JOURNAL

OF THE

New York Entomological Society

Vol. XL December, 1932 No. 4

STUDIES IN AMERICAN SPIDERS: THE GENUS GRAMMONOTA

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GRAMMONOTA Emerton

Conn. Acad. Trans. 6: 38, 1882

Type: *Erigone pictilis* Cambr. (designated by Simon, Hist. Nat. Ar. 1: 666, 1894).

Itys Cambridge Biol. Centr. Amer. 1: 127, 1894. Type *Itys pergrata* Cambr.

In this genus we place a series of species which group themselves around *pictilis* as type. The embolic division of the male palpus is provided with a tailpiece as in Ceraticelus, Caratinopsis, etc. The embolus does not have a break as in Ceraticelus nor is it coiled as in Ceratinopsis but is looped across the end of the bulb. Unfortunately in the type, *pictilis,* the embolus is more highly specialized than in other members of the genus, the duct of the embolus being continued beyond the tip and coiled in a small, tight spiral. In this genus the colors are mostly gray and the abdomen usually bears conspicuous light markings recalling those in Dictyna. In some species the head of the male is like that of the female (*inornata*) but in others it bears a hump (*pictilis*) or a series of lobes (*gigas*).

SPECIES DESCRIBED AS GRAMMONOTA BUT WHICH BELONG ELSEWHERE.

Grammonota venusta Banks (Phila. Acad. Nat. Sci. Proc. 1892, p. 34, pl. 5, fig. 6) equals *Eperigone tridentata* Em.

Grammonota orites Chamberlin (Ent. Soc. Am. Ann. 12: 249, pl. 17, fig. 7, 8. 1919) equals *Oedothorax montanus* Em.

Grammonota simplex Chamberlin (Same, p. 250, pl. 18, fig. 1, 2. 1919) is apparently an Oedothorax.

Grammonota obesior Chamberlin (Same, p. 250, pl. 17, fig. 6. 1919) was described from the female only. It is related to Microneta.

Grammonota fratrella Chamberlin (Same, p. 250, pl. 18, fig. 3, 1919) was described from the female only. It is related to Microneta.

Grammonota letourneuxi Simon Ar. France 5: 599, 1884. From upper Egypt. Now the type of the genus Synaphris Simon.

Grammonota bidentata Emerton

Grammonota bidentata Emerton. Can. Ent. 58: 117, fig. 6, 1926.

We have had no specimens of this species for study. It seems to be closely related to *maculata* if not identical with it.

Type localities: Holliston and Sharon, Mass.

Grammonota capitata Emerton

(Figure 37)

Grammonota capitata Emerton. Psyche, 31: 141, fig. 3, 1924.

This species is closely related to *pictilis* from which it differs, according to Emerton, in being one-eighth smaller in size. In the male the cephalothorax is slightly shorter and the hump on the head rises more abruptly behind. The male palpi and the epigynum cannot be distinguished from those of *pictilis*.

Emerton records the species from Amston, Conn., Chatham and Holliston, Mass.

Gramonota electa new species

(Figures 1 and 2)

Male. Length, 2 mm. Cephalothorax dull yellow, strongly suffused with dusky except near the margin; viewed from above, evenly rounded on the sides with a slight constriction at the cervical groove, then gradually converging to the front, eyes in profile; viewed from the side, gently and evenly rounded over the back to the posterior eyes, median ocular area slanting downward in a nearly straight line. Clypeus slighly convex and

somewhat retreating. Back of the eyes there is a group of long, stiff hairs directed forward; the median ocular area clothed with a thick brush of recurved hairs. Sternum and labium pale yellow lightly suffused with dusky. Endites orange yellow. Legs light orange yellow. Abdomen has the ground color pale yellowish white and is marked with a median gray herring-bone stripe, posteriorly connected with the gray of the sides by four transverse bars in front with a gray basal band. Venter pale yellowish white.

Posterior eyes in a very slightly procurved line, equal, the median separated by three times the radius and from the lateral by a little less. Anterior eyes in a straight line, the median smaller than the lateral, subcontiguous and separated by a little more than the diameter.

Femur of palpus rather long, slender, slighly curved inward. Patella short and straight. Ratio of length of femur to that of patella as 19 to 7. Tibia obconic with the sides straight, the dorsal margin smooth and nearly straight; the dorso-lateral apophysis a bluntly pointed, broad, triangular tooth finely dentate on the anterior margin. Paracymbium slender, bent at a right angle and then strongly curved, the tip strongly hooked. The basal part clothed in front with a row of long hairs. The embolic division very similar to that of *inornata* except that the tip of the embolus is coiled in an open spiral of one full turn.

Female. Length, 2 mm. Similar to the male in form and color except that eyes are closer together and the gray on the abdomen covers less of the surface. The basal gray band is reduced to an irregular spot on each side and there are only two gray cross bars posteriorly. The sternum is margined with dark gray. Posterior eyes in a nearly straight line, the median slighly smaller than the lateral, separated by a little less than the diameter and a little nearer to the lateral. Anterior eyes in a straight line, the median smaller than the lateral, subcontiguous and separated from the lateral by a little less than the diameter. The epigynum consists of a strongly convex plate. The median fovea has the lateral walls curved and converging towards the front where there are two triangular openings lying close together.

Holotype male, allotype female. Turrialba, Costa Rica, 2500 ft. A. T. Aug. 12, 1929 (William Hamilton).

Grammonota gigas Banks

(Figures 3–8)

Erigonoplus gigas Banks. Can. Ent. 28: 65, 1896.

Caracladus gigas Crosby. Phila. Acad. Nat. Sci. Proc. 1905, p. 306.

Grammonota gigas Emerton. Conn. Acad. Sci. Trans. 14: 187, pl. 2, fig. 8, 1909.

Male. Length, 2.4 mm. Cephalothorax orange strongly suffused with dusky, head darker except the cephalic lobes; viewed from above rounded on the sides and convergent towards the front with only a slight constriction at the cervical groove, front rather narrow, rounded; viewed from the side, rather steeply ascending behind and then gently rounded over to the base of the cephalic lobe, median ocular area slightly convex, clothed with a group of erect recurved hairs. Clypeus strongly convex and slightly retreating. Cephalic lobe consists of 5 thick parallel finger-like rounded ridges, the median extending forward between the posterior median eyes. Sternum and labium orange strongly suffused with dusky, darker at the margin. Endites orange, lighter distally. Legs light yellowish-orange; the metatarsi of the first legs strongly enlarged, fusiform, distinctly paler. Abdomen gray, anteriorly above there is a large area in which the integument is strongly indurated, smooth and shining, dusky orange. Posteriorly the abdomen is pale marked with 3 or 4 transverse gray bars connected with a median stripe. Venter somewhat lighter.

Posterior eyes in a slightly procurved line, equal and equidistant separated by 3 times the radius. Anterior eyes in a recurved line, the median smaller than the lateral, separated by the radius and from the lateral by twice the diameter.

Femur of palpus rather stout, cylindrical, slightly curved inward. Patella short and thick. Ratio of length of femur to that of patella as 21 to 7. Tibia obconic, viewed from above the mesal side somewhat convex, the dorsal margin smooth, gently and broadly excavated toward the base of the dorso-lateral apophysis. The latter is black, broadly triangular, and minutely dentate on the mesal margin. The paracymbium long, slender, strongly curved and slightly enlarged at tip.

Embolic division of the same type as in *inornata,* the terminal loop is long enough to be visible from the back of the palpus.

Female. Length, 2.5 mm. Similar to the male in form and color. The epigynum consists of a convex plate. The median fovea is bounded laterally by nearly straight walls, broadly rounded in front. The middle lobe straight behind and overhung by a broadly rounded lobe in front.

Type locality: Ithaca, N. Y.

New York: Lake Tear of the Clouds, Mt. Marcy, July 11, 1918, 1 ♂ 1 ♀; West Kilns, Clinton Co., June 28, 1931, 1 ♂ 2 ♀; Trenton Falls, June 5, 1921, 1 ♀; Parkers, Lewis Co., Sept. 2, 1926, 2 ♀, (Chapman); Cinnamon Lake, Schuyler Co., July 20, 1930, 1 ♂; July 4, 1924, 2 ♂; Labrador Pond, June 25, 1922, 1 ♀; Freeville, April 27, 1921, 1 ♂; May, 1911, 1 ♂; McLean, June 21, 1924, 1 ♀; Howard, July 5, 1924, 2 ♀; Ithaca, May, 1 ♀.

Iowa: Clay, July 20, 1907, 1 ♂ from stomach of *Bufo americanus* (U. S. Biological Survey).

Emerton also records it from Fitzwilliam, N. H., and Plum Island, Mass.

Grammonota inornata Emerton

(Figures 9–13)

Grammonota inornata Emerton. Conn. Acad. Sci. Trans. 6: 39, pl. 10, fig. 5, 1882.

Male. Length, 1.9 mm. Cephalothorax dark brown almost black, a little lighter posteriorly; viewed from above evenly rounded on the sides, slightly constricted at the cervical groove, broadly rounded across the front; viewed from the side, evenly and gently rounded over the back to the top of the head which is higher than the posterior eyes Head nearly normal; clypeus nearly straight and very slightly retreating.

Posterior eyes in a straight line, equal, the median separated by the diameter and a little farther from the lateral. Anterior eyes in a straight line, the median smaller than the lateral, separated by the radius and from the lateral by the diameter.

Sternum dark brown, blackish at the margin, finely rugulose. Labium and endites dark brown, lighter distally. Legs orange yellow. Abdomen dark gray without any distinct pattern of lighter markings, a little pointed in front and longitudinally wrinkled.

Femur of palpus cylindrical, moderately slender and gently curved inward; patella short and broad. Ratio of length of femur to that of patella as 15 to 6. Tibia viewed from the side obconic, obliquely truncate distally with a short, sharp, incurved tooth on the dorso-lateral angle; viewed from above the margin is smooth and straight except for this same tooth. Paracymbium

broad at base, the narrower terminal part arising at a right angle from the basal part; tip slightly hooked; the basal part with a row of 4 stiff hairs. Bezel broad and rounded, the edge smooth. Tail-piece of the embolic division very long and spirally curved, the tip lying in the angle between the tibia and the base of the cymbium. The embolus black, rather stout when it emerges from behind the bezel but gradually narrows to a fine point without any break, not coiled but looped across the end of the bulb.

Female. Length, 2.3 mm. Similar to male in form and color, but the head is a little wider and the posterior eyes are in a slightly recurved line. The epigynum is a strongly convex plate; the middle lobe is short and broad.

Type localities: Saugus and Woods Hole, Mass., New Haven, Conn.

Massachusetts: Woods Hole, Aug. 20, 1925, 22 ♂ 41 ♀, under weeds on beach (W. T. M. Forbes); July 10, 1919, 1 ♂ 6 ♀ (Forbes); Sept. 20, 1922, 11 ♂ 2 ♀ (Forbes).

New York: Cutchogue, Sound Beach, Aug. 28, 1920, 1 ♂; Orient Point, Aug. 28, 1920, 1 ♂ 2 ♀; Tottenville, Nov. 17, 1918, 1 ♂ 3 ♀; Sea Cliff, June 13, 1919, 1 ♂, 1 ♀; Mattituck, Aug. 28, 1920, 2 ♂; Riverhead, Sept. 10, 1922, 1 ♂; Cold Spring Harbor, July 13, 1930, 2 ♂.

Missouri: Columbia, July 1905, 2 ♂ 2 ♀; Nov. 1904, 40 ♂ 79 ♀; Jan. 1905, 1 ♀; Oct., 8 ♂ 4 ♀; June, 4 ♂ 1 ♀; Pierce City, Mar., 1 ♂, 4 ♀.

Emerton also records the species from Anticosti Id., Dauphin, Man., Lyme, Conn., Providence and Newport, R. I., Hyannis, Chatham, Provincetown, Boston and Ipswich, Mass.

Grammonota insana Banks

(Figures 14–17)

Acartauchenius insanus Banks, Cal. Acad. Sci. Proc. Ser. 3, 1: 242, Pl. 14, fig. 12, 1898.

Male. Length, 2.5 mm. Cephalothorax brownish, lighter on the head. Viewed from above evenly rounded on the sides, narrowed from the cervical groove; viewed from the side, evenly rounded over the back, highest back of the eyes. From this point it slopes to the anterior median eyes. Just back of the

eyes there is a cluster of stiff hairs slanting forward and similar hairs directed upward occupy the ocular area. Clypeus retreating. Sternum and labium brownish, darker toward the edge. Endites light, like the legs. Legs and palpi dusky yellow.

Posterior eyes in a strongly procurved line, anterior eyes gently recurved.

Abdomen straw yellow, nearly white, gray on the sides except in front and marked down the middle with a gray stripe broken into spots posteriorly, the spots connected with the gray on the sides by narrow transverse bands. Venter light, marked with gray toward the spinnerets and along the sides.

Tibia of male palpus armed with a short, stout, dorso-lateral apophysis.

Female. Length 3 mm. Similar to the male in coloration. The pattern on the back of the abdomen is more distinct but does not reach the tip, which is yellowish. The head is not so highly elevated as in the male and the clusters of stiff hairs are absent.

Posterior eyes in a strongly procurved line; anterior eyes gently recurved. Anterior tibiæ armed beneath with two rows of seven or eight stiff hairs. The epigynum is a gently convex plate, the middle lobe broad with the lateral walls short and convergent.

Redescribed from one male and two female types, San Miguel Heracosta, Sonora, Mexico.

Grammonota inusiata, new species

(Figures 18 and 19)

Male. Length, 1.9 mm. Cephalothorax chestnut brown; viewed from above, evenly rounded on the sides, very slightly constricted at the cervical groove and then slightly narrowed towards the front, eyes in profile; viewed from the side, moderately ascending behind to the cervical groove, then in an almost straight line to the back of the head and then rounded over the head to the posterior median eyes. Clypeus almost straight and slightly retreating. Sternum and labium dusky orange, darker at the margin. Endites dusky orange, lighter distally. Legs orange. Abdomen gray with a herring-bone pattern on the posterior half and a dark median line anteriorly.

Posterior eyes in a straight line, equal, the median separated by the diameter and a little farther from the lateral. Anterior eyes in a very slightly recurved line, the median smaller than the lateral, subcontiguous and separated from the lateral by the diameter.

Femur of palpus short and stout, nearly straight. Patella short. Ratio of length of femur to that of patella as 16 to 7. Tibia obconic, evenly convex. The sides nearly straight, the dorsal margin smooth and evenly convex. The dorso-lateral apophysis rather blunt, incurved, the mesal margin minutely dentate. The embolic division much as in *inornata*, the embolus long, not coiled, merely looped across the end of the bulb.

Female. Length, 2.5 mm. Similar to the male in form and markings. Epigynum with the median lobe rectangular with the sides slightly rounded, over-hung in front by a rounded triangular lobe.

Holotype, male; allotype, female. Barneveld, N. Y., Sept. 7, 1919. G. N. Wolcott.

New York: Barneveld, Aug. 24, 2 ♂ 2 ♀; Sept. 13, 1 ♂; June 3, 1 ♀; Aug. 18, 2 ♀; July 26, 2 ♀; Aug. 20, 1 ♂, 1 ♀; Aug. 4, 3 ♀. All collected by G. N. Wolcott in 1919. Ithaca, May, 1 ♂.

Grammonota kincaidi Banks

(Figures 22 and 23)

Gonglydium kincaidi Banks. Proc. Ent. Soc. Wash. 7: 96, pl. 2, fig. 1, 1905.

Oedothorax kincaidi. Petrunkevitch. Catalogue p. 262, 1911.

Male. Length, 1.9 mm. Cephalothorax dusky orange yellow, with darker radiating lines, narrowly margined with darker; viewed from above, evenly and broadly rounded on the sides to the cervical groove where there is a slight constriction, evenly and broadly rounded across the front; viewed from the side gently ascending behind to the cervical groove then continuing in an almost straight line to the top of the head where it rounds over gently to the posterior eyes. Along the median line, in front of the cervical groove, there is a row of 5 or 6 long stiff hairs directed forward. Clypeus almost straight and slanting slightly forward. Sternum dusky orange yellow with faint, radiating, darker markings. Labium and endites orange yellow, lighter distally. Legs dusky orange. Abdomen pale with the sides and a central herring-bone pattern dark gray.

Posterior eyes in a straight line, equal, the median separated by the diameter and a little farther from the lateral. Anterior eyes in a straight line, the median smaller than the lateral, separated by less than the radius and from the lateral by a little less than the diameter.

Femur of palpus rather short, cylindrical, slightly widened distally, gently curved inward. Patella short and stout. Ratio of length of femur to that of patella as 13 to 4. Tibia obconic, the dorsal margin smooth and nearly straight curving forward to form the mesal margin of the dorso-lateral apophysis. The latter is short, incurved, and the inner margin of the tip is finely dentate. The embolic division is very similar to that of *inornata.*

Type locality: Olypmia, Wash.

Washington: Friday Harbor, June–July, 1928, 1 ♂ (Shackleford).

Grammonota maculata Banks

(Figures 24–26)

Grammonota maculata Banks. Trans. Am. Ent. Soc. 23: 68, 1896.

Male. Length, 2 mm. Cephalothorax dusky yellowish; viewed from above, rather broad, evenly rounded on the sides to the cervical groove where it is very slightly constricted, eyes in profile; viewed from the side ascending behind to the cervical groove where there is a shallow depression, then evenly rounded over the head to the eyes. Clypeus slightly convex and retreating. Sternum light yellow, dusky at margin. Labium and endites brighter yellow. Legs pale yellow. Abdomen dirty white with a median longitudinal gray stripe, widened at the segments and obsolete posteriorly. Sides of abdomen marked with two or three large, irregular, gray spots darker around the spinnerets. Venter pale. Posterior eyes in a straight line, the median slightly larger than the lateral, separated by the diameter and from the lateral by a little less. Anterior eyes in a slightly recurved line, the median smaller than the lateral, subcontiguous, separated from the lateral by a little more than the radius.

Femur of palpus rather short and stout, slightly widened distally and gently curved inward. Patella broad. Ratio of length of femur to that of patella as 15 to 7. Tibia short, obconic but the sides are not so straight as in *inornata,* broadly and evenly emarginate mesally from the dorso-lateral apophysis, which terminates in two rounded teeth. Paracymbium strongly curved,

slightly enlarged at the tip. The embolic division very similar to that of *inornata,* the embolus not coiled but looped across the end of the bulb.

Female. Length, 2.2 mm. Cephalothorax darker than in the male. Abdomen light above with a median longitudinal dark stripe, which posteriorly is widened along the segments to form narrow transverse bands, uniting with the spots on the sides. Venter light. The epigynum consists of a quadrate plate with rounded corners marked in front by a transverse lunate plate darker and more heavily chitinized. The middle lobe is transverse, rectangular, in front of which the interior parts show through as indicated in the figure.

Type localities: Runnymede, Fla., and Brazos Co., Texas.

Texas: Houston, Dec. 9, 1928, 1 ♂ 1 ♀ (P. D. Harwood).

Mississippi: Lucedale, May, 1929, 1 ♂ (H. Dietrich).

New York: Shinnecock Hills, L. I., June 15, 1919, 1 ♀.

Virginia: East Falls Church, June 30, 1926, 1 ♀.

Florida: Wewahitchka, Dead Lake, April 6, 1927, 1 ♀.

Georgia: Billy's Island, Okefinokee Swamp, June, 1912, 2 ♂.

Costa Rica: Turrialba, Aug. 10, 1927, 1 ♀ (Hamliton).

Rosenfeld also records the species from Mansura, La., in Spanish moss.

Grammonota maritima Emerton

(Figures 20 and 21)

Grammonota maritima Emerton. Can. Ent. 57: 67, fig. 4, 1925.

Male. Length, 2.8 mm. Cephalothorax orange, head somewhat suffused with dusky; viewed from above, evenly rounded on the sides, very slightly constricted at the cervical groove, eyes in profile, the head broad. Cephalothorax viewed from the side rather steeply ascending behind to the cervical groove and then gently rounded over the head to the posterior eyes. Head back of the eyes sparsely clothed with black hairs directed forward, shorter hairs along the radiating furrows. Clypeus almost straight and slightly protruding. Sternum and labium orange, slightly suffused with dusky and darker at the margin. Endites lighter. Legs and palpus yellowish orange. Abdomen gray with a median light herring-bone pattern.

Posterior eyes in a straight line, equal, the median separated by 3 times the radius and from the lateral by the diameter. Anterior eyes in a straight line, the medium smaller than the lateral, separated by the radius and from the lateral by a little more than the diameter.

Femur of palpus moderately long and slender, slighly curved inward. Patella short and thick. Ratio of length of femur to that of patella as 18 to 8. Tibia short, obconic. The dorso-lateral process incurved, black, moderately short and blunt, minutely dentate on the mesal margin. This process is bounded laterally by a distinct rounded notch and mesally the margin is nearly straight with a small, irregular tooth near the center. The mesal margin of the tibia thin and smoothly rounded. Lateral margin somewhat expanded, evenly rounded, armed with a row of 4 stiff hairs just back of the margin. Paracymbium broad at base, gradually narrowed and strongly curved. Tail-piece of the embolic division long and slender and extending over the edge of the cymbium. The terminal part long, slender, coiled in a loose spiral of one turn with an extra reverse loop at the tip.

Female. Length, 2.9 mm. Similar to male in form and color. Head back of eyes not dusky. The epigynum consists of a quadrate plate with rounded edges. The median fovea rectangular with the sides nearly parallel, the middle lobe over-hung from in front by a broadly rounded lobe. The fovea bounded in front by a nearly straight, continuous transverse ridge; in *gigas* this ridge is interrupted in the middle.

Described from 1 ♂ 1 ♀ from Barrington, N. S., Sept. 8, 1923, collected in moist gravel under litter washed up by the tide by Miss Elizabeth B. Bryant who kindly presented us with these specimens from the type lot.

Grammonota ornata Cambridge

(Figures 27–29)

Erigone ornata Cambridge. Zool. Soc. London Proc. 1875, p. 395, pl. 46, fig. 3.

Grammonota ornata Emerton. Conn. Acad. Sci. Trans. 6: 36, pl. 10, fig. 3, 1882.

Male. Length, 2 mm. Cephalothorax light chestnut brown; viewed from above evenly rounded on the sides with scarcely any indication of a constriction at the cervical groove; viewed from the side gradually ascending behind without any depression at the cervical groove, rounded over the head to the posterior eyes. Clypeus almost straight and somewhat retreating. Area back of the posterior eyes sparsely clothed with moderately long erect hairs. Median ocular area clothed with short, pale hairs directed upward. Sternum and labium dusky orange, darker at the margin. Endites orange, lighter distally. Legs yellowish orange. Abdomen dark gray with two pairs of irregular light spots on the front half and four or five transverse light bars on posterior half, the anterior bars often interrupted.

Posterior eyes in a straight line, equal, the median separated by slightly more than the diameter and a little farther from the lateral. Anterior eyes in a very slightly procurved line, the median smaller than the lateral, separated by less than the radius and from the lateral by the diameter.

Femur of palpus rather short and stout, slightly curved inward. Patella short and straight. Ratio of length of femur to that of patella as 15 to 6. Tibia obconic, much like *maculata* but the dorsal margin has the excavation mesad of the dorso-lateral apophysis shallower. The dorso-lateral apophysis is short, armed with two black teeth, the mesal one shorter and acute, the lateral one blunt at tip. Paracymbium long and very strongly curved, slightly enlarged at tip. The embolic division, as in *inornata,* the embolus not coiled but looped across the tip of the bulb.

Female. Length, 2.5 mm. Similar to male in form and color but the abdominal markings are more distinct. The epigynum consists of a plate notched in the middle in front; the middle lobe is a quadrate plate over-hung from in front by a bluntly pointed lobe and crossed by a deeply impressed line parallel with the margin of the overhanging anterior lobe.

Type locality: Providence, Mass., (*sic*), probably R. I.

Allotype, female, Staten Island, N. Y.

New York: Clove Valley, Staten Island, Nov. 16, 1918, 2 ♂ 1 ♀; Montauk Pt., May 24, 1924, 1 ♀.

New Jersey: Mays Landing, June 1925, 2 ♂ (Fletcher).

Emerton also records the species from Reading and Tyngsboro, Mass. Banks records it from Black Mts., N. C.

Grammonota pallipes Banks

(Figures 30–32)

Grammonota pallipes Banks. N. Y. Ent. Soc. Jour. 3: 86, 1895.

Male. Length, 2.3 mm. Cephalothorax brownish yellow, darker on the head. Seen from the side evenly rounded to the cervical groove. Head not elevated. Clypeus nearly perpendicular, only slightly projecting. Cheliceræ dark brown. Sternum and labium brownish, darker towards edge. Endites light brownish yellow. Posterior row of eyes gently procured, anterior row slighly recurved. Abdomen light yellowish with a distinct herring-bone pattern. Venter and sides of abdomen more or less suffused with grayish. Legs and palpi brownish yellow.

Tibia of palpus provided with a triangular dorso-lateral process; on the mesal side at base there is a minutely dentate rounded lobe mesad of which there is a rounded emargination. The embolic division is of the *inornata* type.

Female. Length, 2.5 mm. Cephalothorax yellowish brown. Sternum and labium dusky orange. Endites yellowish orange, lighter distally. Legs orange. Abdomen pale dirty yellowish with a darker median stripe in front which posteriorly becomes herring-bone-shaped.

The epigynum a roughly quadrate plate. The anterior margin has a sharp notch in the middle which extends into a black-topped, nipple-like projection. The middle lobe transverse, the sides rounded and convergent forward. Anteriorly it is overlain by a rounded, pale-colored lobe which is slightly notched behind and marked with a fine, median dark line.

Male described from the type in the Museum of Comparative Zoology, female from 15 specimens found in a vial containing the types of *Grammonota trivittata* Banks, from Roslyn, N. Y.

Type locality: Long Island, N. Y., probably near Sea Cliff.

New Jersey: May's Landing, June, 1925, 1 ♀ (Fletcher).

Grammonota pictilis Cambridge

(Figures 33–36 and 38–39)

Erigone pictilis Cambridge. Zool. Soc. Lond. Proc. 1875, p. 396, pl. 46, fig. 4.

Grammonota pictilis Emerton. Conn. Acad. Sci. Trans. 6: 38, pl. 10, fig. 4, 1882.

Erigone pictilis Keyserling. Spinnen Am., Therid. 2: 194, pl. 18, fig. 252, 1886.

Grammonota pictilis Crosby. Phil. Acad. Nat. Sci. Proc. 1905, p. 310.

Male. Length, 2.5 mm. Cephalothorax yellowish brown with the head lighter; viewed from above broadly rounded on the sides, the margin crenulate, very slightly constricted at the cervical groove and broadly rounded across the front; viewed from the side, evenly and gently rounded over the back to the cervical groove, then elevated into a cone-shaped hump behind the eyes; median ocular area convex, clypeus almost straight and slightly protruding. Median ocular area clothed with recurved hairs longest in the middle; the cephalic hump clothed with stiff erect hairs, those in front directed forward.

Posterior eyes in a straight line, equal, equidistant and separated by a little less than twice the diameter. Anterior eyes in a very slightly recurved line, the median smaller than the lateral, separated by the diameter and from the lateral by twice the diameter.

Sternum, labium and endites yellowish brown darker at margin. Legs dusky yellowish. Abdomen black ornamented above with a pattern of light markings which anteriorly are united to form two broad longitudinal stripes and posteriorly form short transverse bars.

Femur of palpus moderately long, slender, and slightly widened distally; patella short. Ratio of length of femur to that of patella as 12 to $4\frac{1}{2}$. Tibia short without any true dorsal apophysis, the dorsal margin being nearly straight with a very small black tooth in the center. Laterally the margin is extended into a thin, curved, beak-like process which is bounded laterally by a triangular emargination. At the base of this

process there is, in the specimen from Nova Scotia, a small black tooth on the surface of the tibia. Paracymbium long, slender and evenly curved. The bezel is high, thin and slightly notched at the point of emergence of the embolus. The tail-piece of the embolic division long, slender and spirally curved, the tip reaching to the tibia. The embolus is basally a stout curved black rod which makes nearly one complete turn around the tip of the bulb where it ends in a sharp point after giving off the ejaculatory duct accompanied by a thin membranous conductor. The duct makes a semicircular loop across the end of the bulb and is then coiled in a flat spiral of four or five turns which lies in the angle between the bezel and the base of the embolus.

Female. Length, 2.6 mm. Similar to male in form and color. Posterior eyes in a straight line, equal, the median separated by the diameter and a little farther from the lateral. Anterior eyes in a slightly recurved line, the median smaller than the lateral, separated by a little less than the radius and from the lateral by the diameter. The epigynum has a large squarish opening, rounded in front in which the middle lobe is anteriorly deeply depressed below the general level of the epigynum and provided with two large distinct oval openings. The posterior margin of the middle lobe is elevated, more broadly so on the sides.

Type locality: Beverly, Swampscott and Boston, Mass.

Nova Scotia: Digby, 1 ♂.

New Hampshire: Hollis, Aug., 4 ♀ (Fox); Pike, May, 1908, 1 ♀ (Hayhurst); Randolf, Sept. 1, 1906, 1 ♀ (Nelson).

New York: Little Pond, Orange Co., May 25, 1920, 1 ♂; Ithaca, July–Aug., 1 ♀; Letchworth Park, July 9, 1922, 2 ♀; Trenton Falls, June 25, 1921, 1 ♀; Bumps Pond, Washington Co., July 28, 1920, 1 ♀; Chapel Pond, June 27, 1923, 1 ♂ (Chapman); Ithaca, Banks collection. Stamford, May 28, 1921 (H. P. Chrisp). The specimen Banks left in the Cornell collection is an immature example lacking one molt. One side is male and the other female.

South Dakota: Hill City, 2 ♀ (Marx) Fox collection.

Maine: Sebasicook Lake, Aug. 24, 1925, 1 ♀; Falmouth, Aug. 30, 1925, 1 ♀; Winterport, Aug. 29, 1925, 7 ♀; Island Falls, Aug. 27, 1925, 1 ♀.

Emerton also records this species from Southern Labrador; Truro, N. S.; Monfort, Que.; Ottawa and Minaki, Ont.; Dauphin and LePas, Manitoba.

Grammonota semipallida Emerton

Grammonota semipallida Emerton. Can. Ent. 51: 105, pl. 7, fig. 3, 1919.

We have been unable to study specimens of this species, which is recorded by Emerton from Winnipeg, Manitoba.

Grammonota spinimana Emerton

(Figures 40–42)

Grammonota spinimana Emerton. Can. Ent. 55: 240, fig. 3, 1923.

Male. Length, 2.5 mm. Cephalothorax viewed from above rather broad, evenly rounded on the sides with a very slight constriction at the cervical groove, bluntly rounded across the front; viewed from the side steeply ascending behind, then nearly level with a very gentle arch back of the eyes. A median row of stiff hairs directed forward extending from the cervical groove to between the posterior median eyes. Between these eyes there is a low ridge which is cut off square in front even with the front margin of these eyes. Clypeus slightly convex and somewhat protruding. The first and second legs are distinctly thickened and the tibiæ and metatarsi are armed below with rows of stiff, stout, erect hairs.

Posterior eyes in a straight line, equal and equidistant separated by the diameter. Anterior eyes in a very slightly recurved line, the median smaller than the lateral, separated by less than the radius and from the lateral by a little more than the diameter.

Femur of palpus rather short and thick, broader distally. Patella short, as broad as femur. Tibia short and broad, the front margin smooth, gently and broadly concave mesally from the dorso-lateral apophysis. The latter black, rather slender, and not strongly incurved. The ventro-lateral angle of the tibia prolonged into a black, beak-shaped tooth. Paracymbium strongly curved, the tip only slighly enlarged. The embolic

division much as in *inornata*. The median apophysis appears as a notched process just inside the bezel and seems to serve as a support for the terminal part of the embolus.

Type locality: Moose Island, James Bay, Canada.

Montana: Billings, Biological Survey Card No. 1778, 1 ♂, Aug. 19, 1909, from stomach of *Bufo woodhousii*.

Utah: Washington Co., Biological Survey Card No. 1713, 1 ♂, from stomach of *Bufo woodhousii*.

Colorado: Pingree Park, Aug. 20, 1924, 1 ♂ (C. R. Jones); Bear Creek, Morrison, Aug., 1906, 1 ♀ (Oslar).

Grammonota texana Banks

(Figures 43–47)

Acartauchenius texanus Banks. Ent. Soc. Wash. Proc. 4: 192, 1899.

Male. Length, 2.3 mm. Cephalothorax orange yellow; viewed from above evenly rounded on the sides with a slight constriction at the cervical groove, eyes in profile; viewed from the side rather steeply ascending behind to the cervical groove, then gradually ascending to base of the cephalic hump. The hump is very high and bears a cluster of long, procurved hairs on the back near the apex. Median ocular area convex and densely clothed with long recurved hairs. Clypeus slightly convex and somewhat retreating. Sternum and labium dusky yellow, darker at the margin. Endites yellowish, lighter distally. Legs yellowish tinged with orange. Abdomen yellowish-gray with a median longitudinal dark stripe which does not reach the anterior end and which posteriorly may form an interrupted, herring-bone pattern or may be obliterated. In some specimens it is reduced to a short gray stripe on the middle of the abdomen.

Posterior eyes in a slightly procurved line, equal, the median separated by twice the diameter and from the lateral by three times the radius. Anterior eyes in a recurved line, the median smaller than the lateral, separated by the radius and from the lateral by three times the radius.

Femur of palpus rather stout, cylindrical, and curved inward at base. Patella short and thick. Ratio of length of femur to that of patella as 18 to 7. Tibia short, obconic, when viewed

from above the sides straight, the dorsal margin smooth, broadly and evenly convex, the dorso-lateral apophysis broad, quadrate, thin, incurved with the edge finely dentate. This apophysis is bounded mesally by a rather deep rounded notch. The embolic division much as in *inornata*. The median apophysis appears as a thin, broad process lying at the apical end of the bezel, its outer angle black and bluntly pointed.

Female. Length, 2.8–3.8 mm. Similar to male in color but the dark markings on the abdomen are usually better developed and the sides are often marked with dark patches. Tibiæ of first and second legs armed beneath with a double row of long, slender spines. Posterior eyes in a slightly procurved line, equal and equidistant, separated by about the diameter. Anterior eyes in a slightly recurved line, the median a little smaller than the lateral, separated by less than the radius and from the lateral by three-fourths the diameter. The epigynum consists of a quadrate plate, the sides of which are rounded; on the anterior part the surface is transversely wrinkled. The lateral bounding walls of the median fovea moderately convergent towards the front and then parallel or divergent from the last third. The median lobe is over-hung from in front by a rather large heart-shaped lobe. In front of the epigynum there is a narrow transverse hardened sclerite.

Type localities: Shreveport, La.; Holly Springs, Miss.; and Brazos Co., Texas.

Georgia: Thunderbolt, June 26, 1912, 4 ♂ 8 ♀; Billy's Island, Okefinokee Swamp, June, 1912, 1 ♂ 3 ♀.

Arkansas: Hope, June–July, 6 ♂ 10 ♀, beating flowers (Knobel); Sept. 1, 1926, 1 ♀, beating underbrush (Knobel).

Louisiana: Shreveport, ♂ ♀.

Alabama: Biol. Sur. Card No. 279, *Bufo terrestris*, Mobile, 1892, 1 ♂, (J. Hurter).

Mississippi: Ocean Springs, Apr. 26, 1931, 4 ♀; June 4, 1930, 1 ♂ 4 ♀ (Dietrich); Isle of Caprice, Biloxi, June 15, 1930, 1 ♀ (Dietrich); Holly Springs ♂ ♀.

Florida: Lake Jackson, Leon Co., April 12, 1927, 1 ♀; Alachua Co., 1 ♂; Orlando, Oct. 11, 1926, 2 ♀ (Culver); Micanopy, May 9, 1926, 1 ♀ (Hubbell).

Texas: Brazos Co., ♂ ♀; no locality, 2 ♀ (Yothers); Houston, Feb. 1929, 1 ♀.

Grammonota trivittata Banks

(Figures 48 and 49)

Grammonota trivittata Banks. N. Y. ENT. SOC. JOUR. 3: 86, 1895.

Grammonota trivittata Emerton. Conn. Acad. Sci. Trans. 16: 388, pl. 1, fig. 6, 1911.

Male. Length, 2 mm. Cephalothorax dull yellow strongly suffused with dusky except on the head; head dull yellowish; viewed from above, evenly rounded on the sides with a slight constriction at the cervical groove, broadly rounded across the front; viewed from the side, evenly ascending in a straight line to the cervical groove and then evenly and broadly rounded over the head to the posterior eye. Clypeus slighly convex and somewhat protruding. Sternum and labium dusky orange darker on the margin. Endites pale dull orange. Legs yellowish. Abdomen dull white with a median longitudinal dark stripe with irregular edges, posteriorly somewhat herring-bone-shaped. Sides of abdomen gray. Venter pale.

Posterior eyes in a straight line, equal, the median separated by the diameter and a little farther from the lateral. Anterior eyes in a straight line, the median smaller than the lateral, separated by less than the radius and from the lateral by the diameter.

Femur of palpus moderately stout, cylindrical, almost straight. Patella short and straight. Ratio of length of femur to that of patella as 22 to 10. Tibia obconic, the dorsal margin straight. The dorso-lateral apophysis only moderately incurved and with only a slight indication of being dentate on the median side.

Female. Length, 3 mm. Cephalothorax brown with the head pale. Marking on abdomen of the same type as in the male. Epigynum consists of a plate, nearly circular in outline, somewhat truncate behind. The median fovea with the sides nearly straight, converging toward the front, rounded in front. The middle lobe crossed in front of the middle by a strongly curved groove convex posteriorly, in front of which are the openings.

Type locality: Sea Cliff, N. Y.

Massachusetts: Wellfleet, Aug. 28, 1918, 1 ♂; Woods Hole, July, 1919, 1 ♀ (Forbes).

New York: Roslyn, Banks, types in M. C. Z.

Connecticut: Hammonasset Beach, July 26, 1923, 1 ♀.

Emerton also records this species from Lyme, Conn.; Providence and Newport, R. I.; Martha's Vineyard, Nantucket, Hyannis, Chatham, Provincetown, Plymouth, Boston, Gloucester, and Ipswich, Mass.; Bath and Thomaston, Me.

Grammonota vittata Barrows

(Figures 50–52)

Grammonota vittata Barrows. Ohio Jour. Sci. 19: 357, pl. 15, fig. 1, 1919.

Male. Length, 2 mm. Cephalothorax orange, lightly suffused with dusky; viewed from above evenly rounded on the sides with a slight constriction at the cervical groove, eyes in profile; viewed from the side, gradually ascending behind to the cervical groove and then very gently arched over the head to the posterior eyes. There is a median row of hairs directed forward in front of the cervical groove; the row is double between the posterior median eyes and there is a cluster of long curved hairs in the median ocular area. Clypeus almost straight and very slightly protruding.

Sternum and labium orange suffused with dusky, darker towards the margin. Endites yellowish orange, lighter distally. Cheliceræ orange. Legs yellowish orange. Abdomen grayish yellow with a sooty, median stripe extending back two-thirds the length of the abdomen.

Posterior eyes in a straight line, equal, the median separated by a little more than the diameter and from the lateral by a little more than the radius. Anterior eyes in a very slightly recurved line, the median smaller than the lateral, subcontiguous, separated from the lateral by two-thirds the diameter.

Femur of palpus rather short, cylindrical, almost straight. Patella short and straight. Ratio of length of femur to that of patella as 18 to 8. Tibia obconic, when viewed from above the

mesal side appears convex. The dorsal margin smooth and nearly straight. The dorso-lateral apophysis very broad, quadrate, the lateral angle square. The mesal angle obtuse and finely dentate. The paracymbium long, slender, strongly curved and the tip pointed and very strongly hooked. The embolic division similar to that of *inornata* but the tail-piece is shorter. The embolus is not coiled but looped across the end of the bulb. Just back of the bezel there is a conspicuous, black, stout, curved, sharp-pointed process.

Female. Length, 2.6 mm. Similar to male in form and color. The anterior legs have the tibiæ armed beneath with three pairs of long, slender spreading spines with an extra one distally; the metatarsi with two pairs. Tibia of second legs armed below with a single long spine; metatarsi armed below with two spines, not paired.

The epigynum consists of a large light-colored plate. The median fovea quadrate, the sides slightly constricted anteriorly, the front margin broadly rounded.

Type locality: Hebron, Ohio.

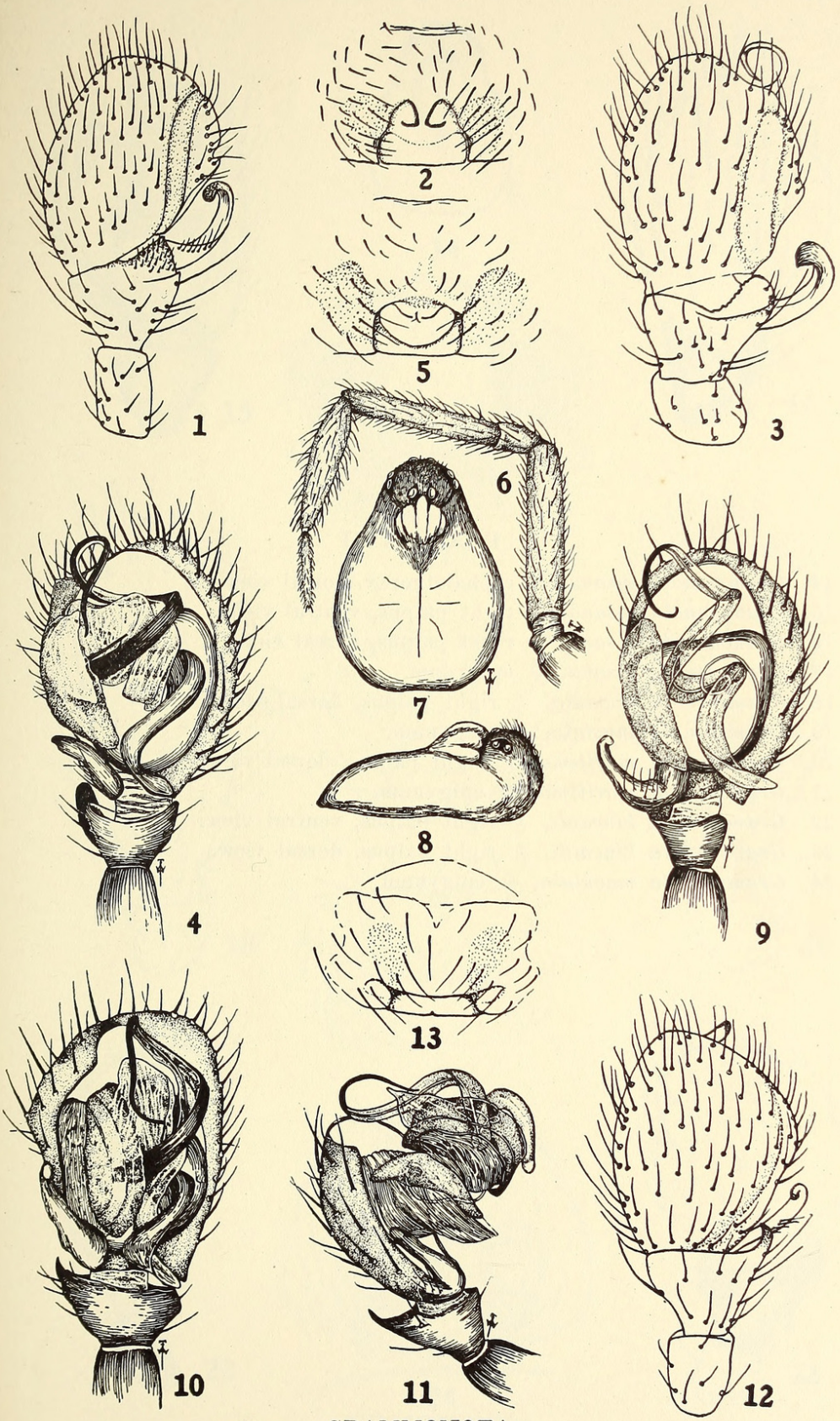
Through the kindness of Profesosr Wm. M. Barrows, of Ohio State University, we have been able to study a pair of this interesting species.

Ohio: Hebron, Oct. 3, 1918, 1 ♂ 1 ♀.

New Jersey: Mays Landing, June, 1925, 1 ♂ (Fletcher).

PLATE XVI

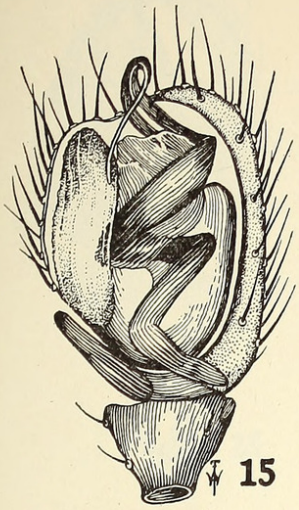
1. *Grammonota electa,* ♂ right palpus, dorsal view.
2. *Grammonota electa,* ♀ epigynum.
3. *Grammonota gigas,* ♂ right palpus, dorsal view.
4. *Grammonota gigas,* ♂ right palpus, ventral view.
5. *Grammonota gigas,* ♀ epigynum.
6. *Grammonota gigas,* ♂ first leg.
7. *Grammonota gigas,* ♂ cephalothorax, dorsal view.
8. *Grammonota gigas,* ♂ cephalothorax, lateral view.
9. *Grammonota inornata,* ♂ right palpus, ventral view, cleared.
10. *Grammonota inornata,* ♂ right palpus, ventral view.
11. *Grammonota inornata,* ♂ right palpus, lateral view, cleared.
12. *Grammonota inornata,* ♂ right palpus, dorsal view.
13. *Grammonota inornata,* ♀ epigynum.



GRAMMONOTA

PLATE XVII

14. *Grammonota insana*, ♂ cephalothorax, dorsal view.
15. *Grammonota insana*, ♂ right palpus, ventral view.
16. *Grammonota insana*, ♂ right palpus, dorsal view.
17. *Grammonota insana*, ♀ epigynum.
18. *Grammonota inusiata*, ♂ right palpus, dorsal view.
19. *Grammonota inusiata*, ♀ epigynum.
20. *Grammonota maritima*, ♂ right palpus, dorsal view.
21. *Grammonota maritima*, ♀ epigynum.
22. *Grammonota kincaidi*, ♂ right palpus, ventral view.
23. *Grammonota kincaidi*, ♂ right palpus, dorsal view.
24. *Grammonota maculata*, ♀ epigynum.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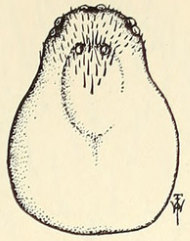
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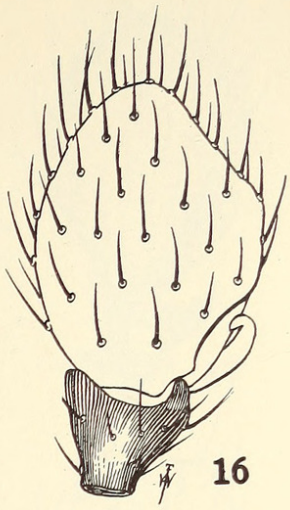
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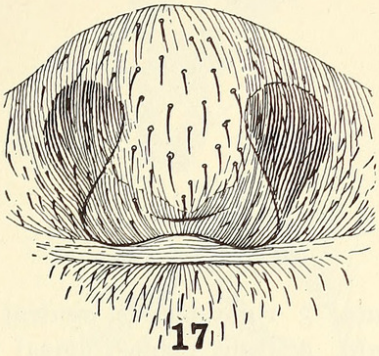
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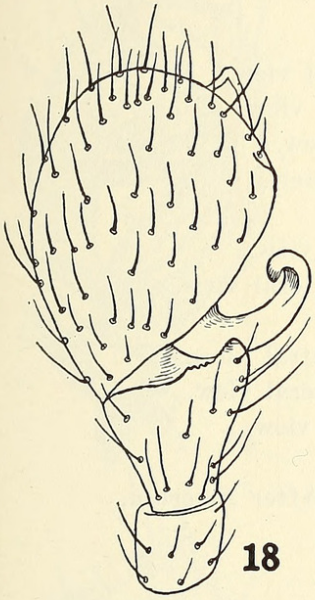
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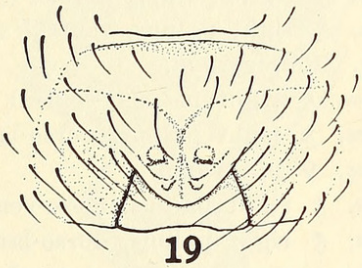
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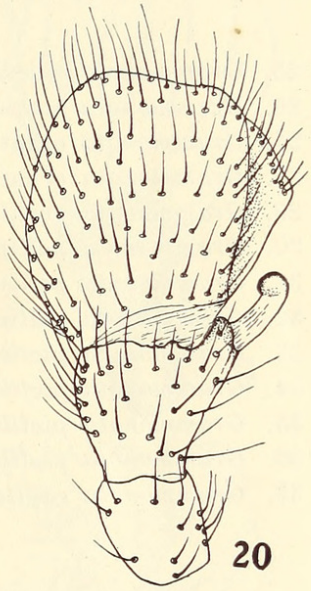
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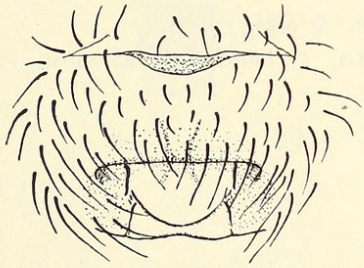
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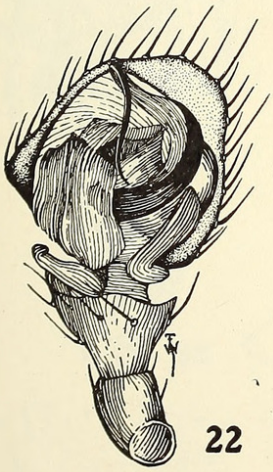
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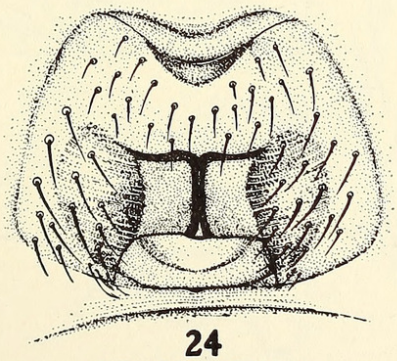
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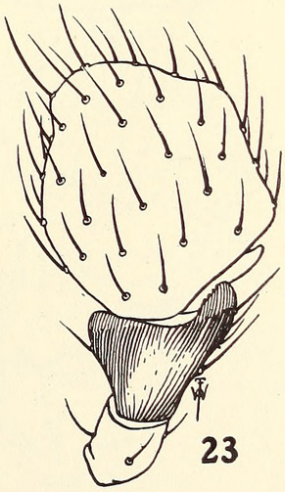
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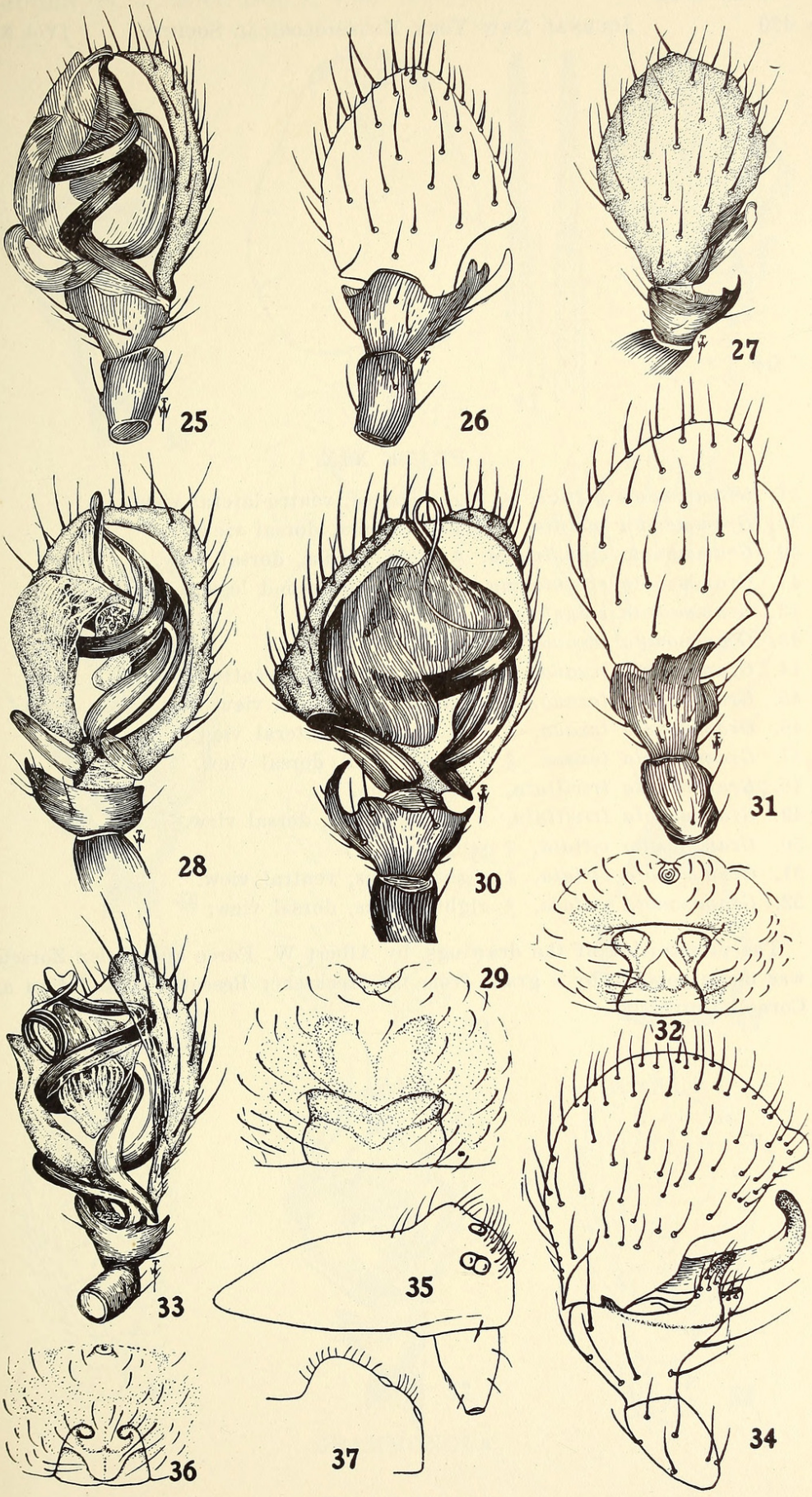
GRAMMONOTA

PLATE XVIII

25. *Grammonota maculata,* ♂ right palpus, ventral view.
26. *Grammonota maculata,* ♂ right palpus, dorsal view.
27. *Grammonota ornata,* ♂ right palpus, dorsal view.
28. *Grammonota ornata,* ♂ right palpus, ventral view.
29. *Grammonota ornata,* ♀ epigynum.
30. *Grammonota pallipes,* ♂ right palpus, ventral view.
31. *Grammonota pallipes,* ♂ right palpus, dorso-lateral view.
32. *Grammonota pallipes,* ♀ epigynum.
33. *Grammonota pictilis,* ♂ right palpus, meso-ventral view.
34. *Grammonota pictilis,* ♂ right palpus, dorso-lateral view.
35. *Grammonota pictilis,* ♂ cephalothorax, lateral view.
36. *Grammonota pictilis,* ♀ epigynum.
37. *Grammonota capitata,* ♂ head, lateral view. After Emerton.

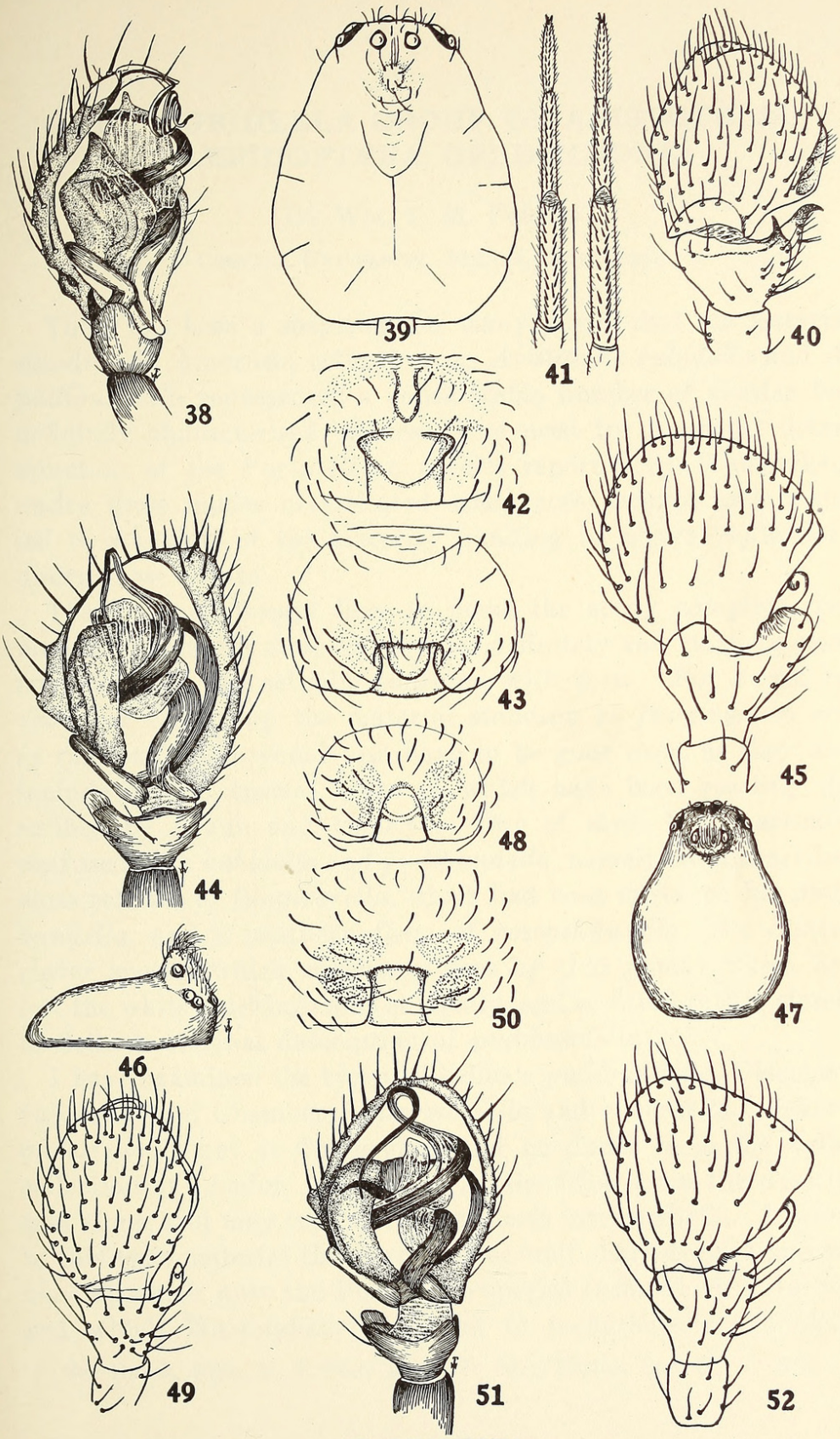


GRAMMONOTA

PLATE XIX

38. *Grammonota pictilis*, ♂ right palpus, ventro-lateral view.
39. *Grammonota pictilis*, ♂ cephalothorax, dorsal view.
40. *Grammonota spinnimana*, ♂ right palpus, dorsal view.
41. *Grammonota spinnimana*, ♂ first and second legs, ventral view.
42. *Grammonota spinnimana*, ♀ epigynum.
43. *Grammonota texana*, ♀ epigynum.
44. *Grammonota texana*, ♂ right palpus, meso-ventral view.
45. *Grammonota texana*, ♂ right palpus, dorsal view.
46. *Grammonota texana*, ♂ cephalothorax, lateral view.
47. *Grammonota texana*, ♂ cephalothorax, dorsal view.
48. *Grammonota trivittata*, ♀ epigynum.
49. *Grammonota trivittata*, ♂ right palpus, dorsal view.
50. *Grammonota vittata*, ♀ epigynum.
51. *Grammonota vittata*, ♂ right palpus, ventral view.
52. *Grammonota vittata*, ♂ right palpus, dorsal view.

The preparation of the drawings, by Albert W. Force and Helen Zorsch, was made possible by a grant from the Heckscher Research Foundation at Cornell University.



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