

**SPIDERS OF THE GENUS *PIRATA* IN NORTH AMERICA,
CENTRAL AMERICA AND THE WEST INDIES
(ARANEAE: LYCOSIDAE)**

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¹Mrs. Don L. Frizzell, deceased

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ABSTRACT

Thirty-two species of *Pirata*, including nine new species, from North and Central America and the West Indies are described and illustrated with photographs on 39 plates. Keys to males and females are included. Data on distribution, life history, and ecology are summarized. Photographs of all available types are included.

INTRODUCTION

Wolf spiders of the genus *Pirata* have been recorded from all the continents and many islands. In the area covered by this study most of them are small with a body length of a centimeter or less and are easily overlooked by collectors or passed up as immatures. The object of this study was to describe all of the species known from North and Central America and the West Indies. No attempt was made to determine the limits of the genus; this would require a study on a much wider basis. We have followed Chamberlin, Gertsch, Kaston and others in recognizing *Pirata* as those species that have a tuning-fork pattern on the carapace, plus a few others, one or two of doubtful affinity. The genitalia of the species included in this study differ enough to suggest that several lines of descent are involved and that they will fall into several genera when the family has been studied thoroughly.

Members of *Pirata* occur typically around bodies of water, upon which they run with great ease, or in bogs, swamps and marshes. Several species may be found in damp meadows or on mesic slopes. One species was collected originally in Florida in a rotten log in a mesic hammock.

The cocoon is carried around attached to the spinnerets. This behavior makes these little spiders much more conspicuous to the eyes of the collector than is usually the case.

As early as 1963 Harriet Exline wrote to Wallace that she was beginning a study of the genus *Pirata* and during the next five years they exchanged specimens and information at infrequent intervals. Shortly after Harriet's death in 1968 Dr. William B. Peck, who had been entrusted with her collection and spider papers, wrote to Wallace and inquired if he would be interested in finishing her manuscript on *Pirata*. Wallace replied in the affirmative and shortly thereafter received the manuscript and began to study the collections. It soon became obvious that Miss Exline had studied all of the larger collections except the Chamberlin collection and Wallace was pleased to note that they agreed on every identification except in two or three cases where it appeared she had put a wrong label in a vial with species with which she was perfectly familiar.

As the work progressed Wallace recorded on 3 × 5 cards all of the data available on every specimen examined and it finally appeared to him that it would be simpler in writing up the results of the study to start from scratch in describing the species and to use his 3 × 5 cards in compiling the data on distribution, life history and ecology. As a result, only the specimens examined by Wallace are recorded in this study (those examined by Miss Exline would be included). Records from the literature are not included. In fairness to Miss Exline it should be pointed out that any mistakes or faulty judgements in this paper are attributable to Wallace and not to her.

During this investigation Wallace found photographs of the genitalia and, indeed, of the whole spider, to be very useful in studying diagnostic characters and in comparing species. As he progressed from one species to the next it was very convenient and necessary to compare photographs dozens of times and often this made it unnecessary to locate a vial and remove specimens for study under a microscope. Photographs are used to illustrate this paper because, even though the picture may not be as good as one might wish for, still it is a more accurate representation of the structure than Wallace could have made in a drawing. The small size of the genitalia in *Pirata* often makes securing a good photograph almost impossible. Nevertheless, the characteristics necessary to distinguish between species can be illustrated on film.

SYNONYMS

- **Pirata agilis* Banks, 1892 = *P. montanus* Emerton
- **Pirata arenicola* Emerton, 1909, female = *P. piraticus* (Clerck)
- **Pirata arenicola* Emerton, 1909, male = *P. aspirans* Chamberlin
- Pirata californicus* Banks, 1904 = *P. sedentarius* Montgomery
- **Pirata elegans* Stone, 1890 = *P. montanus* Emerton
- **Pirata exigua* Banks, 1892 = *P. minutus* Emerton
- Pirata febriculosa* Becker, 1881 = *P. piraticus* (Clerck)
- **Pirata humicolus* Montgomery, 1902 = *P. minutus* Emerton
- **Pirata liber* Montgomery, 1902 = *P. insularis* Emerton
- **Pirata loennbergi* Tullgren, 1901 = *Sosippus floridanus* Simon
- **Pirata nigromaculatus* Montgomery, 1904 = *P. montanus* Emerton

Pirata piraticus Emerton, 1885 = *P. marxi* Stone

Pirata procursor Montgomery, 1902 = *Pardosa xerampelina* (Keyserling)

Pirata prodigiosa Keyserling, 1876 = *P. piraticus* (Clerck)

**Pirata sylvestris* Emerton, 1909, female = *P. piraticus* (Clerck)

**Pirata sylvestris* Emerton, 1909, male = *P. insularis* Emerton

**Pirata transversolineatus* Tullgren, 1901 = *Sosippus floridanus* Simon

**Pirata wacondana* Scheffer, 1904 = *P. sedentarius* Montgomery

*Type examined by H. K. Wallace.

METHODS

All of the descriptions and measurements in this paper are of specimens preserved in ethyl or isopropyl alcohol (we use 70%). The measurements were made with an ocular micrometer in a Leitz stereoscopic microscope. All data on every specimen examined are recorded by species on printed 3 × 5 data cards which will be deposited in the Florida State Collection of Arthropods, Division of Plant Industry, University of Florida, Gainesville, Florida. These cards could be useful to students wishing to make life history or distributional studies. More than three thousand photographs were taken; these will be deposited with the 3 × 5 cards. Collection of adult males and females, egg sacs, and penultimate males was tallied by species for each month of the year and the distribution of each species plotted on an outline map of North America. This information is summarized in the treatment of each species.

A large number of hours were spent trying to work out a system of numbering and locating the ventral spines on legs I and II that could be used in distinguishing between species with unsatisfactory results.

INTRODUCTION TO THE KEYS

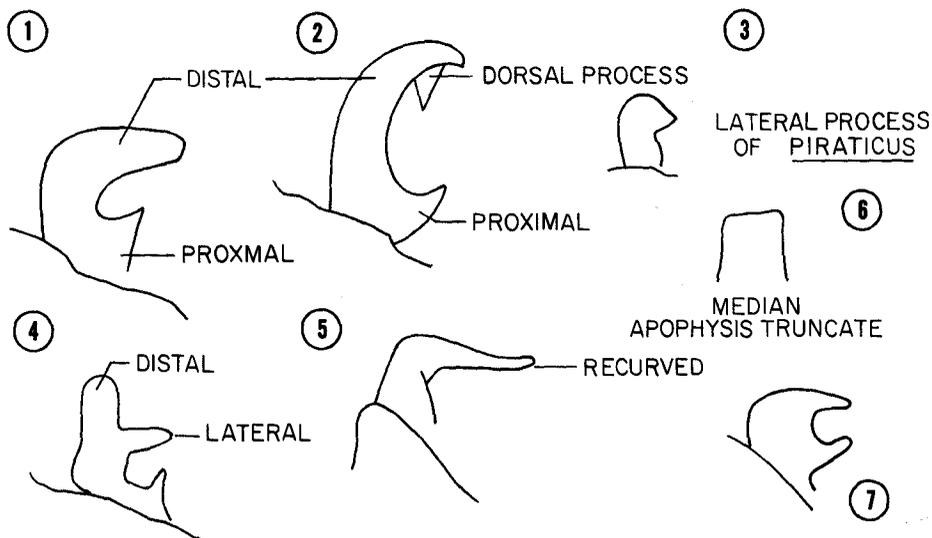
Some of the characters in the keys are based upon average specimens. For example, with respect to the markings on the carapace: the tuning-fork pattern may be distinct or broken up into pigmented spots in different individuals of the same species—these are keyed as having a tuning-fork mark; the amount of pigment varies so that the carapace in normally pigmented specimens appears to have a submarginal light stripe with pigmented margin, while lightly pigmented specimens appear to have a wide marginal light band and heavily pigmented specimens no light band at all—these may be keyed both with a submarginal light band and a marginal light band. In some species the annulae on the legs vary from distinct to very faint. These are keyed as with annulae.

KEY TO MALE *PIRATA*

- 1a. Tibia I with eight or fewer long overlapping ventral spines 2
 1b. Tibia I with more than eight long overlapping ventral spines *spiniger*
- 2a(1a). Tibia I distinctly swollen, metatarsus I with a distinct brush of hairs on ventral surface *cantralli*, n. sp.

- 2b. Tibia I not swollen, metatarsus I without brush 3
- 3a(2b). Carapace dark, heavily pigmented without tuning-fork mark or lateral light stripes 4
- 3b. Carapace with tuning-fork pattern or head region unpigmented 7
- 4a(3a). Lower margin of furrow of chelicerae with two teeth, femur I quite dark; carapace 1.7 mm long or less *minutus*
- 4b. Lower margin of furrow of chelicerae with three teeth, (lateral tooth may be quite small); carapace more than 1.7 mm long 5
- 5a(4b). Anterior eye row strongly procurved; femur, patella and tibia I dark . *bryantae*
- 5b. Anterior eye row weakly procurved or straight; femur I light or banded; tibia I not dark 6
- 6a(5b). Median apophysis of palpus small, chunky, terminating in a sharp point, without a proximal process (Fig. 3) *piraticus*
- 6b. Median apophysis larger, distal process forms almost a right angle with base, ending in a rounded tip; with a proximal process (Fig. 1) *sedentarius*
- 7a(3b). Lower margin of furrow of chelicerae with two teeth 8
- 7b. Lower margin of furrow of chelicerae with three teeth (sometimes lateral tooth is quite small) 10
- 8a(7a). Carapace 3.0 mm long or more *marxi*
- 8b. Carapace less than 2.0 mm long 9
- 9a(8b). Femur I dark, sides of carapace dark, legs not banded *minutus*
- 9b. Femur I light or banded; carapace with a wide marginal light area . . 50
- 10a(7b). Sides of carapace dark, without lateral light area 11
- 10b. Sides of carapace with lateral light area 13
- 11a(10a). Median apophysis of palpus with long distal or lateral process 12
- 11b. Distal process of median apophysis broadly truncate, with rounded distal edge (Figs. 6, 228) *montanus*
- 12a(11b). Carapace less than 1.8 mm long, femur I dark; distal process of median apophysis forms an arc with base which has another, pointed proximal process (Fig. 2) *minutus*
- 12b. Carapace more than 1.8 mm long; femur I not much darker than other leg segments; distal process of median apophysis forms an angle with base; tip of distal process recurved somewhat; base of median apophysis with a rounded proximal process (Fig. 5) *pagicola*
- 13a(10b). Sides of carapace with a wide marginal light area, with or without pigmented rim 14

- 13b. Sides of carapace with a distinct submarginal light area separated from rim by conspicuous band or areas of pigment32
- 14a(13a). Femur I dark *hiteorum*, n. sp.
- 14b. Femur I light or banded or not much darker than other leg segments15
- 15a(14b). Carapace less than 2.0 mm long16
- 15b. Carapace 2.0 mm long or longer27
- 16a(15a). Anterior eye row as wide as posterior medium row, straight *seminola*
- 16b. Anterior eye row narrower than posterior median row17
- 17a(16b). Distal process of median apophysis truncate, not pointed or rounded18
- 17b. Distal process pointed or rounded19
- 18a(17a). Distal process short, truncate (Fig. 6); anterior eye row procurved and much narrower than posterior median row *hiteorum*, n. sp.
- 18b. Distal process elongate, hatchet-shaped; femur I light or banded; anterior eye row straight or only slightly procurved *alachuus*
- 19a(17b). Distal process almost as short as proximal process so that median apophysis is robust, but small and chelate in appearance (Fig. 7) *suwaneus*
- 19b. Median apophysis not chelate in appearance20



Figs. 1-7.—Explanation of key to the males. For key purposes there is no lateral process unless a distal process is present also, except in the case of *P. triens*, which appears to be of the *P. aspirans* type, and *P. piraticus*. Median apophysis: 1, *P. sedentarius*, *P. seminola*, *P. veracruzae*; 2, *P. insularis*, *P. minutus*; 3, *P. piraticus*; 4, *P. aspirans*, *P. triens*, *P. iviei*; 5, *P. mayaca*, *P. pagicola* (median apophysis recurved); 6, *P. montanus*, *P. hiteorum* (median apophysis truncate); 7, *P. suwaneus*.

- 20a(19b). Apex of distal process of median apophysis pointed, without an egg-tooth-like structure on tip 21
- 20b. Apex of distal process rounded, with an egg-tooth-like structure on tip 23
- 21a(20a). Median apophysis with a distinct proximal process 22
- 21b. Median apophysis without a distinct proximal process (Fig. 183) *davisi*, n. sp.
- 22a(21a). Median apophysis viewed from beneath with a curved distal process, the tip of which is spatulate in lateral view *nanatus*
- 22b. Median apophysis viewed from beneath with a distal process that has a straight distal edge then angles sharply to apex; not spatulate in lateral view 30
- 23a(20a). Anterior median eyes twice as large as laterals 24
- 23b. Anterior median eyes not much larger than anterior laterals 25
- 24a(23a). Median apophysis with a large, plate-like circular distal process continuous with a short lateral process *iviei*, n. sp.
- 24b. Median apophysis with a finger-like distal process rather than a plate-like one with a proximal process *allapahae*
- 25a(23b). Distal process, in ventral view, forms almost a right angle with body of median apophysis 26
- 25b. Distal process in ventral view evenly curved or forms only a slight angle with body of median apophysis; tip round, usually lighter in color than rest of median apophysis *apalacheus*
- 26a(25a). Tip of distal process of median apophysis round; without egg-tooth-like process; proximal process not pointed *welakae*, n. sp.
- 26b. Tip of distal process pointed or with egg-tooth-like process; proximal process pointed 54
- 27a(15b). Median apophysis short, chunky, with a short pointed lateral process and no distal process which gives whole median apophysis the silhouette of the head of a bird with a short beak (Fig. 3) *piraticus*
- 27b. Median apophysis with distal or lateral process or both, not short or chunky 28
- 28a(27b). Median apophysis with both distal and lateral process 53
- 28b. Median apophysis with distal or lateral process, but not both 29
- 29a(28b). With distal process and no lateral process 31
- 29b. Median apophysis without distal process and with a very much enlarged lateral process, spatulate at tip (Fig. 75) *triens*, n. sp.
- 30a(22b). Distal arm narrower than body of median apophysis and forming a right angle with it; cymbium 0.49 mm long *turrialbicus*, n. sp.

- 30b. Distal arm as wide or wider than body and forming less than a right angle with it; cymbium 0.59 mm long *felix*
- 31a(29a). Tip of Distal arm at median apophysis truncate, hatchet-shaped *alachuus*
 31b. Tip of distal arm not truncate or hatchet-shaped 45
- 32a(13b). Carapace 2.9 mm or less long 34
 32b. Carapace 3.0 mm or more long 33
- 33a(32b). Lower margin of furrow of chelicerae with two teeth; median apophysis very large (Fig. 201) *marxi*
 33b. Lower margin with three teeth *sedentarius*
- 34a(32a). Anterior eye row straight or only slightly procurved 36
 34b. Anterior eye row distinctly procurved 35
- 35a(34b). Median apophysis small, chelate, the distal and basal processes almost same length (Figs. 7, 126-127) *suwaneus*
 35b. Median apophysis with long, robust distal process with tip round and normally lighter in color than body *apalacheus*
- 36a(34a). Carapace 1.9 mm or less long 37
 36b. Carapace 2.0 mm or more long 42
- 37a(36a). Anterior eye row straight and as wide or almost as wide as posterior median row *seminola*
 37b. Anterior eye row slightly procurved; narrower than posterior median row . . 38
- 38a(37b). Median apophysis with long, curved distal process bearing dorsal process near its tip; with a short basal process (Fig. 2) *insularis*
 38b. Not so 39
- 39a(38b). Median apophysis with a finger-like lateral process and a flat, round plate-like distal process *iviei*, n. sp.
 39b. Median apophysis with a lateral or distal process, but not both 40
- 40a(39b). Distal process forms almost a right angle with the body of the median apophysis and is drawn out into a long recurved tip (Figs. 5, 92) *mayaca*
 40b. Distal process forms almost a right angle with body of median apophysis, but is shorter, thicker and not recurved 41
- 41a(40b). Distal process curved and gradually narrows to a point in ventral view; spatulate in lateral view; lacks proximal process. ARE=PME; anterior eye row straight *seminola*
 41b. Distal process more angular and wider, often with what looks like a small egg-tooth on tip; not spatulate in lateral view; with a proximal process. ARE narrower than PMR *allapahae*, *sedentarius*, *veracruzae*

- 42a(36b). With a brush at hair-like structures on metatarsus I, tibia I and II swollen *cantralli*, n. sp.
- 42b. Metatarsus I without brush; tibia I and II not swollen 43
- 43a(42b). Median apophysis with well developed distal or lateral process, or both . . . 44
- 43b. Distal process not developed, median apophysis small, similar to that of *P. piraticus*, but with a rounded tip instead of a pointed tip like that of *P. piraticus* (Fig. 3) *zelotes*, n. sp.
- 44a(43a). Median apophysis with well developed distal and lateral process *aspirans*
- 44b. With distal process well developed, but no lateral process 47
- 45a(31b). Distal process of median apophysis robust, gently curved; of *insularis* type, without lateral process, with small proximal process; carapace 2.9 mm long or longer *giganteus*
- 45b. Distal process not robust, forms an angle with body of median apophysis . . 46
- 46a(45b). Distal process long, drawn out into a slender, recurved tip (Fig. 5) . . . *pagicola*
- 46b. Distal process not recurved 52
- 47a(44b). Median apophysis with a long evenly curved distal process which bears a dorsal process near its tip 51
- 47b. Distal process forms almost a right angle with body of median apophysis and lacks a dorsal process 48
- 48a(47b). Distal process long, drawn out into a slender, recurved tip (Figs. 5, 102, 104) *pagicola*
- 48b. Distal process short, not recurved, with an egg-tooth-like process on tip (Figs. 1, 159-160) *sedentarius*
- 49a(24b). Distal process in ventral view evenly curved; a straight shelf-like structure just proximal of base of median apophysis (Fig. 235) *sylvanus*
- 49b. Distal process slightly angled, its tip rather short, round, and usually lighter in color than rest of median apophysis *apalacheus*
- 50a(9b). Distal process long, attenuated, forming less than a right angle with body of median apophysis *montanoides*
- 50b. Distal process short, wide, forming almost a right angle with body of median apophysis *turrialbicus*, n. sp.
- 51a(47a). Median apophysis with a proximal process, distal process not spatulate in lateral view, bearing a pointed distal process (Figs. 2, 84, 88) *insularis*
- 51b. Median apophysis without a proximal process; distal process spatulate in lateral view, dorsal process not pointed—shelf-like *seminola*
- 52a(46b). Distal process forms almost a right angle with body of median apophysis; is short and may have an egg-tooth-like process at tip (Figs. 1, 159-160) *sedentarius*

- 52b. Distal process more elongate; does not form a right angle with body of median apophysis; most significant feature is a straight, shelf-like structure proximal to and ventral to body of median apophysis (Fig. 235) *sylvanus*
- 53a(28a). Median apophysis with a large, plate-like circular distal process that is continuous with a short lateral process *iviei*, n. sp.
- 53b. Distal process at median apophysis as long as lateral process, not circular and plate-like *aspirans*
- 54a(26b). Anterior edge of distal process of median apophysis slightly arched; tip ending in egg-tooth-like process *sedentarius*
- 54b. Anterior edge of distal process straight, sharply angled to form tip *turrialbicus*, n. sp.

KEY TO FEMALE *PIRATA*

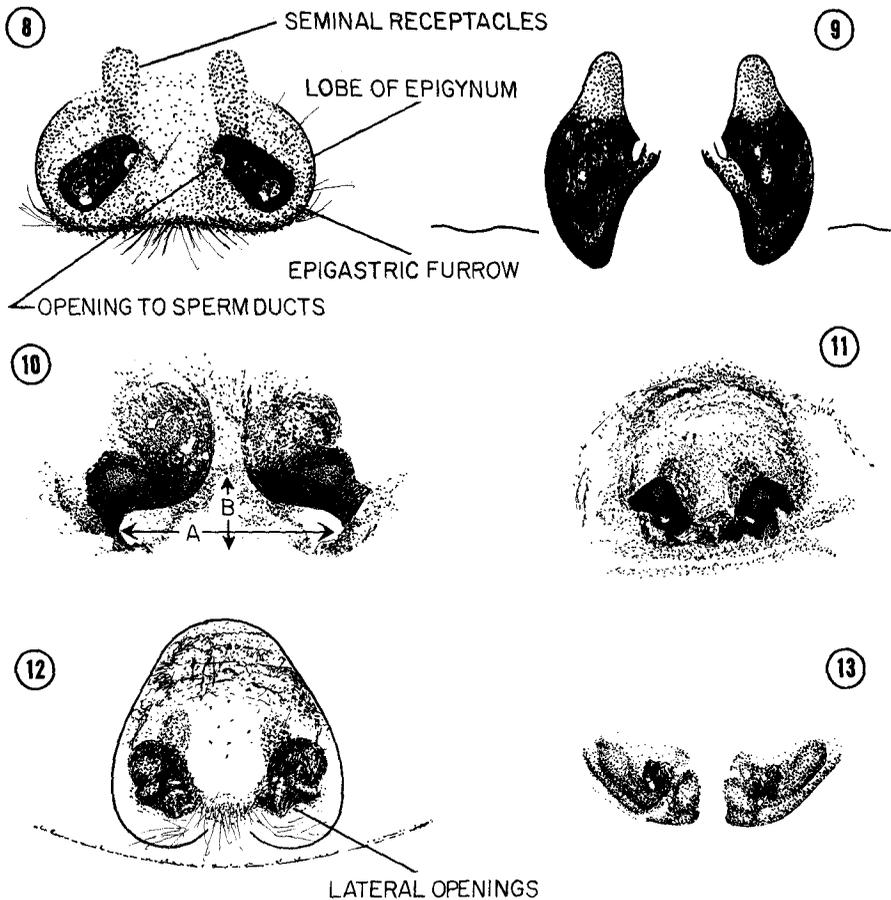
- 1a. Tibia I with eight or fewer long overlapping ventral spines 2
- 1b. Tibia I with more than eight long overlapping ventral spines *spiniger*
- 2a(1a). Carapace dark, heavily pigmented, without tuning-fork mark or lateral light stripes *bryantae*
- 2b. Carapace with tuning-fork pattern or head region unpigmented 3
- 3a(2b). Sides of carapace dark, without a marginal or submarginal light area 4
- 3b. With a marginal or submarginal light band on both sides of carapace 5
- 4a(3a). Retromargin or furrow of chelicerae with three teeth; carapace 2.0 mm long or longer 36
- 4b. Retromargin with two teeth; carapace less than 2.0 mm long *minutus*
- 5a(3b). Retromargin of chelicerae with two teeth 6
- 5b. Retromargin with three teeth (tooth next to base of fang may be so small it is difficult to see) 7
- 6a(5a). Carapace 3.0 mm long or longer *marxi*
- 6b. Carapace less than 3.0 mm long *pagicola*
- 7a(5b). Carapace with a wide marginal light band with or without pigmented rim 8
- 7b. Carapace with a submarginal light area, separated from rim by a distinct band of pigment which may or may not be continuous 26
- 8a(7a). Epigynum has two lobes which extend posteriorly beyond epigastric furrow. . 9
- 8b. Epigynal lobes do not extend posteriorly beyond epigastric furrow 20

- 9a(8a). Epigynal lobes somewhat pointed posteriorly (Fig. 9) 10
 9b. Epigynal lobes rounded posteriorly (Fig. 8) 16
- 10a(9a). Epigynal lobes concave on postmedial surface 11
 10b. Not so 15
- 11a(10a). Epigynal lobes contiguous 12
 11b. Not so 13
- 12a(11a). Carapace less than 2.0 mm long; legs without annulae; seminal receptacles converge anteriorly; anterior median eye diameter double that of anterior lateral eye diameter *allapahae*
 12b. Carapace 2.0 mm long or longer; legs with annulae; seminal receptacles parallel or diverge anteriorly; anterior median eyes less than twice diameter of anterior lateral eyes *aspirans*
- 13a(11b). Carapace more than 2.5 mm long; dorsum with prominent white paired spots; seminal receptacle openings on ventral surface, middle of lobes halfway back *piraticus*
 13b. Carapace less than 2.5 mm long 14
- 14a(13a). Epigynum of *aspirans* type (Fig. 10) with ventral overhang forming a kind of cave-like entrance posteriorly; carapace less than 2.0 mm long *iviei*, n. sp.
 14b. Epigynum consists of two prominent lobes projecting posteriorly without ventral overhang characteristic of *aspirans* group 32
- 15a(10b). Lobes of epigynum almost contiguous, separated by less than width of a lobe (U.S.A.) (Figs. 197-198) *hiteorum*, n. sp.
 15b. Lobes of epigynum well separated, by at least width of a lobe (Costa Rica) (Figs. 109, 118) 34
- 16a(9b). Carapace more than 2.0 mm long *sedentarius*
 16b. Carapace less than 2.0 mm long 17
- 17a(16b). Lobes of epigynum concave on posteromedial surface 19
 17b. Not so 18
- 18a(17b). Lobes of epigynum contiguous posteriorly 36
 18b. Lobes of epigynum separated by almost width of a lobe *welakae*, n. sp.
- 19a(17a). Seminal receptacles diverge anteriorly at an angle of about 90 degrees *nanatus*
 19b. Seminal receptacles almost parallel to each other or converge anteriorly . . . 37
- 20a(8b). Carapace more than 2.4 mm long; epigynum consists of two large, almost circular, heavily pigmented contiguous plates *giganteus*
 20b. Carapace less than 2.4 mm long 21

- 21a(20b). Epigynal lobes of *aspirans* type (concave on posteromedial surface) 22
- 21b. Epigynal lobes not concave on posteromedial surface 24

- 22a(21a). Carapace less than 2.0 mm long 38
- 22b. Carapace 2.0 mm or more long (Great Lakes region) 23

- 23a(22b). Anterior median eyes twice as large as anterior laterals; epigynal opening (Fig. 10) A/B=4/1 *indigenus*, n. sp.
- 23b. Anterior median eyes less than twice as large as laterals; epigynal opening (Fig. 10) A/B=2/1 *triens*, n. sp.



Figs. 8-13.—Explanation of key to the females. Epigynum: 8, *P. alachuus*. Seminal receptacles parallel, lobes do not extend posterior to epigastric furrow, lobes rounded posteriorly, openings to sperm ducts on posteroventromedial surface of lobes of the epigynum, lobes of epigynum contiguous; 9, *suwaneus* type. Lobes extend posterior to epigastric furrow, lobes pointed posteriorly, lobes concave on posteromedial surface; 10, *aspirans* type. A, width of epigynal opening, B, length of epigynal opening; 11, *P. montanoides*. Epigynum not divided into right and left lobes. Pigmented areas look like clipped ears of a dog; 12, *P. sylvanus*. Epigynal openings lateral in position; 13, *P. zelotes*, n. sp. Epigynal lobes shaped like human ears.

- 24a(21b). Epigynal openings on posterior edge of lobes facing posterolaterally (Figs. 11-12) 25
- 24b. Epigynal openings on ventral surface of lobes and central located . . . *alachuus*
- 25a(24a). Heavily sclerotized portions of epigynum doughnut-shaped with light center (Fig. 12) *sylvanus*
- 25b. Heavily sclerotized portions of epigynum shaped like trimmed ears of a dog (Fig. 11) *montanoides*
- 26a(7b). Carapace 3.0 mm long or longer; epigynal lobes shaped somewhat like human ears (Fig. 13) *zelotes*, n. sp.
- 26b. Carapace less than 2.0 mm long 27
- 27a(26b). Epigynal lobes rounded posteriorly 28
- 27b. Epigynal lobes pointed posteriorly 30
- 28a(27a). Epigynal lobes concave on posteromedial surface 29
- 28b. Epigynal lobes not concave 31
- 29a(28a). Epigynal lobes contiguous; anterior median eyes double that of anterior lateral eyes; seminal receptacle openings on inner edge of lobes halfway back. *mayaca*
- 29b. Epigynal lobes not contiguous; anterior median eyes less than double that of anterior lateral eyes; seminal receptacle openings ventral surface middle of lobe, halfway back 33
- 30a(27b). Carapace less than 2.0 mm long 39
- 30b. Carapace 2.0 mm long or longer *pagicola*, *mayaca*
- 31a(28b). Carapace less than 2.2 mm long *seminola*
- 31b. Carapace 2.2 mm long or longer *insularis*, *cantralli*, n. sp.
- 32a(14b). Seminal receptacles converge anteriorly (Florida) *allapahae*
- 32b. Seminal receptacles parallel or diverge anteriorly (Central America) 34
- 33a(29b). Carapace less than 2.5 mm long; seminal receptacle openings on ventral surface in middle of lobe, halfway back *seminola*
- 33b. Carapace usually more than 2.2 mm long; seminal receptacle openings on posteromedial surface of lobe of epigynum *sedentarius*
- 34a(15b,32b). Apex of lobes of epigynum pointed; carapace 1.7 mm long
. *turrialbicus*, n. sp.
- 34b. Apex of lobes curved rather than pointed; carapace 1.9-2.1 mm long . . . *felix*
- 35a(4a). With *aspirans* type epigynum, i.e., lobes extending posterior to epigastric furrow, somewhat pointed, concave on posteromedial aspect (Figs. 98-99, 103) *pagicola*
- 35b. Epigynum without posteriorly projecting lobes (Fig. 229) *montanus*

- 36a(18a). Lobes of epigynum large, round, heavily sclerotized; may look like two round black plates *apalacheus*
 36b. Not so 40
- 37a(19b). Anterior eye row almost straight; anterior median eyes twice as large as laterals *allapahae*
 37b. Anterior eye row distinctly procurved; anterior median eyes not much larger than anterior laterals *welakae*, n. sp.
- 38a(22a). Epigynal opening three times as wide as long (Fig. 10-A/B) (Georgia, North Carolina) *iviei*, n. sp.
 38b. Epigynal opening four times as wide as long (Fig. 10-A/B) (Texas, Mexico) *davisi*
- 39a(30a). Epigynum of *aspirans* type (Fig. 10) with deep concavities on posteromedial aspect of each lobe *iviei*, n. sp., *pagicola*, *mayaca*
 39b. Epigynum of *suwaneus* type (Fig. 9), somewhat concave on posteromedial aspect of each lobe, but not excavated as in *aspirans* type . . *suwaneus*, *browni*
- 40a(36b). Lobes of epigynum round posteriorly, weakly developed *alachuus*
 40b. Lobes of epigynum pointed posteriorly, concave on posteromedial aspect (*aspirans* type) *pagicola*

SPECIES GROUPS

In the descriptions species that appear to be most closely related are arranged in groups. In the last group species whose relationships are uncertain are treated in alphabetical order. The following is a list of the groups and their included species.

- (1) *nanatus* group: *P. allapahae* Gertsch, *P. apalacheus* Gertsch, *P. nanatus* Gertsch, *P. seminola* Gertsch and Wallace, *P. welakae*, n. sp.
- (2) *aspirans* group: *P. aspirans* Chamberlin, *P. indigenus*, n. sp., *P. iviei*, n. sp., *P. triens*, n. sp.
- (3) *insularis* group: *P. insularis* Emerton, *P. cantralli*, n. sp.
- (4) *mayaca* group: *P. mayaca* Gertsch, *P. pagicola* Chamberlin.
- (5) *felix* group: *P. felix* Pickard-Cambridge, *P. browni* Gertsch and Davis, *P. suwaneus* Gertsch, *P. turrialbicus*, n. sp., *P. veracruzae* Gertsch and Davis.
- (6) *piraticus* group: *P. piraticus* (Clerck), *P. zelotes*, n. sp.
- (7) *sedentarius* group: *P. sedentarius* Montgomery, *P. spiniger* (Simon).
- (8) Species of uncertain relationship: *P. alachuus* Gertsch and Wallace, *P. bryantae* Kurata, *P. davisi*, n. sp., *P. giganteus* Gertsch, *P. hiteorum*, n. sp., *P. marxi* Stone, *P. minutus* Emerton, *P. montanoides* Banks, *P. montanus* Emerton, *P. sylvanus* Chamberlin and Ivie.

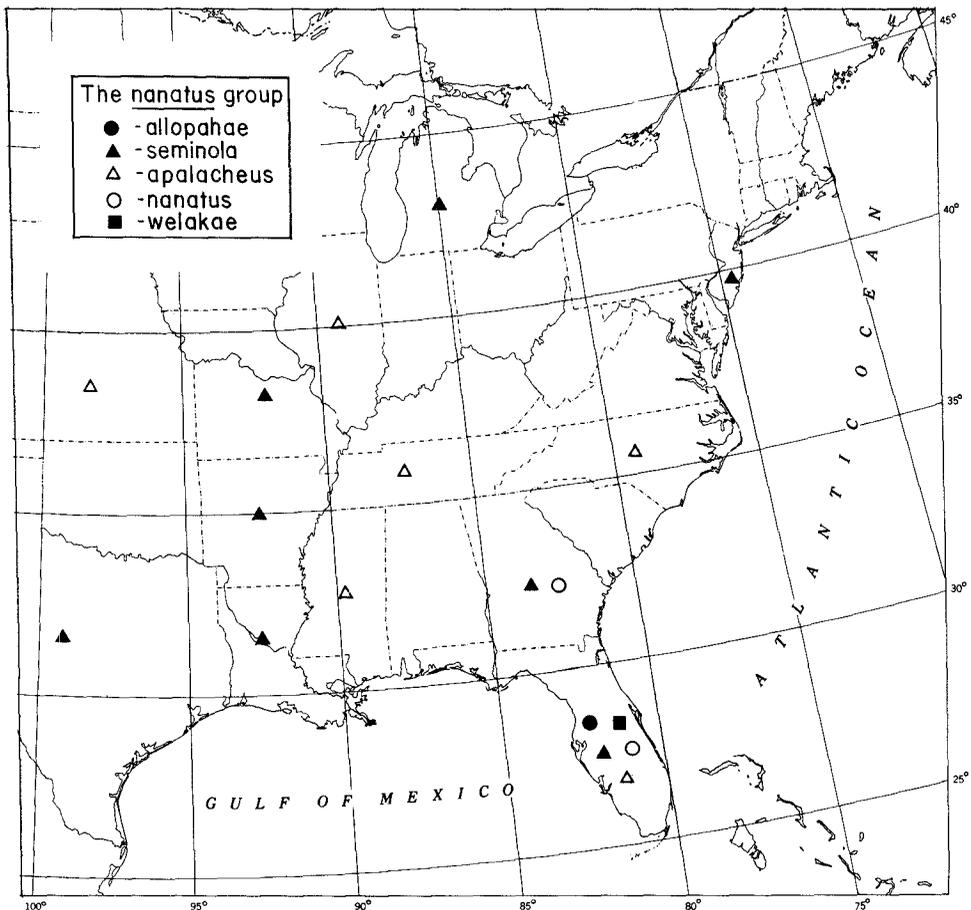
In listing the specimens examined locality, date, collector, etc., usually are given for species known from only a few localities. In cases where the species is represented by numerous collections only state and county are given. The abbreviations in parentheses following the number of specimens indicates the collection in which the vial is deposited.

Dates are given as listed on labels to avoid the possibility of error in conversion to some standard form.

THE *NANATUS* GROUP

The following five species in the southeastern United States, *P. apalacheus*, *P. nanatus*, *P. seminola*, *P. allapahae*, and *P. walakae*, n. sp., may easily be confused, although they differ in character combinations of size, pattern, spination and structure of the genitalia. *P. nanatus*, *P. apalacheus*, and *P. walakae*, have marginal light areas on the carapace while the other two have submarginal light bands (*P. seminola* has marginal banding in Arkansas). *P. nanatus* and *P. allapahae* epigyna are very similar, but may be distinguished by the position of the seminal receptacles; in the latter they are parallel, in the former they diverge from one another anteriorly. The seminal receptacles also diverge in *P. walakae*, n. sp. The epigynum of *P. nanatus*, *P. allapahae*, and *P. walakae*, n. sp., resemble *P. sedentarius* somewhat, while that of *P. seminola* is very similar in appearance to that of *P. insularis*; and *P. apalacheus* is unique.

The palp of *P. nanatus* is smaller than that of *P. allapahae* (cymbium 0.45 mm versus 0.55 mm) and their median apophyses differ in shape; the median apophysis of *P. nanatus*



is larger in proportion to the size of the cymbium than it is in *P. allapahae*. In *P. nanatus* the median apophysis extends anteriorly beyond the excavation of the cymbium about one-third the distance to its tip. In *P. allapahae* it barely extends beyond the rim of the excavation. In ventrolateral view the anterior process of the median apophysis of *P. nanatus* is wider and more spatulate than in *P. allapahae*, and in *P. allapahae* it is more rounded and less angular than in *P. nanatus*. The palpal tibia is relatively shorter in *P. nanatus* than in *P. allapahae* and *P. seminola*.

The anterior process of the median apophysis in *P. seminola* is spatulate somewhat like that in *P. nanatus* in ventrolateral view, but the median apophysis lacks the distinct medial process of the base like in *P. nanatus*. The median apophysis of *P. seminola* has a dorsally extending shelf that extends to its tip (Fig. 39).

In *P. welakae*, n. sp., the median apophysis is stout and resembles that of *P. sedentarius* somewhat, lacking the basal median process of *P. nanatus* and *P. allapahae*. It is about the same size as these two, but is smaller than in *P. sedentarius*. The median apophysis of *P. apalacheus* has a characteristic light colored, flattened anterior tip.

Pirata allapahae Gertsch

Figs. 14-19

Pirata allapahae Gertsch, 1940, Florida Entomol., 23(2):23, fig. 9 (male, female, Alachua Co., Fla., A.M.N.H., examined).

Etymology.—This species was named after the Allapaha Indian tribe which lived in Florida.

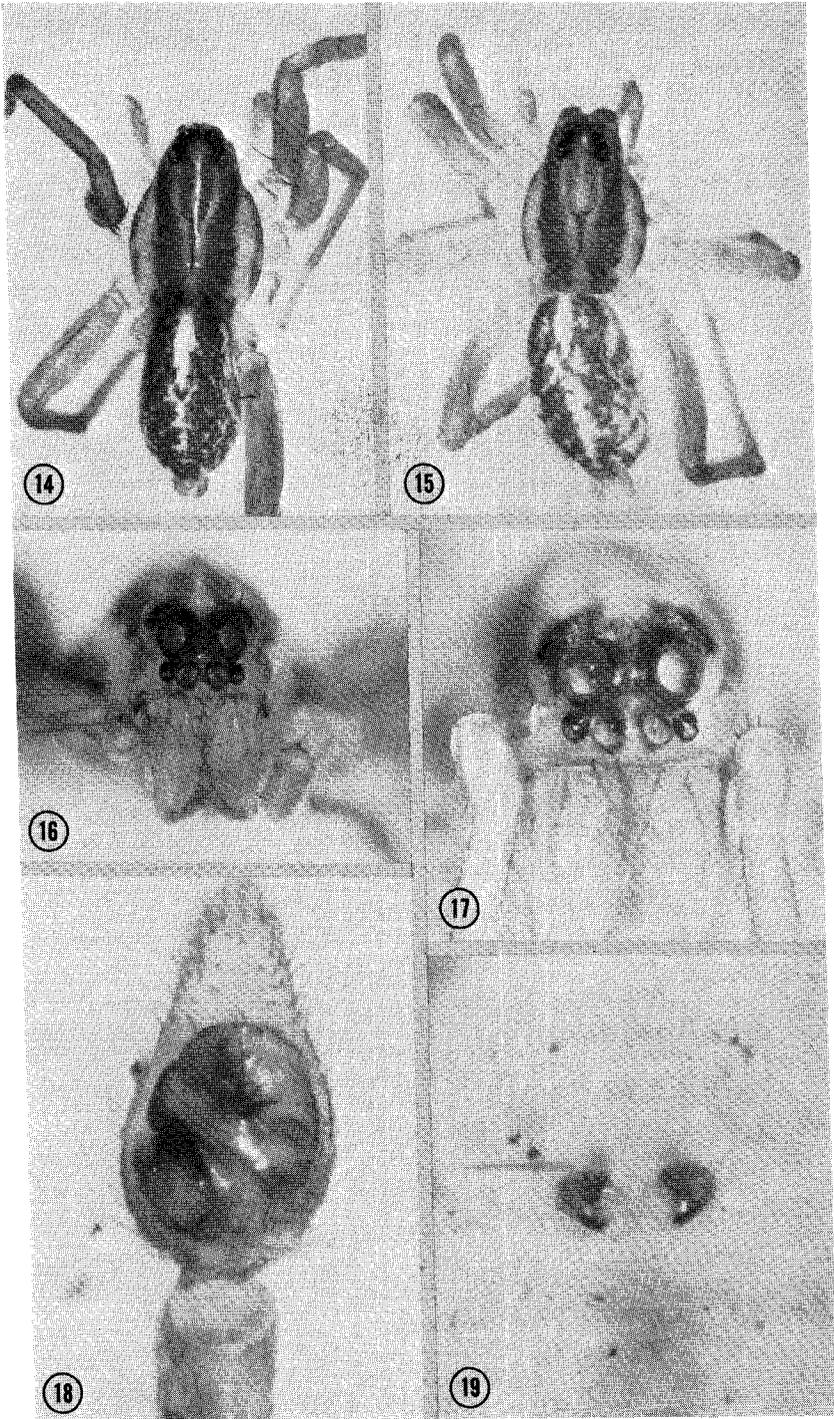
Description of holotype.—A male with carapace 1.75 mm long, 1.25 mm wide. Carapace with a wide submarginal band and typical tuning-fork pattern. Legs dusky, a suggestion of annulae on some femora (Fig. 14). Anterior eye row almost straight, slightly narrower than posterior median eye row; anterior median eyes about twice the size of anterior lateral eyes, anterior eyes evenly spaced. Palpal tibia 0.37 mm, cymbium 0.55 mm long. Median apophysis of palp with a pointed proximal process (Fig. 18).

Description of allotype.—A female with carapace 1.87 mm long, 1.37 mm wide. Carapace with a wide submarginal band, and typical tuning fork pattern. Legs dusky (Fig. 15). Anterior eye row slightly procurved, narrower than posterior median eye row; anterior median eyes are twice as large as the anterior lateral eyes. Epigynum (Fig. 19) with lobes about a diameter apart, concave on medial surface. The seminal receptacles are visible through the body wall; are rather short and inclined towards each other anteriorly. Note: Gertsch did not describe or list a female, but the type vial contains a female labeled as allotype.

Variations and observations.—Gertsch described the pattern of the carapace as having a "broad marginal band and a black edge" which is another way of describing, in our words, "a wide submarginal band." Sometimes the black edge is missing, as in a female from Pasco County, Florida.

In examining the collections we were impressed from time to time with the fact that *P. allapahae* resembled *P. sedentarius* both in pattern and genitalia, although considerably smaller in size.

There is some variation in size. Males range from 1.55 to 1.80 mm in carapace length and females from 1.72 to 2.0 mm.



Figs. 14-19.—*P. allapahae*: 14, holotype male, Florida, Alachua Co.; 15, allotype female, Florida, Alachua Co.; 16, paratype male, eyes, Florida, Alachua Co.; 17, paratype female, eyes, Florida, Alachua Co.; 18, holotype, palpus; 19, allotype, epigynum.

Distribution.—Known only from Florida: Alachua, Lake, Marion, Pasco, and Putnam Counties.

Specimens examined.—*Florida*: Alachua Co.: HKW Sta 7B, Feb. 7, 1937, male holotype, female allotype and male and female paratypes; HKW Cat. No. 1016, Feb. 13, 1938, 1 male; Marion Co.: 9.1 mi. E. Fla. 318 at Citra, N. of Fla. 318, in bog, 13 Apr., 1950, H.G.P. No. 3, male, 6 females, egg sacs (D.P.I.); Pasco Co.: 1.0 mi. S. U.S. 41 x Fla. 52 on U.S. 41, edge cypress bay, March 21, 1947, HKW Cat. No. 1242, female, egg sac (A.M.N.H.); Putnam Co.: U.F.C.R., Mud Springs, K 62, May 3, 1947, HKW Cat. No. 1257, male, female (D.P.I.); U.F.C.R., Margin sawmill pond, G-58, VI.1.47, HKW Cat. No. 1264, 2 males, female (D.P.I.).

Life history.—We have examined males and females collected from February through June; egg sacs from March and April.

Ecology.—This species is apparently not restricted to the edge of water. It has been collected from sphagnum moss around cypress ponds, near a spring on a mesic slope, and under pine needle litter in a flatwoods.

Remarks.—There is some evidence that this species occurs in company with or near to *P. sedentarius* in Florida. *P. allapahae* has paired white spots on the abdomen.

Pirata apalacheus Gertsch

Figs. 20-25

Pirata apalacheus Gertsch, 1940, Florida Entomol., 23(2):17-19, figs. 3, 4 (male, female, Alachua Co., Fla., A.M.N.H., examined); Barnes, 1953, Amer. Mus. Nov., 1632:11.

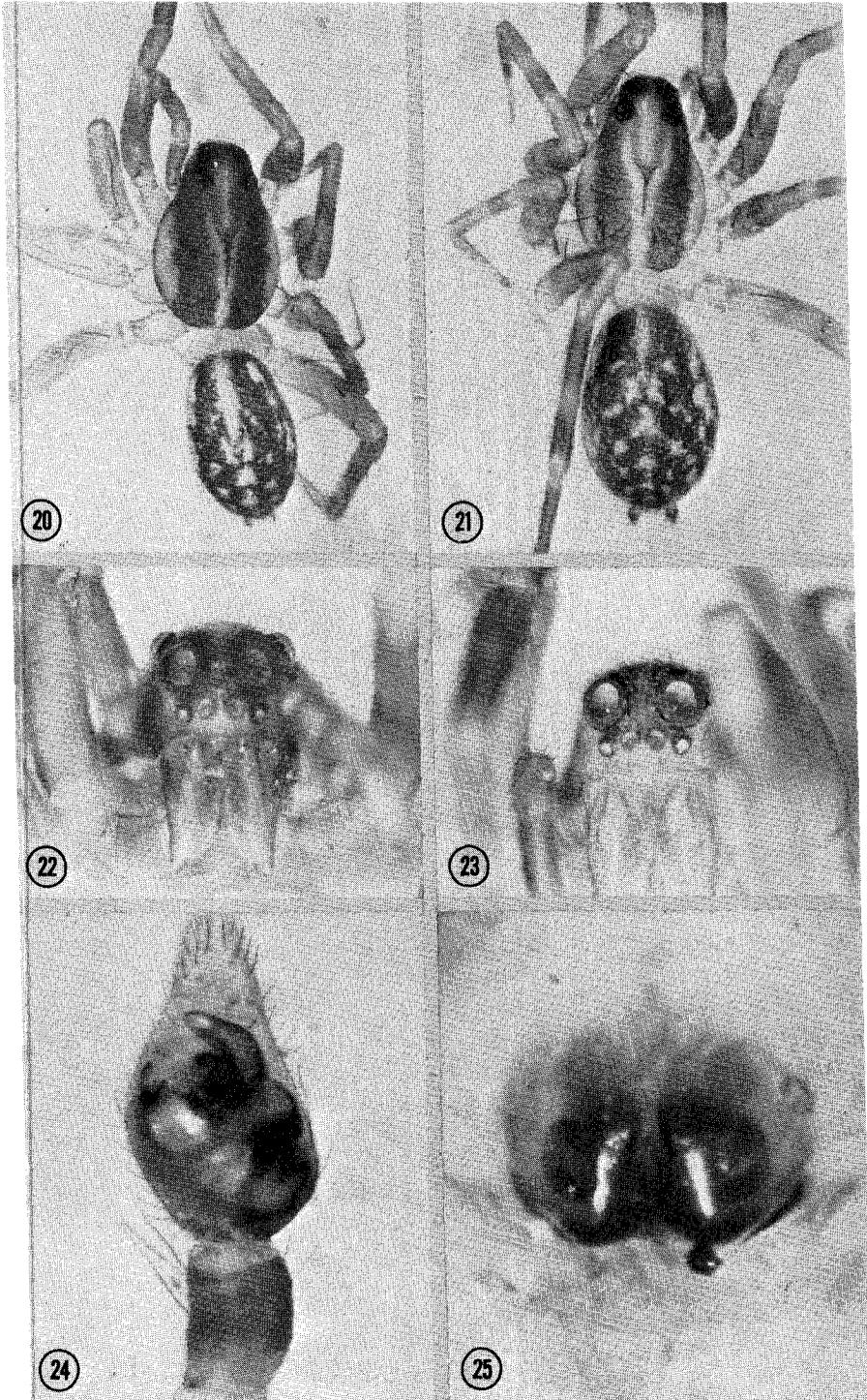
Description of holotype.—Carapace 1.67 mm long, 1.20 mm wide, with a wide marginal light area, narrowly and unevenly pigmented along the edges, the usual tuning-fork mark fading out between the eyes (Fig. 20). Anterior eye row distinctly procurved, much narrower than posterior median eye row, anterior eyes evenly spaced, anterior median eyes about half again as large as anterior lateral eyes (Fig. 22). Height of clypeus is equal to the diameter of an anterior median eye, slanted posteriorly. Legs with indistinct annulae. The median apophysis of palp is quite characteristic in shape with a light-colored tip (Fig. 24).

Description of allotype.—Carapace 1.77 mm long, 1.22 mm wide. Resembles the male except: the tuning-fork mark is quite distinct (Fig. 21); there is very little pigment along edge of carapace, and the clypeus is not slanted as much. The epigynum is quite characteristic in appearance; when heavily pigmented it looks like two black contiguous disks (Fig. 25). Tibia I and II with three pairs of ventral spines, none apical.

Variations and observations.—This species resembles *P. minutus* in appearance and size, but its genitalia are quite different and the front legs are not dark as in the former species. It also resembles *P. welakae* in appearance and size. There is some variation in size, the carapace in males varying in length between 1.5 and 1.7 mm and in females between 1.5 and 1.8 mm.

Distribution.—Southeastern United States, Illinois and Kansas.

Specimens examined.—*Alabama*: Baldwin, Madison, Marshall, Tuscaloosa Counties and Chatahoochie State Park; *Florida*: Alachua, Columbia, Dade, Duval, Jefferson, Highlands, Hillsborough, Indian River, Leon, Liberty, Monroe, Nassau, Polk, Putnam Counties; *Georgia*: Daugherty County; *Illinois*: Madison County, Bell Smith Springs,



Figs. 20-25.—*P. apalacheus*: 20, holotype male, Florida, Alachua Co.; 21, allotype female, Florida, Alachua Co.; 22, holotype male, eyes; 23, allotype female, eyes; 24, holotype, palpus; 25, allotype, epigynum.

Bedford; *Kansas*: Douglas County; *Mississippi*: Jackson, Wilkinson Counties; *North Carolina*: Alamance, Carteret, Durham, Orange Counties; *Tennessee*: Roane County.

Life history.—This is evidently a summer species. In Florida males have been taken from April through August and females from March through October with a preponderance in June and July; females with egg sacs have been collected from May through August. From the western and northeastern United States adults have been taken only in July and August. This may be a reflection of collecting activities.

Ecology.—*P. apalacheus* differs from most other species of *Pirata* in its occurrence away from water. The type locality was a rotten log in a mesic hammock far from the nearest pond or stream. H. W. Weems, Jr., collected it in pine needle litter in June in Alachua Co., Florida. H. G. Parrish collected it in leaf litter in a mesic hammock in Alchua Co., Florida. Alan Brady collected it under leaves and logs in Highland Hammock State Park, Florida. At Tall Timbers Research Station in Leon Co., Florida, many collections were made in pitfalls in various types of terrestrial situations away from water, annually burned pine woods, broom sedge-pine, woodyard hammock, beech woods, spruce pine, hickory-sweet gum association, etc. In Everglades Park, Florida, it has been collected in pitfalls in hardwood hammock. It appears to be a humus-loving form.

Pirata nanatus Gertsch

Figs. 26-31

Pirata nanatus Gertsch, 1940, Florida Entomol., 23(2):19-20, fig. 7, 8 (male, female, Turner Co., Ga., A.M.N.H., examined).

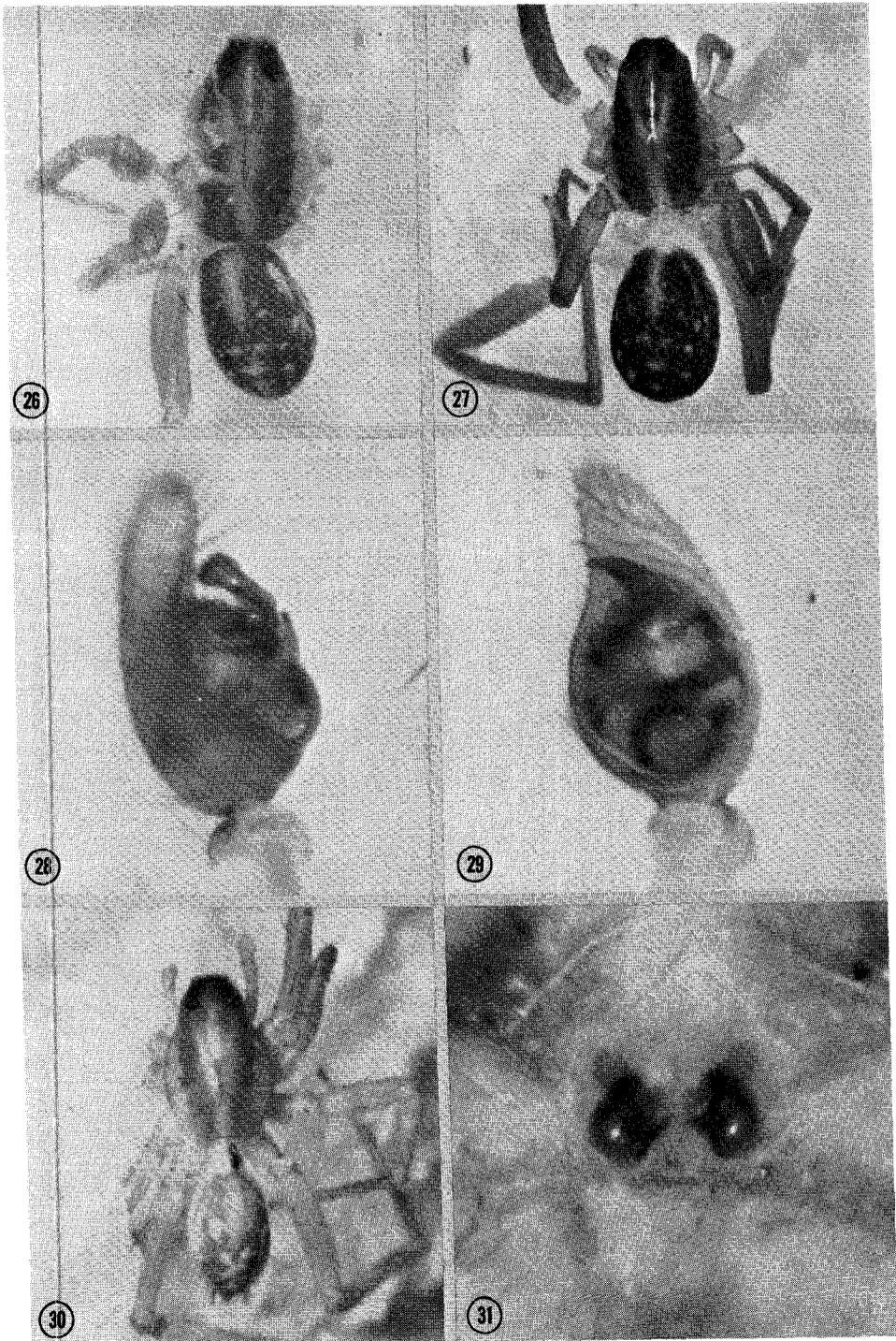
Diagnosis.—*Pirata nanatus* is one of the smallest, if not the smallest *Pirata* in North America. It may easily be confused with *P. seminola*, *P. allapahae* and *P. welakae*, n. sp., all of which occur in the same geographic region. *P. nanatus* has a wide marginal light band on the carapace; in females the epigynum resembles that of *P. sedentarius* and the seminal receptacles diverge anteriorly; the median apophysis of the palp in males extends anteriorly beyond the excavation of the cymbium and has a pointed tooth at its base (Fig. 29).

Descriptive notes on male holotype.—The cephalothorax (Fig. 26) is smashed and five legs and palps are disarticulated. Carapace 1.37 mm long, 1.05 mm wide, with wide marginal light area. Anterior eye row narrower than posterior median eye row, procurved; anterior median eyes larger than anterior lateral eyes, closer to each other than to the laterals. Palpal cymbium 0.45 mm long, palpal tibia 0.25 mm long.

Descriptive notes on female allotype.—Carapace 1.37 mm long, 0.95 mm wide, shiny, with a wide marginal light area (Fig. 27), the "black" edge rather obscure. Eye arrangement similar to that described above for the male.

Descriptive notes on five paratypes.—Two females from Columbia Co., Florida, HKW 402, IV.27.35. These two small females are dark and their patterns are obscure, but appear to have wide marginal light areas; carapaces 1.3 mm long, 0.9 mm wide; most legs disarticulated.

Three females from same collection as holotype, Georgia, Turner Co., 9 mi. S.E. Sycamore, V.6.37, HKW 606 (HKW). Amount of pigment varies somewhat. All three with wide marginal light areas on carapace, carapace shiny, sternum and venter light, legs not banded but are lightly pigmented.



Figs. 26-31.—*P. nanatus*: 26, holotype male, Georgia, Turner Co.; 27, allotype female, Georgia, Turner Co.; 28-29, holotype, palp; 30, male, Georgia, Baker County, Springfield Rd.; 31, allotype, epigynum.

Female No. 1: Carapace 1.30 mm long, 0.95 mm wide. Legs 4123.

Female No. 2: Carapace 1.55 mm long, 1.07 mm wide. Lower margin of furrow of chelicerae with three teeth, middle tooth the largest, tooth next to fang the smallest. Anterior eye row narrower than posterior median eye row, procurved, about equally spaced. Anterior median eyes are one and one-half times as large as the anterior lateral eyes. Legs 4123.

Female No. 3: Carapace 1.25 mm long, 0.88 mm wide. Lower margin of furrow of chelicerae with three teeth, middle tooth the largest, tooth next to the fang the smallest. Eyes like female no. 2. Legs 4123.

Four females from Alachua Co., Florida, have the following dimensions of the carapace: 1.18 mm long, 0.87 wide; 1.27 mm long, 0.95 mm wide; 1.30 mm long, 0.97 mm wide; 1.27 mm long, 0.95 mm wide.

Variation.—*P. nanatus* usually has a wide marginal light area on the carapace; the male from Baker Co., Georgia, has a little pigment along the edge of the carapace. The males we have examined are quite small: carapaces 1.35 mm long, 0.93 mm wide and 1.37 mm long, 1.05 mm wide. The carapace of females varies from 1.18 mm to 1.45 mm in length, with most being less than 1.40 mm.

The spines on tibia I and II are quite long (Fig. 61).

Distribution.—Known only from Florida and Georgia.

Specimens examined.—*Florida*: Alachua Co.: Sta 1 VIC, I.30.37, female paratype (A.M.N.H.); Sta. 1 VIC., IV.19.37, 3 female paratypes (H.K.W.); Columbia Co.: IV.27.35, H.K.W. 402, 2 female paratypes (H.K.W.); Leon Co.: Tall Timbers Research Station, VI.8-14.68, W. H. Whitcomb, male, 3 females (J.A.B.); *Georgia*: Baker Co.: Springfield Pond, 5 July 60, male (H.K.W.); Charlton Co.: Billy's Island, Okefinokee Swamp, W 82° 15': N 30° 45', June, 1912, C. R. Crosby, 7 females (Utah); Turner Co.: 9 mi. S.E. Sycamore, V.6.37, H.K.W. 606, 1 male, 10 females (Holotype, allotype, paratypes, A.M.N.H. and H.K.W.).

Life History.—*P. nanatus* appears to be a spring form judging from the scanty material available. We have examined one male each from May, June and July; one female from January, six from April, ten from May, 16 from June, and one from August. The only egg cases are from May. The scarcity of specimens in collections probably results from their small size and the difficulty of collecting the species.

Ecology.—This species has been collected in flatwoods, sphagnum in flatwoods, near water in a grassy pine woods, on the surface of water in a pond, and from a woodyard hammock (Berlese).

Pirata seminola Gertsch and Wallace

Figs. 32-43

Pirata seminola Gertsch and Wallace, 1935, Amer. Mus. Nov., 794:7-8, figs. 33, 35 (male, female, Levy Lake, Florida, A.M.N.H., examined).

Remarks on types.—We measured the carapace of the male holotype as 1.87 mm long, 1.32 mm wide (vs. 1.80 mm long, 1.25 mm wide in original description) and that of female allotype as 1.87 mm long, 1.27 mm wide (vs. 1.75 mm long, 1.20 mm wide in original description). Both types have submarginal light band on the carapace (Figs. 32-33). We also found the anterior eye row of the allotype to be narrower than the posterior median row as described.