co., Bozeman (45.68°N, 111.05°W), no date, H.B. Mills, AMNH, 1♀ with young). *Wyoming*, Campbell Co., Gillette, (44.29°N, 105.50°W), June 2005, no name, DMNS, 1♂, 1♀; *Sheridan Co*., Sheridan (44.80°N, 106.96°W), 29 June l949, D. G. Penning, AMNH, 1♀ with egg sac. *Colorado*, Arapahoe Co., Aurora (39.65°N, 104.75°W), 20 August 2001, B. Shipley, DMNS, 1♀, 2 mi. [3.2 km] E of Marshall (39.96°N, 105.23W), 16 April 1961, B. Vogel, DMNS, 1♀, I-70, 0.5 mi. [0.80 km] N of Elberta Co. Line (39.58°N, 104.02°W), 30 August 2004, H. Guarisco, DMNS, 1♀; Boulder Co., (40.01°N, 105.27°W), 19 May 1912, Betts, AMNH, 1♀ with egg sac; Denver Co., Denver (39.74°N, 104.98°W), 8 August 1971, Lamore, AMNH, 1♀, Washington Bay in Denver near Southwest Plaza (39.83°N, 105.20°W), October 1998, D.M. Endricks, DMNS, 1♀; El Paso Co., Billerest Terrace (38.88°N, 104.76W), 16 July 2001, A. Broughton, DMNS, 1♀; Jefferson Co., Arvada (39.80°N, 105.09°W), 8 July 1933, C.H. Moss, AMNH, 1♀ with egg sac, 9797 West Ohio Avenue, Lakewood (39.70°N, 106.11°W), August 2001, E. House, DMNS, 1♂; *Larimer Co*., 1756 Haase Court, Berthoud (40.31°N, 105.81°W), 18–20 August 1999, P. Phillips, DMNS, 1♂, 2120 Bridgefield Lane, 24205 Colorado Ave., Loveland (40.37°N, 105.08°W), 30 July 1999, D. Goldade, 1♀, 7894 Little Fox Lane, Wellington (40.70°N, 105.00°W), 14 September 2000, M. Payew, DMNS, 1♀, Dixon Reservoir (40.55°N, 105.14°W), 24 May 2000, D. Chlebown, DMNS, 1♀, Environmental Learning Center (40.57°N, 105.01°W), 25 September 1999, J.M. Diez, DMNS, 1♀, Fort Collins (40.56°N, 105.10°W), 29 August 2004, J. Enstrom, DMNS, 1♀, Ft. Collins (40.58°N, 105.11°W), 10 August 1970, 1♂, 4 January 1971, 1♀, 30 August 1973, 1♀, 18 September 1973, 1♀, 1 September 1977, 1♂, 1♀, 15 July 1980, 1♀, 24 November 1980, 1♂, 4 March 1985, W.D. Frank, DMNS, 1♂, 22 October 1982, D. Clarkson, DMNS, 1♀, 9 August 1987, D. Johnson, DMNS, 1♂, 13 June 1989, 7 August 1990, Kilburn, DMNS, 1♂, B. Holter, DMNS, 1♀, 1 September 1990, no name, 1♀, 23 September 2001, L. Sander, DMNS, 1♂, Loveland (40.40°N, 105.11°W), 10 October 1967, 1♀, W.D. Frank, DMNS, 1♀, DMNS, 1♀; Weld Co., Bones Galore Paleo Site, Pawnee National Grassland (40.73°N, 103.80°W), 15 August 2001, T. Hiester, DMNS, 1♂. *Nevada*, Nye Co., Mercury Test Site (36.66°N, 116.00°W), 18 June l963, G. Hayward, AMNH, 2♂. *Montana*, Cascade Co., Great Falls (47.50°N, 111.30°W), 15 August 1976, B. Cutler, AMNH, 1♂, 1♀.



Map 4.—Distribution Map of *Tigrosa grandis*.

Diagnosis.—*Tigrosa grandis* and *T. aspersa* are the two largest species of *Tigrosa.* Most specimens of *Tigrosa grandis* were collected west of the 100th meridian (Map 4), and most specimens of *T. aspersa* were collected east of the 100th meridian (Map 2). In female *T. grandis* the median longitudinal light stripe originates in the AME region and extends to the posterior declivity of the carapace (Fig. 22), while in *T. aspersa* it is limited to the cephalic region (Fig. 10). In female *T. grandis* the LP of the median septum of the epigynum (Fig. 26) is narrower than in *T. aspersa* (Fig. 15) and the TP in *T. aspersa* is more spade-shaped than T-shaped. In *Tigrosa grandis* the LP is shorter and the TP is thicker than in *T. helluo* (Fig. 33). The atrium of the epigynum in *T. grandis* is not as pronounced as in *T. georgicola* (Fig. 18), and the TP is thicker. The bilobed terminal chamber of the spermathecae of *T. grandis* (Fig. 27) distinguishes it from females of *T. aspersa* (Fig. 14) and *T. georgicola* (Fig. 19). Male *T. grandis* (Figs. 24, 25) have a shorter median apophysis (MA) than *T. helluo* (Figs. 30, 31) and *T. georgicola* (Figs. 20, 21). The submarginal stripes on the carapace in male *T. grandis* are continuous from the posterior cephalic region to the posterior declivity (Fig. 23), while in *T. aspersa* the stripes consist of disconnected segments (Fig. 11). Also, the dorsum of the abdomen in *T. grandis* is uniformly brown except for the dark cardiac mark and a series of darker chevrons posterior to the cardiac area (Fig. 23), while in *T. aspersa* the dorsum is mottled in appearance without distinct chevrons posterior to the cardiac area (Fig. 11).

Color pattern.—*Female:* Dorsal pattern illustrated in Fig. 22. Face dark brown with eye nacelles black. White appressed hair lateral to AME row in cheek area. Chelicerae black, hirsute. Thin yellow line from AME extending between PME with width one-half the diameter of PME. Carapace dark reddish brown with black lines radiating from thoracic groove. Narrow median longitudinal stripe, yellow to tan in color, extending from AME region to posterior declivity, slightly wider as it surrounds thoracic groove. Lighter tan uneven or scalloped submarginal stripes, less conspicuous than median longitudinal stripe. Dorsum of abdomen dark brown with black, oblong rectangular mark surrounding cardiac area. Three to four darker chevrons posterior to cardiac region, accented with white and with white dots at edges. Venter with central area cream to light brown or tan from epigastric furrow, tapering to base of spinnerets. Epigastric region cream to yellow. Lateral areas mottled with dark brown spots against a lighter background (Fig. 43). Legs tan to light brown, darker than in male. Labium dark reddish brown with yellow distal ends. Sternum dark reddish brown with median yellow dash or short line.

Male. Pattern illustrated in Fig. 23. Face dark reddish brown with covering of lighter appressed hair on clypeus. Chelicerae dark reddish brown with black condyles. Narrow yellow line from AME running between PME. Carapace dark reddish brown with black lines radiating from thoracic groove to submarginal stripes. Narrow median yellow line from PME to posterior declivity, widest at thoracic groove. Pale scalloped submarginal stripes present, but not as sharply delineated as in female. Dorsum of abdomen mottled brown and pale yellow with brown lanceolate mark in cardiac region. Three or four darker chevrons on posterior half. Lateral areas lighter in color. Venter of abdomen cream to pale yellow without darker spots or stripes. Legs light brown on dorsal surfaces, lighter brown to yellow ventrally. Labium dark brown to black with yellow distal ends. Sternum light brown with faint median longitudinal stripe. For slightly different and more detailed description see Slowik & Cushing (2009).

Natural history.—Slowik has personally observed *T. grandis* occupying burrows and wandering at night in search of prey (Slowik & Cushing 2009). This behavior is not unlike that of *Hogna carolinensis* (Walckenaer 1805). The burrows ranged from 2–4 inches [5.1–10.2 cm] in depth, but were not surmounted by turrets, as is often the case with *H. carolinensis.* Deeper burrows were vertical with a small cavity at the base, while shallower burrows tended to be more horizontal in position.

Distribution.—*Tigrosa grandis* has been found from eastern Kansas southwestward to Nevada and northwestward to Montana (Map 4). Slowik & Cushing (2009) report collecting *T. grandis* from the grasslands east of the Rocky Mountains in Wyoming and Colorado and west into the San Luis Valley of Colorado. Misidentification of specimens of *T. helluo* from Nebraska as *T. grandis* has created discrepancies in the distribution records for these two species. Apparently neither *T. helluo* nor *T. aspersa*, which occur more eastward than *T. grandis,* are found in Wyoming or Colorado. See Slowik and Cushing (2009) for a more detailed discussion of this situation.

Tigrosa helluo (Walckenaer 1837)
new combination
Figs. 28–33, 41, Map 5, Table 5

Lycosa helluo Walckenaer 1837:337; Chamberlin 1908:226; Comstock 1913:633, 1940:645; Muma 1943:46; Kaston 1948:327; Griswold 1993:3.
Lycosa sayi Walckenaer 1837:337.
Lycosa babingtoni Blackwall 1846:30.
Tarentula vafra C. L. Koch 1847:135.
Leimonia helluo Simon 1864:351.
Leimonia sayi Simon 1864:351.
Trochosa helvipes Keyserling 1877:659.
Lycosa nidicola Emerton 1885:482, 1902:69; Montgomery 1902:559. *Lycosa crudelis* Banks 1892:66.
Hogna helluo Roewer 1955:258; Dondale & Redner 1990:51; Bennett 1992:8; Paquin & Dupérré 2003:161; Slowik & Cushing 2009:263.

Type material.—Holotype: USA, *New York*, specimen lost.

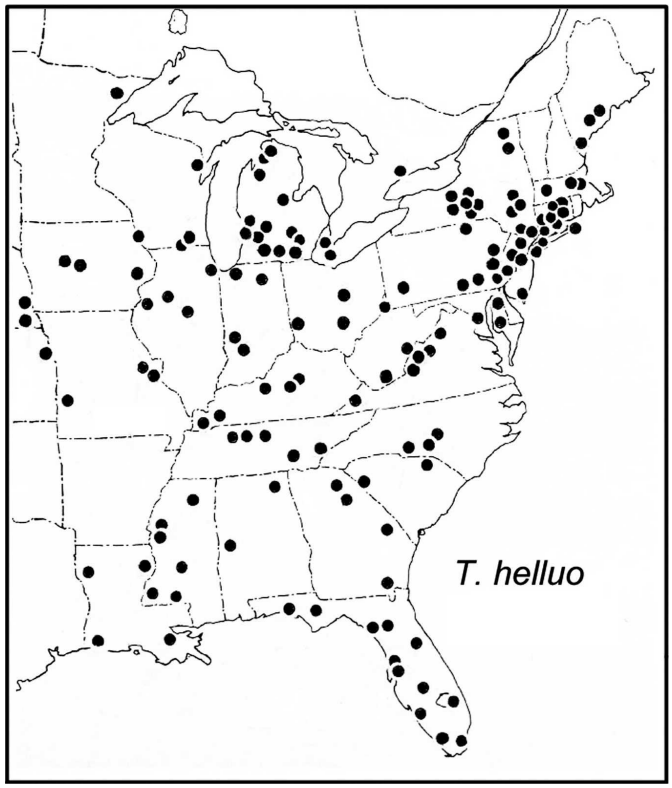
Remarks.—Walckenaer (1837) provided a brief written description of *Lycosa helluo*, presumably based upon specimens that he had examined. Unfortunately no one has been able to locate these specimens. Chamberlin (1908) based his determination of *Lycosa helluo* upon Walckenaer's description. Chamberlin (1908) then provided a lengthy description and illustrations of the epigynum and male palpus of what he called *Lycosa helluo* Walckenaer. This diagnosis established the identity of *Lycosa helluo* and was recognized by subsequent North American arachnologists, particularly Comstock (1913) and Kaston (1948, 1981). In my opinion Chamberlin's description is diagnostic and Walckenaer's name for this species should be retained for the sake of nomenclatural stability.

Other material examined.—CANADA: *Ontario*, Essex Co., Pelee Island (41.77N°, 82.69°W), 4–16 June 1950, W. Ivie & T.B. Kurata, AMNH, 3♀, Point Pelee National Park (41.95°N, 82.51°W), 5 September 1953, D.E. Johnston, AMNH, 1♀; Highland Creek near Toronto (43.78°N, W79.17°W) 24 July

Table 5.—Mean and range of ten females and ten males of *Tigrosa helluo* from New York.

	Mean (range)		Mean (range)
Females			
Anterior eye row	1.49 (1.32–1.7)	Femur I	5.76 (4.8–6.7)
PME width	1.66 (1.6–1.9)	Patella-Tibia I	7.29 (6.0–8.5)
PLE width	2.17 (1.9–2.5)	Metatarsus I	4.03 (3.3–4.7)
POQ length	1.51 (1.4–1.7)	Tarsus I	2.70 (2.3–3.1)
Car. width at PLE	4.00 (3.3–4.8)	Total length I	19.78 (16.6–22.9)
Carapace width	6.42 (5.3–7.6)	Femur IV	6.56 (5.5–7.7)
Carapace length	8.39 (6.9–9.7)	Patella-Tibia IV	7.93 (6.7–9.0)
Body length	17.46 (14.9–21.5)	Metatarsus IV	6.92 (6.0–8.0)
Patella-Tibia II	6.57 (5.3–7.7)	Tarsus IV	3.31 (2.7–3.7)
Patella-Tibia III	5.83 (4.8–6.7)	Total length IV	24.71 (21.0–28.5)
Males			
Anterior eye row	1.09 (.96–1.2)	Femur I	4.92 (4.0–5.7)
PME width	1.24 (1.1–1.4)	Patella-Tibia I	6.50 (5.3–7.7)
PLE width	1.60 (1.4–1.8)	Metatarsus I	4.42 (3.5–5.2)
POQ length	1.15 (1.0–1.3)	Tarsus I	2.79 (2.3–3.2)
Car. width at PLE	2.51 (2.1–2.9)	Total length I	18.63 (15.0–21.8)
Carapace width	4.43 (3.7–5.2)	Femur IV	5.55 (4.7–6.5)
Carapace length	5.80 (4.9–6.9)	Patella-Tibia IV	6.77 (5.5–7.8)
Body length	11.25 (9.6–12.9)	Metatarsus IV	6.40 (5.2–7.6)
Patella-Tibia II	5.71 (4.7–6.7)	Tarsus IV	3.10 (2.5–3.7)
Patella-Tibia III	4.85 (3.9–5.7)	Total Length IV	21.81 (17.8–25.5)

1943, S. Herrod, AMNH, 1♂. USA: *Maine*, Lincoln Co., no specific locality (44.06°N, 69.54°W), 10–20 July 1948, D.J. Borror, AMNH, 1♀, Waldoboro (43.43°N, 70.66°W), 1971, Mrs. E.M. Lloyd, MCZ, 1♀; York Co., Wells (43.15°N, 70.67°W), 12 August 1933, W. Ivie, AMNH, 4♂. *Massachusetts*, Hampshire Co., Amherst (42.38°N, 72.52°W), 4 October



Map 5.—Distribution Map of *Tigrosa helluo*.

1938, L.M. Barlett, AMNH, 1♀; Middlesex Co., Burlington (42.51°N, 71.19°W), 9 May 1962, A.R. Brady, MCZ, 1♂, Cambridge (42.37°N, 71.11°W), no date, J.H. Emerton, MCZ, 1♀. *Connecticut*, Fairfield Co., New Canaan (41.15°N, 73.49°W), April 1951, M. Statham, AMNH, 1♀, Norwalk (41.11°N, 73.41°W), 10 June 1933, W.J. Gertsch, AMNH, 1♀ with parasitized egg sac; Hartford Co., New Britain (41.68°N, 72.78°W), 8 June 1960, 1♀, 6 July 1961, A.J. Nappi, AMNH, 1♀ with young, West Hartford (41.76°N, 72.74°W), 28 May 1979, Sorkin & Klemens, AMNH, 1♀, Windsor (42.51°N, 73.06°W), 8 June 1960, A.J. Nappi, AMNH, 1♀ with young; New London Co., Colchester (41.57°N, 72.33°W), 11 May 1938, B.J. Kaston, AMNH, 1♂; New Haven Co., Guilford (41.28°N, 72.68°W), February 1937, J.M. Whiteside, AMNH, 1♀, Hamden (41.38°N, 72.90°W), 15 December 1936, W. MacFarland, AMNH, 1♀, Hamden, Mt. Carmel (41.42°N, 72.91°W), 26 August 1936, K. Sommerman, AMNH, 1♀, Hamden, Whitneyville (41.34°N, 72.91°W), 9 August 1932, B.J. Kaston, 1♀, New Haven, Westville (41.28°N, 72.68°W), 5 June 1933, B.J. Kaston, AMNH, 1♂, 1♀; Tolland Co., Storrs (41.82°N, 72.25°W), May 1935, G. Tolles, AMNH, 1♀, 25 May 1935, G. Nettleton, AMNH 1♀; *New York*, Albany Co., Rensselaerville (42.52°N, 74.14°W), 1 August 1948, F.S.E. & S.T. Green, AMNH, 1♀ with young, 17 August 1948, S.C. Bishop, AMNH, 1♀ with egg sac, 18 August 1948, S.C. Bishop, AMNH, 1♀, 19 September 1949, F. Harper, AMNH, 1♀ with egg sac; Clinton Co., Beekmantown (44.77°N, 73.50°W), 2 September 1962, E. Davis, AMNH, 1♀; Kings Co., Bergen Beach (40.62°N, 73.91°W), 29 April 1906, no name, AMNH, 2♀, 6 May 1906, no name, AMNH, 2♀, 30 May 1907, no name, AMNH, 2♀ with 1 egg sac, no name, 4 July 1907, AMNH, 3♀ with 2 egg cases, 23 May 1908, L.F. Barmann, AMNH, 3♀, 16 May 1909, O. Chiles, AMNH, 2♂, 2♀ with egg sacs, 12 May 1911, O. Chiles, AMNH, 1♀, Brooklyn (40.69°N, 73.99°W), September 1940, W. Spector, AMNH, 1♀; Madison Co.,

Hamilton (42.83°N, 75.54°W), 6 May 1910, L.F. Barmann, AMNH, 1♀; Nassau Co., Long Beach (40.59°N, 73.67°W), 3 May 1955, W. Ivie, AMNH, 3♀; New York Metropolitan Area: Bronx Borough, Harlem (40.81°N, 73.95°W), 12 June 1907, no name, AMNH, 1♀, Brooklyn Borough, Forest Park (43.75°N, 78.48°W), 27 September 1908, no name, AMNH, 1♀, 19 May 1909, L.T. Barnum, AMNH, 1♀, Queens Borough, Flushing (40.74°N, 73.83°W), 14 July 1912, H. Boyle, AMNH, 1♀, April 1937, 1♀, 18 March 1937, S.C. Bishop, AMNH, 4♀, Flushing Meadow (40.76°N, 73.83°W), 23 June 1962, 1♂, 30 June 1962, R.W. Fredrickson, AMNH, 1♀, Jamaica, (40.70°N, 73.81°W), 23 May 1909, O. Chiles, AMNH, 2♀, 1 egg sac; Rockland Co., Sloatsburg (41.15°N, 74.19°W), 20 September 1934, W.J. Gertsch, AMNH, 1♀; Schuyler Co., Tyrone (42.42°N, 77.07°W), 1910, no name, AMNH, 1♂, 1♀, no date, R.V. Chamberlin, AMNH, 1♂, 3♀; Seneca Co., Waterloo (42.89°N, 76.87°W), 3 September 1977, G. Dingerkus, AMNH, 1♀; Suffolk Co., Cold Spring Harbor (40.87°♀N, 73.46°W), 25 June 1903, no name, AMNH, 1♀ with young, 6 August 1908, no name, AMNH, 1♂, 16 June 1932, 3♀, 19 June 1932, W.J. Gertsch, AMNH, 2♀ with 2 egg sacs, July–August 1950, E. Mayr, AMNH, 1950, 1♀ with egg sac, Greenport (42.24°N, 73.77°W), 1 May 1949, R. Latham, AMNH, 1♀, 2 mi. [3.2 km] SW of Greenport, W. Ivie, 8 May 1955, AMNH, 2♀, Hampton Bays (40.87°N, 72.52°W), 20 June 1934, no name, AMNH, 1♀, Long Island, (40.80°N, 72.62°W), no date, no name, AMNH, 1♀, 30 April 1891, N. Pike, AMNH, 3♀, 3i, Montauk (41.03°N, 71.95°W), 7 June 1931, ♀ with 1 egg sac, 5 July 1931, 1♀, 17 June 1932, R. Latham, AMNH, 1♀, Orient (4l.14°N, 72.30°W), 30 September 1932, 1♀, 10 May 1934, 1♀, 3 June 1948, 1♀, 1952, R. Latham, AMNH, 1♀ with egg sac, Riverhead (40.94°N, 72.64°W), 3 October 1956, R. Latham, AMNH, 1♂; Tompkins Co., Danby (42.35°N, 76.48°W), 27 July 1975, G. Dingerkus, AMNH, 1♀, Dryden (42.49°N, 76.30°W), 9 September 1974, G. Dingerkus, AMNH, 1♀ with young, Ithaca (42.44°N, 76.50°W), May 1902, no name, AMNH, 1♀, June 1905, no name, AMNH, 2♀ with 1 egg sac, 4 September 1976, G. Dingerkus, AMNH, 1♀, McLean (42.55°N, 76.29°W), 28 September 1912, no name, AMNH, 1♀, 28 September 1918, no name, AMNH, 1♀; Ulster Co., Ashokan (41.98°N, 74.20°W), 31 July 1909, no name, AMNH, 4♀, Phoenica (42.08°N, 74.32°W), July 1906, L.T. Barnum, AMNH, 1♂, Saugerties (42.08°N, 73.95°W), 15–20 August 1911, no name, AMNH, 1♀, 1 September 1911, no name, AMNH, 3♂, 3♀; Warren Co., Lake George (43.43°N, 73.71°W), June 1937, S.C. Bishop, AMNH, 1♀; Winchester Co., Montrose (43.35°N, 78.48°W), summer 1952, R.E. Thurston, AMNH, 2♀. *New Jersey*, Bergen Co., Edgewater (40.83°N, 73.58°W), 31 May 1909, no name, AMNH, 2♀ with 4 egg sacs, 16 June 1911, B. von Kochous, AMNH, 1♀, Ramsey (41.06°N, 74.14°W), 24 September 1934, no name, AMNH, 2♂, 2♀, 11i, 31 May 1935, no name, AMNH, 2♀, 3 August 1935, W.J. Gertsch, AMNH, 1♂, 1–10 June 1944, W. J. Gertsch, AMNH, 1♀, Tenafly (40.92°N, 73.97°W), 12 September 1907, AJ. Nappi, AMNH, 1♀ with young; Cape May Co., Ocean City (40.93°N, 73.97°W), 6 June 196l, M.N. & G.P. Feinberg, AMNH, 1♀ with young; Essex Co., Montclair (40.82°N, 74.22°W), 20 June 1907, no name, AMNH, 2♀; Hunterdon Co., Lambertville (40.37°N, 74.95°W), September 1951, 2♀, June 1955, W. Ivie, AMNH, 2♀; Mercer Co., Pennington (40.33°N, 74.79°W), 26 September 1939, K.W. Cooper, AMNH, 1♀, Princeton (40.36°N, 74.66°W), 13 October 1939, K.W. Cooper, AMNH, 1♀, Trenton (40.22°N, 74.76°W), 6 August, no name, AMNH, 1♀. *Pennsylvania*, Berks Co., Shillington (40.30°N, 75.97°W), 20 June 1937, L. Hook, AMNH, 2♂, Virginville (40.52°N, 75.87°W), October 1965, P. Vaurie, AMNH, 1♀; Bradford Co., Wilawana (41.99°N, 76.60°W), June 1939, R. Crandall, AMNH, 2♀; Chester Co., Valley Forge (39.84°N, 75.47°W), 4 November 1966, AMNH, E. Knauss, 1♀; Fayette Co., Horseshoe Bend, Neshaminy Creek, NE of Jamison (40.26°N. 75.09°W), 17 May 1953, 1♂, 3♀, July 1953, 1♀, 21–31 August 1953, 6♂, 8 September 1953, 1♀, 25 September 1953, 1♀, March 1954, 1♀, April 1954, 4♀, May 1954, 1♂, 5♀ with 2 egg AMNH, W. Ivie, 1♀, 23 May 1965, J. & W. Ivie, AMNH, 1♂, 2♀, 1 egg sac; Lancaster Co. (40.05°N, 76.18°W), August 1887, Stone, AMNH, 2♀, Lancaster (40.05°, 76.18°), June 1954, 5♂, 3♀ with one egg sac, July 1954, 2♂, 3♀, May 1955, 2♂, 2♀, July 1955, 3♂, 1i, September 1956, 2♂, September 1957, AMNH, 5♂, 1♀, July 1964, W Ivie, AMNH, 1♀; Montgomery Co., North Wales (40.21°N, 75.28°W), l9 July–9 August 1944, V.M. von Hagen, AMNH, 1♂; Northampton Co., Easton (40.69°N, 75.21°W), August 1943, no name, 1♀, Wind Gap (40.84°N, 75.29°W), 8 August 1943, no name, 1♀ with egg sac, Philadelphia Co., Philadelphia (39.95°N, 75.18°W), May 1909, L.T. Barnum, AMNH, 3♀; Wabash Co., (40.99°N, 77.60°W), 17 March 1930, W.W. Long, AMNH, 2♀; Washington Co., (40. 21°N, 80.18°W), 17 March 1930, W.W. Long, AMNH, 2♀, 4i; York Co., 4 mi. [6.4 km] N of Waterford (39.97°N, 76.69°W), 12 August 1962, D. Kurczewski, AMNH, 1♀. *Ohio*, Hocking Co., Cantwell Cliffs near Rockbridge (39.56°N, 82.60°W), 27 July 1935, W. Ivie, AMNH, 1♀; Knox Co., (40.41°N, 82.46°W), no name, AMNH, 1♀; Perry Co., New Lexington (39.71°N, 82.21°W), 22 July 1873, Holden, AMNH, 1♂; Preble Co., 2 mi. [3.2 km] S of New Paris (39.86°N, 84.79°W), 26 August 1950, V. Roth, AMNH, 1♂. *Maryland*, Anne Arundel Co., Patuxent (39.05°N, 76.74°W), May 1942, no name, AMNH, 1♂, 2♀, 4i; Cecil Co., Elk Neck (39.51°N, 75.95°W), 17 May 1964, J. & W. Ivie, AMNH, 1♀; Dorchester Co., Cambridge (38.56°N, 76.08°W), 28 May 1979, G. Price, HCC, 1♀; Montgomery Co., Bethesda (38.98°N, 77.09°W), 25 April 1944, 1♀, 18 October 1944, J.M. Davis, AMNH, 1♂, Kensington (39.03°N, 77.08°W), 21 August 1945, J.M. Davis, AMNH, 1♀ with young. *District of Columbia*, Washington D.C. (38.89°N, 77.03°W), 1 June 1944, J.M. Davis, AMNH, 1♀, 4 October 1945, B. Malkin, AMNH, 1♂. *West Virginia*, Mercer Co., Princeton (34.99°N, 81.10°W), 28 August 1968, N.I. Platnick, AMNH, 1♀; *Ohio Co.*, Wheeling (40.10°N, 80.63°W), August–October 1947, K.W. Haller, AMNH, 1♀; *Pocahontas Co.*, Minnehaha Springs (38.16°N, 79.98°W), July 1947, K.W. Haller, AMNH, 1♂, 2♀. *Virginia*, Alleghany Co., Clifton Forge (37.81°N, 79.82°W), April 1950, R.L. Hoffman, AMNH, 2♂, 1♀; Augusta Co., Mint Spring, S of Staunton (38.15°N, 79.07°W), no date, no name, AMNH, 1♀; Bath Co., (38.05°N, 79.75°W), no date, no name, MCZ, 1♂, 1♀; Page Co., Luray (38.67°N, 78.46°W), 1–7 October 1943, AMNH, 1♀, 8–17 April 1946, AMNH, B. Malkin, 1♀; Portsmouth (Independent City) (36.83°N, 76.30°W), 5–13 May 1968, E. Sabath, AMNH, 1♂. *Kentucky*, Boyle Co., 3 mi. [4.8 km] SE of Danville (37.65°N, 84.77°W), 29 June–4 July, S.C. Bishop, AMNH, 1♀;

Christian Co., Hopkinsville (36.87°N, 87.49°W), 10 March 1929, no name, AMNH, 1♂; Fulton Co., (36.50°N, 88.87°W), no date, no name, AMNH, 1♀; Hardin Co., Summit (37.58°N, 86.04°W), 1 May 1944, B. Malkin, AMNH, 2♀, 1i; Jasmine Co., Valley View (37.85°N, 84.43°W), 28 June 1925, no name, AMNH, 1♀. *Tennessee*, Cheatam Co., Kingston Spring (36.10°N, 87.11°W), 10–15 July 1933, W.J. Gertsch, AMNH, 1♂, 1♀, 2i; Davidson Co., Nashville (36.17°N, 86.78°W), 27 April 1957, no name, AMNH, 1♂; Sevier Co., Greenbriar Cove, Great Smoky Mountains National Park (35.60°N, 83.50°W), 3 June 1939, A.E. Cole, AMNH, 1♀; Wayne Co., Factory (35.52°N, 86.58°W), 4 May 1976, G. Dingerkus & R.A. Stiles, AMNH, 1♀; Wilson Co., Cedars of Lebanon State Park (36.09°N, 86.34°W), 10 May, A.R. Brady, HCC, 3♀. *North Carolina*, Lee Co., Deep River near Sanford (35.47°N, 79.16°W), 25 April 1938, W.J. Gertsch, AMNH, 8♀ with 1 egg case; Moore Co., Manly (35.19°N, 79.37°W), October 1955, A. Twombly, AMNH, 1♂, 1♀, 2i; Swain Co., Nantahala (35.34°N, 83.62°W), summer 1952, H.I. Gillies, AMNH, 1♀; Union Co., Monroe (34.98°N, 80.55°W), June 1942, Mrs. E L. Bell Jr., AMNH, 1♂. *South Carolina*, Chesterfield Co., Cheraw (34.70°N, 79.88°W), 22 August 1933, no name, AMNH, 3♀; McCormick Co., 4 mi. [6.4 km] N of Modoc (33.74°N, 82.21°W), 29 May 1964, A.R. Brady, HCC, 1♀, 1i. *Georgia*, Clarke Co., Athens (33.96°N, 83.37°W), 7 August 1929, Richards, AMNH, 1♂, 19 June 1953, H.O. Lund, AMNH, 1♀ with egg sac; Charleston Co., Folkston (30.83°N, 92.01°W), 18 February 1938, no name, AMNH, 1♀; Hall Co., Gainesville (34.30°N, 83.83°W), 24 April 1943, W. Ivie, AMNH, 3♀; Screven Co., Sylvania (32.76°N, 81.65°W), 9 April 1943, 1♀, N of Sylvania, 15 April 1943, 1♀, 17 April 1943, W. Ivie, AMNH, 1♀, 1i. *Florida*, Alachua Co., Paynes Prairie, Gainesville (29.65°N, 82.32°W), 10 March 1936, no name, AMNH, 2♀, 1i; Bay Co., Panama City (30.16°N, 85.66°W), 29 March 1965, A.R. Brady, HCC, 1♂; Collier Co., 17.2 mi. [27.68 km] N of Jerome (27.47°N, 81.52°W), 6 April 1952, A. Schwartz, AMNH, 2♀, 18.2 mi. [29.29 km] W of Monroe Station (27.47°N, 81.52°W), 18 April 1952, A. Schwartz, AMNH, 1♂, 1♀; Dade Co., Florida City (35.45°N, 80.48°W), 31 March 1957, W.J. Gertsch, R. Forster, AMNH, 1♀, 20 mi. [32.2 km] W of Miami (25.73°N, 80.24°W), 31 April 1952, A. Schwartz, AMNH, 1♀, Big Pine Key (34.67°N, 81.35°W), 16 June 1962, A.R. Brady, HCC, 1♀; Hernando Co., Aripeka (28.43°N, 82.67°W), 2 June 1964, J. Reiskind, HCC, 1♀ with egg sac; Highlands Co., Highlands Hammock State Park (27.47°N, 81.52°W), 20 April 1973, N.R. Spencer, HCC, 1♂, 1♀, 1 June 1973, A.R. Brady, HCC, 3♀; Lee Co., Fort Myers (26.64°N, 81.87°W), no date, W.J. Gertsch, AMNH, 1♀; Levy Co., Manatee Springs State Park (29.50°N, 82.97°W), 11 June 1961, 2♂, 21 June 1962, A.R. Brady, HCC, 1i; Liberty Co., Torreya State Park (30.55°N, 84.95°W), 1 June 1964, A.R. Brady, HCC 1♂, 1♀, 18 May 1973, A. Jung, HCC, 2♂, 1♀; Martin Co., Port Mayaca (26.99°N, 80.61°W), 29 March 1938, W.J. Gertsch, AMNH, 1♂, 2♀ with 1 egg sac; Orange Co., Winter Park (28.59°N, 81.35°W), 21 March 1938, W.J. Gertsch, AMNH, 1♀; Pasco Co., 10 mi. [16.1 km] S of Zephyrhills (28.23°N, 82.18°W), 7 April 1938, W.J. Gertsch, AMNH, 3♂. *Alabama*, Greene Co., Eutaw (32.84°N, 87.89°W), 9 July 1950, M. Cazier, AMNH, 2♀; Jackson Co., (34.73°N, 85.97°W), 23 July 1910, no name, AMNH, 1♀. *Mississippi*, Adams Co., Selma (32.41°N, 87.02°W), R.V. Chamberlin, 25 July 1910, AMNH, 1♀; Pike Co., Fernwood (31.19°N, 90.45°W), 19 July 1910, R.V. Chamberlin, AMNH, 1♂, 2♀; Pontotoc Co., 1 mi. [1.6 km] SE of Ecru (34.35°N, 89.03°W), no date, W.H. Cross, MSST, 1♂; Rankin Co., Thompson Field (32.32°N, 89.99°W), 10 September 1983, T.C. Lockley, HCC, 1♀; Washington Co., (33.27°N, 90.96°W), 5 June 1987, 1♀, 8 June 1987, T.C. Lockely, HCC, 1♀ with young, Stoneville (33.42°N, 90.92°W), 18 April 1982, T.C. Lockley, HCC, 1♀. *Louisiana*, Caddo Par., Shreveport (32.51°N, 93.75°W), 10 April 1948, J.H. Robinson, AMNH, 1♀; Cameron Par., l mi. [1.6 km] N of Johnson Bayou by State Highway 82 (33.80°N, 82.27°W), 23 March 1974, R.L. Ervin, AMNH, 1♀ with egg sac; Madison Par., Tallulah (32.41°N, 91.19°W), no date, no name, AMNH, 1♀; St. Charles Par. (29.89°N, 90.36°W), Bonnet Carre Spillway, 10 February 1950, E.N. Lambarement, AMNH, 1♀. *Michigan*, Allegan Co., Hope College Field Station (42.59°N, 85.91W), 18 September 1978, A.R. Brady, HCC, 1♀, 4 mi. [6.4 km] S of New Richmond (42.59°N, 86.11°W), 17 July 1966, A.R. Brady, HCC, 1♀, Holland (42.77°N, 86.10°W), 12 June 1975, B. Ross, HCC, 1♀ with egg sac, Zoerman Farm, Holland (42.77°N, 86.10°W), 22 June 1995, N.T. Harmon, HCC, 1♀, Mann Creek, Holland (42.77°N, 86.10°W), 12 May 1971, K. Ringsmith, HCC, 1♀; Barry Co., Otis Lake (42.61°N, 85.42°W), 24 June l960, N.I. Platnick, AMNH, 1♀; Calhoun Co., Albion (42.25°N, 94.75°W), 27 June 1930, 1♀, 3 June 1935, 1♀, 2 June 1949, 1♀, A.M. Chickering, MCZ, 1♀; Charlevoix Co. (45.25°N, 85.06°W), 27 July 1938, A.M. Chickering, MCZ, 1♂, 4 mi W of Petoskey (45.37°N, 84.96°W), 29 July 1937, A.M. Chickering, MCZ 1♂; Cheboygan Co., (45.65°N, 84.48°W),17 June 1930, no name, MCZ, 1♂, July 1944, no name, MCZ, 1♀ with egg sac, Bois Blanc Island (45.77°N, 84.47°W), 2 August l932, A.M. Chickering, MCZ, 3♀, with 1 egg sac, Douglas Lake (45.53°N, 84.92°W), 10 August 1931, 1♂, 12 August 1931, 1♂, 9 August 1938, 1♀, A.M. Chickering, MCZ, 1♀; Emmet Co., Bayview (45.39°N, 84.93°W), 21 July 1937, 1♀ with egg sac, 14 July 1938, 1♀ with egg sac, July 1941, A.M. Chickering, MCZ, 1♀, Petoskey (45.37°N, 84.96°W), 29 July 1937, 1♂, 18 July 1940, A.M. Chickering, MCZ, 1♀ with egg sac; Kalkaska Co., 12 mi. [19.3 km] W of Kalkaska (44.74°N, 85.17°W), 28 June 1975, B. Witzel, HCC, 1i; Kent Co., Chain Lakes (43.18°N, 85.33°W), 7 June 1975, B. Witzel, HCC, 1♂; Lenawee Co., 3 mi. [4.8 km] SW of Jasper (41.79°N, 84.04°W), 10 October 1975, P. Schuch, HCC, 1♂, 2♀, 1i; Livingston Co., E.S. George Reserve (42.47°N, 84.00°W), 4 October 1936, 1♀, 7 August 1939, I.J. Cantrall, FSCA, 1♂, 21♀, 3i, 28 July 1951, H.K. Wallace, FSCA, 1♀, 10 May 1953, E.N. Pruitt, FSCA, 1♀; *Midland Co.*, (43.65°N, 84.39°W), July 1931, 1♀, 26 August 1933, 1♀ with egg sac, 22 June 1942, A.M. Chickering, MCZ, 1♀, 14 July 1948, R.R. Dreisbach, MCZ, 1♀; Muskegon Co., Muskegon (42.23°N, 86.25°W), 10 August 1945, R.R. Dreisbach, MCZ, 1♀; Ottawa Co., (42.99°N, 86.03°W), S. Schnienzer, HCC, 10 April 1984, Grand Haven (43.06°N, 86.23°W), 20 September 1933, H. Rearwin, AMNH, 1♂, Holland (42.77°N, 86.10°W), 30 September 1968, W. Defeyter, HCC, 1♀, May 1969, D. Michael, HCC, 1♂; Shiawassee Co. (42.95°N, 84.15°W), Rose Lake Experimental Station, 28 May 1958, 1♂, 1♀, 23 May 1966, 2♀, 28 May 1966, E. Evans, AMNH, 3♀; Washtenaw Co., (42.25°N, 83.84°W),

Waterloo Recreation Area, 31 May 1941, A.M. Chickering, MCZ, 2♂, 1♀; 15–31 August, A. Peacock, MCZ,1♀. *Indiana*, Kosciusko Co., Webster Lake (41.21°N, 86.11°W), 14 May 1946, no name, AMNH, 1♀; Monroe Co., Bloomington (39.17°N, 86.53°W), 22 July 1949, L. Griffey, AMNH, 1♀ with egg sac; Owen Co., Spencer (39.29°N, 86.76°W), Spring 1976, J. Lyons, AMNH, 1♀; Parke Co., Turkey Run State Park (39.88°N, 87.21°W), 20 May 1932, F. Clarke, AMNH, 4♀, 1i; Porter Co., Chesterton (41.61°N, 87.06°W), 24 June l939, D.C. Lowrie, AMNH, 1♀, 2i. *Wisconsin*, Crawford Co., Prairie du Chien (43.05°N, 91.14°W), September 1944, L. Smethuis, AMNH, 2♂, 6 May 1953, M. Melanie, AMNH, 1i; Marinette Co., Marinette (45.10°N, 87.63°W), 5 July 1910, AMNH, R.V. Chamberlin, AMNH, 2♀, 1 egg sac; Rock Co., Beloit (42.51°N, 89.04°W), 7 July 1910, R.V. Chamberlin, AMNH, 1♀; Walworth Co., Elkhorn (42.67°N, 88.54°W), 12 July 1938, F. Farn, AMNH, 1♀. *Illinois*, Cook Co., Chicago (41.88°N, 87.63°W), 10 July 1932, W.J. Gertsch, AMNH, 1♀; Henderson Co., Biggsville (40.85°N, 90.86°W), 20 July 1935, W. Ivie, AMNH, 1♀; McLean Co., Bloomington (40.49°N, 89.00°W), no date, H.W. Britcher, AMNH, 1♀, 1i; Peoria Co., Peoria (38.21°N, 89.97°W), 8 July 1910, 1♂, 1 September 1910, R.V. Chamberlin, AMNH, 4♀ with 2 egg sacs; Tazewell Co., East Peoria (40.79°N, 89.60°W), 10 July 1910, R.V. Chamberlin, AMNH, 1♀ with young. *Minnesota*, Lake Co., Wacouta Beach, Lake Pepin (47.57°N, 91.41°W), 15 May 1932, W.J. Gertsch, AMNH, 1♀. *Iowa*, Boone Co., Boone (42.06°N, 93.90°W), 23 June 1910, R.V. Chamberlin, AMNH, 4♀, Ledges State Park (42.06°N, 93.90°W), 19 May 1941, D.T. Jones, AMNH, 3♀, Mongona (42.02°N, 93.93°W), 22 June 1910, R.V. Chamberlin, AMNH, 3♀; Clinton Co., DeWitt (41.82°N, 90.54°W), 26 June 1910, R.V. Chamberlin, AMNH, 1♀, 1i; Story Co., Ames (42.02°N, 93.63°W), Spring 1941, D.T. Jones, AMNH, 1♀; *Missouri*, St. Charles Co., St. Charles (38.78°N, 90.48°W), 1927, M.B. Brown, AMNH, 1♀; St. Louis Co., Ranken (38.53°N, 90.51°W), 29 July 1945, E. P. Meiners, AMNH, 2♀, 4i; Vernon Co., Nevada (37.84°N, 94.36°W), 30 May 1960, D. Lamore, MCZ, 1♀. *Nebraska*, Cass Co., Plattsmouth (41.01°N, 95.90°W), 28 March 1923, W. Ivie, AMNH, 1i; Richardson Co., 10 mi. [16.1 km] N of Falls City (40.06°N, 95.60°W), 7 June 1933, W. Ivie, AMNH, 2i. *Kansas*, Wyandotte Co., Kansas City (39.11°N, 94.63°W), 8 June 1933, W. Ivie, AMNH, 2♀. *Texas*, Harris Co., Houston (29.76°N, 95.37°W), November 1935, S. Mulaik, AMNH, 1♀. *California*, Placeer Co., Auburn (38.90°N, 121.08°W), 11 May 1951, E.I. Schlinger, AMNH, 1♂, not mapped.

Diagnosis.—*Tigrosa helluo* can be distinguished from *T. aspersa* by its smaller size. The average body length of *T. helluo* is 17 mm, whereas in *T. aspersa* the average is 28 mm. Compare Table 5 with Table 2 for additional size differences. The distinct longitudinal stripe on the carapace that begins in the AME region and continues to the posterior declivity in *T. helluo* females (Fig. 28) is represented in *T. aspersa* females (Fig. 10) by a shortened stripe or dash in the eye region. *Tigrosa helluo* (Fig. 28) does not display the short distinct pale dashes behind the AME on each side of the median stripe and the vivid broad cream colored markings surrounding the dark lanceolate cardiac marks, nor does it display the lighter markings of the posterior region that occur in *T. annexa* (Figs. 1–3). *Tigrosa helluo* and *T. georgicola* have very similar dorsal patterns on the cephalothorax and abdomen; however, the pale submarginal stripes in *T. helluo* (Figs. 28, 29) are narrower and do not extend to the carapace margin as in *T. georgicola* (Figs. 16, 17). In addition the venter in *T. helluo* is marked by small black spots (Fig. 41), while *T. georgicola* has several rows of spots or dashes, often coalescing into stripes that converge in front of the spinnerets (Fig. 42), and the venter is occasionally entirely black. The LP of the epigynum in *T. helluo* (Fig. 33) widens slightly anteriorly almost to the anterior margin of the epigynum, while in *T. georgicola* (Fig. 18) it flares outward a considerable distance before the anterior margin and is much wider. The median apophysis (MA) in *T. helluo* (Fig. 30) is less developed than in *T. georgicola* (Fig. 20). The palea in *T. helluo* (Fig. 31) is rounder than in *T. georgicola* (Fig. 21) where it tends to be quadrangular, and the sclerotized ridges on the palea of *T. helluo* are less developed than in *T. georgicola.*

Color.—*Female:* Dorsal pattern illustrated in Fig. 28. Face reddish brown. Chelicerae dark reddish brown with condyles dark red. Eye nacelles black. Carapace reddish brown with black lines radiating from thoracic groove to submarginal stripes. Carapace with thin yellow stripe originating between AME, expanding slightly posterior to PME row, and continuing to posterior declivity; light brown to yellow-brown submarginal stripes with scallops or indentations along edges. Dorsum of abdomen brown; lanceolate cardiac mark lighter brown with dark brown to black margins; often with small lighter dots lateral to cardiac region. Venter of abdomen pale brownish yellow to cream in the middle region and characterized by dark brown or black spots, with darker brown lateral to central area (Fig. 41). Legs reddish brown without distinct bands, although dusky markings on femora occur in some specimens; ventral surfaces of tibiae and femora lighter yellowish brown. Labium and endites dark reddish brown to black. Distal ends of labium and endites lighter yellowish. Sternum and coxae dark reddish brown to black.

Male: Dorsal pattern illustrated in Fig. 29. Face brownish yellow; lateral regions darker brownish. Dark spots under ALE. Chelicerae brownish yellow with condyles darker brown. Eye region of carapace dark brown; eyes circled in black. Carapace mostly brown with darker lines radiating from thoracic groove to submarginal stripes. Narrow yellow median stripe from PME to posterior declivity. Stripe thinnest between PLE and widening as it approaches and surrounds black thoracic groove. Narrow light brown or yellow uneven submarginal stripes. Dorsum of abdomen brown with conspicuous lanceolate cardiac mark that is lighter brown, enclosed with black and bounded by lighter yellow. Four or five faint darker chevrons extending posteriorly from cardiac area. Venter of abdomen yellow or cream with numerous dark brown spots. Legs yellow without darker markings, lighter on ventral surfaces. Labium yellow, brownish at proximal end. Endites yellow without darker color. Sternum yellow with darker brown perimeter and two dark central stripes, widening posteriorly.

Natural history.—Kaston (1948) reported *T. helluo* from woods, salt marshes and grassy areas in Connecticut. In Michigan I have found this species most often near the edge of lakes and in marshy areas. In Florida and Mississippi *T. helluo* also seems to prefer similar wetter areas unlike *T. georgicola,* which is more often found in drier wooded areas. According to Kaston (1948) mature males occur from May to September in

Connecticut and females throughout the year. Apparently females overwinter in the adult stage. Mating occurs in June, and the mating behavior has been recorded by Kaston (1936).

Distribution.—Recorded from Ontario, Canada. In USA *Tigrosa helluo* is found from New England in the northeast, south along the eastern seaboard to Florida, then north and eastward throughout much of the United States to the one-hundredth meridian (Map 5).

Hogna Simon, 1885

Biarabenia Mello-Leitao 1941:137 (part).
Lycorma Simon 1885:9 (part).
Isohogna Roewer 1960:569 (part).
Lynxosa Roewer 1960: 901 (part).
Citilycosa Roewer 1960:846 (part).

Diagnosis.—*Hogna* is distinguished from other large lycosids by the dorsal color pattern on the carapace that consists of a broad cream to yellow median stripe that begins in the facial or frontal area and then extends posteriorly from the facial area to the posterior declivity of the cephalothorax. The width of the median stripe is equal to or exceeds the distance between the PME. In addition, broad scalloped submarginal stripes extend from the cephalic region of the carapace to the posterior declivity. The submarginal stripes sometimes reach to the margins of the carapace, particularly in males. A darker color on the carapace that ranges from medium to dark brown provides a contrasting darker background (Figs. 34, 35). The dark brown or black cardiac mark on the dorsum of the abdomen in *Hogna* is often outlined in a lighter color that is accented by two distinct black dots along the posterior margin (Figs. 34, 35). The venter of the abdomen is largely black, with the color extending from the anterior margin to the base of the spinnerets (Fig. 45). The AER width in *Hogna* is less than the width of the PME row (0.30 mm or more difference), and the POQ length is greater than the width of the AER (0.14 mm or more difference). In the epigynum of *Hogna* the LP is much longer than the TP (Fig. 39), the sides are parallel and there are lateral grooves along the length of the LP (Fig. 39). The structures of the male palpal organ (e.g., embolus, median apophysis, tegulum and tegular apophyses) are plesiomorphic and do not exhibit enough differences to separate *Hogna* from other lycosine genera.

Remarks.—The above preliminary diagnosis is derived from specimens identified as *Hogna* in collections that I have examined. It is based primarily upon collections from the Natural History Museum, London, and the Muséum national d'Histoire naturelle in Paris, as well as additional specimens from France and Italy sent by individual collectors. The focal point of this diagnosis is *Hogna radiata*, the type species of the genus, but it also includes a number of closely related species that occur in northern Africa. Although several of these North African specimens are labeled as *Hogna radiata,* they are quite distinct. Until the geographic range of *H. radiata* itself is determined, I thought it best to offer a conservative diagnosis for *Hogna.* It is very possible that the genus *Hogna,* like the genus *Lycosa,* is largely restricted to the Mediterranean region and is not found in North America.

Simon (1885) listed *Hogna* as a Group under the Genus *Lycosa.* Simon (1898) briefly described *Hogna* and he assigned it to *Lycosa* under the Subgenus *Hogna* (Section IE) with the type *Lycosa radiata.* Section I included all those species of *Lycosa* with three teeth on the posterior margin of the cheliceral groove. The technique used by Simon (l898) was then to compare *Hogna radiata* to the four preceding species of *Lycosa* designated as A–D under Section I. The following information is extracted from that description: AER procurved (less so than in the preceding species), the PME row not as wide as the PLE row; legs robust, with metatarsus IV and patella-tibia IV shorter than in the preceding species; clypeus, tarsi and the genital plate scopulate.

Roewer (1959) cites the first proposal of the name *Hogna* by Simon (1885) and then briefly discusses the diagnosis by Simon (1898). He notes that the genus *Hogna* was regarded by many authors after Simon (1898) as a genus separate from *Lycosa.* He does not think that the arrangement of the scopulae on the legs, to which Simon gives particular attention, is of much significance at the generic level. Roewer (1959) limits his diagnosis of *Hogna* to the following characteristics and emphasizes the arrangement and dimensions of the eyes and eye rows as especially significant. The following is a synopsis of the diagnosis by Roewer (1959): Labium longer than wide. Order of the length of legs IV-I-II-III. Metatarsus IV shorter than Patella-Tibia IV. Tibia I with no more than three pairs of ventral spines or macrosetae. Chelicerae with three teeth on the posterior margins of the cheliceral grooves. Eyes: Anterior row procurved, First row of eyes narrower than the second row. Distance between ALE and AME is equal to distance between AME. AME larger than ALE. Distance between PME is less than 1 diameter of PME. After the emphasis on eye size and arrangement in the diagnosis of *Hogna,* Roewer (1959) uses these features to defend the transfer of eight species from *Hogna*, to *Allocosa, Dingosa, Trochosa* and *Artoriellula* and to transfer six species from *Trochosa, Geolycosa, and Schizocosa* to *Hogna.* Finally he questions the placement of over twenty species in the genus *Hogna* because they have not been sufficiently diagnosed by the authors. This brief view of nomenclatural history is to emphasize the difficulty produced by the promulgation of Roewer (1959) of an artificial system of classification, the carte blanche application of the size and position of eyes. This system (Roewer 1959) lacks value in discriminating the many genera that comprise the family Lycosidae. It has placed a large roadblock in the path to understanding systematic relationships of lycosid genera. According to the rules of nomenclature, however, the names and changes introduced by Roewer must be individually evaluated for their validity. In my own diagnoses of *Hogna* and *Tigrosa* I have tried to incorporate a larger number of characteristics that may shed light on phylogenetic relationships, including dorsal color pattern of cephalothorax and abdomen, eye arrangement, dimensions of body and legs, and most importantly the details of male and female genitalic characters.

Hogna radiata (Latreille 1817)

Figs. 34–39, 45, Table 6

Lycosa radiata Latreille 1817:292; Simon 1876:60, 87, 1937:1094, 1132; Guy 1966:85; Fuhn & Oltean 1969:167; Fuhn & Niculescu-Burlacu 1971:195; Miller 1971:154; Loksa 1972:49; Mcheidze 1997:227.
Hogna radiata Roewer 1955:249, 1959:403; Zyuzin 1993:699; Thaler, Buchar & Knoflach 2000:1076; Deltshev & Blagoev 2001:110; Deltshev 2003:137; Trotta 2005:169.

Table 6.—Mean and range of ten males and ten females of *Hogna radiata* from Western Europe.

	Mean (range)		Mean (range)
Females			
Anterior eye row	1.56 (1.4–1.7)	Femur I	6.89 (6.0–7.7)
PME width	1.89 (1.7–2.0)	Patella-Tibia I	8.83 (8.0–10.1)
PLE width	2.39 (2.2–2.6)	Metatarsus I	5.29 (4.8–6.0)
POQ length	1.70 (1.5–1.9)	Tarsus I	2.99 (2.7–3.3)
Car. width at PLE	4.18 (3.7–4.7)	Total length I	24.01 (21.5–27.0)
Carapace width	6.96 (6.4–7.7)	Femur IV	7.83 (7.0–8.8)
Carapace length	9.26 (8.1–10.0)	Patella-Tibia IV	9.34 (8.6–10.4)
Body length	19.83 (17.4–22.5)	Metatarsus IV	8.70 (7.8–9.8)
Patella-Tibia II*	8.07 (7.4–9.4)	Tarsus IV	3.46 (2.9–3.7)
Patella-Tibia III	6.98 (6.4–7.8)	Total length IV	29.33 (26.9–32.6)
Males			
Anterior eye row	1.30 (1.2–1.6)	Femur I	6.85 (5.9–8.1)
PME width	1.51 (1.3–1.7)	Patella-Tibia I	8.98 (7.7–10.8)
PLE width	1.94 (1.7–2.2)	Metatarsus I	6.05 (5.3–7.6)
POQ length	1.38 (1.2–1.7)	Tarsus I	3.44 (2.9–4.0)
Car. width at PLE	3.18 (2.7–3.9)	Total length I	25.32 (21.9–30.3)
Carapace width	5.85 (5.1–7.4)	Femur IV*	7.51 (6.7–9.0)
Carapace length	7.87 (6.5–9.6)	Patella-Tibia IV*	9.10 (8.1–10.9)
Body length	15.48 (13.4–19.0)	Metatarsus IV*	9.09 (8.1–11.3)
Patella-Tibia II	8.34 (6.7–10.0)*	Tarsus IV*	3.89 (3.3–4.7)
Patella-Tibia III	6.96 (5.3–8.4)*	Total Length IV*	29.59 (26.6–35.9)

* indicates N=9.

Remarks.—The recognition of the species described here as *Hogna radiata* is based upon examination of specimens from key geographic localities. The thorough diagnosis and excellent illustrations of *Lycosa radiata* by Fuhn & Niculescu-Burlacu (1971) were key elements in defining *Hogna radiata.* In addition to references to *Lycosa radiata* and *Hogna radiata* listed above, there are 14 different specific names for *H. radiata* listed as synonyms in the World Catalogue of Spiders (Platnick 2011) . Because of the lack of clarity concerning the true geographic range of *H. radiata* and the absence of a definitive definition of this species throughout its range, I chose to present above only a brief list of selected references for this species. For details of this problem see Fuhn & Niculescu-Burlacu (1971). A complete list of systematic references may be found in Platnick (2011). The application of the name *Hogna radiata* to widespread and diverse populations brings into serious question the systematics of this species. Upon further study I think that several of the synonyms listed by Platnick (2011) will undoubtedly be resurrected as distinct species. The various subspecies names applied to different populations of *H. radiata* are also problematical.

Type material.—*Holotype:* Unable to locate.

Other material examined.—GERMANY: Freiburg (48.00°N, 07.85°E), 18 September 1919, no name, BMNH, 2♂. FRANCE: Montpellier (43.61°N, 3.88°E), 7 July 1969, C.D. Dondale, CNC, 1♂, 24 July 1969, C.D. Dondale, CNC, 1♀; 7 July 1969 Cerbère (42.44°N, 3.17°E), D.J. Clark, 25 June 1962, BMNH, 2♂, 5♀. SPAIN: Laviana (45.25°N, 5.56°W), no date, no name, MNHP, 1♂, 1♀; Island of Menorca (= Minorca) (39.95°N, 4.06°E), D. Braun, BMNH, 1♂, 5♀.

Diagnosis.—An accurate or true diagnosis of *H. radiata* throughout its range is very difficult until the systematic relationships of the populations described under *H. radiata* are determined. The species name *H. radiata* has been applied to populations spread over broad geographic regions. Because a number of these populations are quite distinct, some of the names now listed as synonyms may need to be resurrected as valid species. The color pattern and measurements recorded below are taken from specimens from Western Europe, the area from which *H. radiata* was originally described. Comparisons between *H. radiata* and *Tigrosa* are based primarily upon these specimens. A brief comparison of *H. radiata* and *Tigrosa* is made earlier in the Remarks section under *Tigrosa*, new genus.

The diagnosis of *H. radiata* presented here is based primarily upon the examination of collections from the Natural History Museum, London, and the Muséum national d'Histoire naturelle in Paris, as well as additional specimens from France and Italy examined earlier. Based upon examination of these specimens and a review of the literature, it appears that the geographic range and taxonomic relationships of dissimilar populations of *H. radiata* are not clearly understood. It is not the intention of this paper to determine the range or relationships of these distinct populations described as *H. radiata*. Instead the diagnosis is focused upon the significant systematic differences between *H. radiata,* as portrayed by the specimens examined, and the new genus *Tigrosa.* In *Tigrosa* the presumed synapomorphy that connects its members is the dorsal pattern on the cephalothorax. It is characterized by a narrow cream to yellow median stripe on the carapace that begins in the AME region and continues to the posterior declivity. This stripe widens in the thoracic area, but its width throughout its length does not exceed the space between the PME (Figs. 28, 29). In *H. radiata* the pale yellow median stripe is much wider, and its width exceeds the space between the PME (Fig. 34, 35). In *T. helluo* there are narrow yellow to light brown submarginal stripes beginning behind the PME row and continuing posteriorly (Figs. 28, 29). In *H. radiata* the pale submarginal stripes begin in the vertical facial area, are broader, and often reach to the margins of the carapace

(Figs. 34, 35). The cardiac mark on the dorsum of the abdomen in *T. helluo* is often outlined in dark brown or black (Figs. 28, 29). In *H. radiata* (Figs. 34, 35) the cardiac mark is also outlined in black but includes two distinct black dots along the posterior margin, a condition not found in *Tigrosa.* The ventral surface of the abdomen posterior to the epigastric furrow in *H. radiata* is entirely black (Fig. 45). In *Tigrosa* the venter of the abdomen is usually cream to light brown in overall color with scattered black spots (Figs. 40, 41), without conspicuous black dots or dashes in the central area (Fig. 43), or with spots or dashes arranged in longitudinal rows (Figs. 42, 44). Fundamental differences also occur between *Hogna* and *Tigrosa* in the eye arrangement. For example, the anterior eye row width in *Tigrosa* is subequal to the PME row width (0.17 mm or less difference), but in *Hogna radiata* the anterior eye row width is obviously less than the width of the PME row (0.30 mm. or more difference). Also the length of the POQ in *Tigrosa* (with the exception of *T. aspersa*) is equal to the width of the anterior eye row (0.02 mm or less difference), but in *Hogna radiata* the POQ length is greater than the width of the anterior eye row (0.14 mm or more difference). In other words, the eyes in *Tigrosa* are spaced in a different geometric configuration than in *Hogna.* The epigynum of *H. radiata* (Fig. 39) is also distinct from the epigyna of species in *Tigrosa* (Figs. 9, 15, 18, 26, 33).

Color description.—*Female:* Dorsal pattern illustrated in Figs. 34. Face yellow-brown, darker brown along sides or in cheek area. Chelicerae dark reddish brown to black, eyes circled in black. Carapace brown with broad median cream to orange yellow stripe originating from PLE row and continuing to posterior edge. Median stripe as wide as the PME row throughout most of its length, widest in cephalic region and with dark lines radiating from it to submarginal stripes. Wide cream to yellow submarginal stripes with scalloped edges. Dorsum of abdomen brownish yellow to light brown. Dark brown cardiac mark bounded by lighter cream to yellow and with dark paired spots in posterior half. No discernible chevrons. Venter of abdomen dark brown to black from epigastric furrow to base of spinnerets; cream to pale brownish yellow along sides (Fig. 45). Legs yellow brown without darker markings on dorsal surfaces. Tibiae IV with definite proximal and distal dark bands on ventral surfaces. Tibiae III with less distinct bands in same positions. Labium and endites very dark brown to black with distal ends cream to yellow. Sternum and coxae very dark brown to black.

Male: Pattern illustrated in Fig. 35. Face yellow to pale brownish yellow without darker shading. Eye nacelles black. Carapace brown with dark lines radiating from yellow to orange yellow broad median stripe. Wide yellow to orange-yellow submarginal stripes with scalloped margins; outer margins sometimes reaching edge of carapace. Dorsum of abdomen brownish yellow with dark brown cardiac mark, outlined in pale yellow and with marginal dark spots halfway length of mark. Lighter regions of abdomen light brown. Venter of abdomen cream to yellow without darker markings. Legs light brown without darker bands on dorsal surfaces. Lighter yellow on ventral surface, with darker proximal and distal bands on tibiae IV. Labium and endites yellow without darker markings. Sternum and venter of coxae yellow.

Natural history.—The ecology and phenology described here is translated from Fuhn & Niculescu-Burlacu (1971). According to their studies of Romanian Lycosidae, *H. radiata* is a diurnal species that prefers warm, dry (xerophilic) habitats. It is found in dry grasses and open woods in steppes. In Romania adults were collected from March to December. Females with egg cases occur from August to December, and females with young on their back appear in December. In one case 138 spiderlngs were found with the female. *Hogna radiata* is active in the daytime, wandering through grass. Mating occurs in the fall and then the female digs a shallow burrow where she retreats to construct an egg case. The young leave the egg case in December, but spend the winter with their mother and disperse in April and May.

Distribution.—According to many reports in the literature, such as Roewer (1955), Fuhn & Niculescu-Burlacu (1971) and Platnick (2011), *Hogna radiata* occurs throughout many parts of Europe, eastern Asia and North Africa. Specimens from North Africa labeled *Hogna radiata* that I have examined are a different species than those I have seen from Spain, France, and Italy. Because of this and the fact that many species names have been applied to populations in different parts of the reported range, I suspect that more than one, and possibly several species, are now reported in the literature under *H. radiata.* I have focused upon specimens from France, which are nearer to the type locality for *H. radiata,* in comparing this species to *Tigrosa.*

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