

II with seven ventral and lateral spines; the proximal ventroretrolateral spine overlaps the spine distal to it; the proximal ventroprolateral spine is reduced to not much more than a bristle. One spine is apical in position.

A male from the same collection is smaller than the above. Its carapace measured 1.40 mm long, 1.02 mm wide.

**Description of female.**—With same data. Carapace 1.67 mm long, 1.12 mm wide, with a submarginal light band and tuning-fork pattern as in the male. Dorsum with paired white spots; ventral surface yellow, immaculate except for light pigment in center of venter. Eye arrangement and toothing of chelicerae similar to male.

Legs 4123, banded. Tibia I with five ventral and lateral spines, none apical in position. Tibia II with six ventral and two lateral spines.

**Variations.**—There is some variation in size in this species but they are all small spiders. Male carapaces vary in length from 1.4 mm to 1.8 mm and female carapaces from 1.55 mm to 1.8 mm.

**Distribution.**—*P. suwaneus* probably is limited in its distribution to the southeastern United States and the West Indies. It ranges from North Carolina westward to Louisiana and Arkansas and southward throughout Florida and into the British West Indies. It does not appear to occur as far north as Tennessee; it has not been found in northwestern Arkansas where much collecting has been done, nor in Missouri.

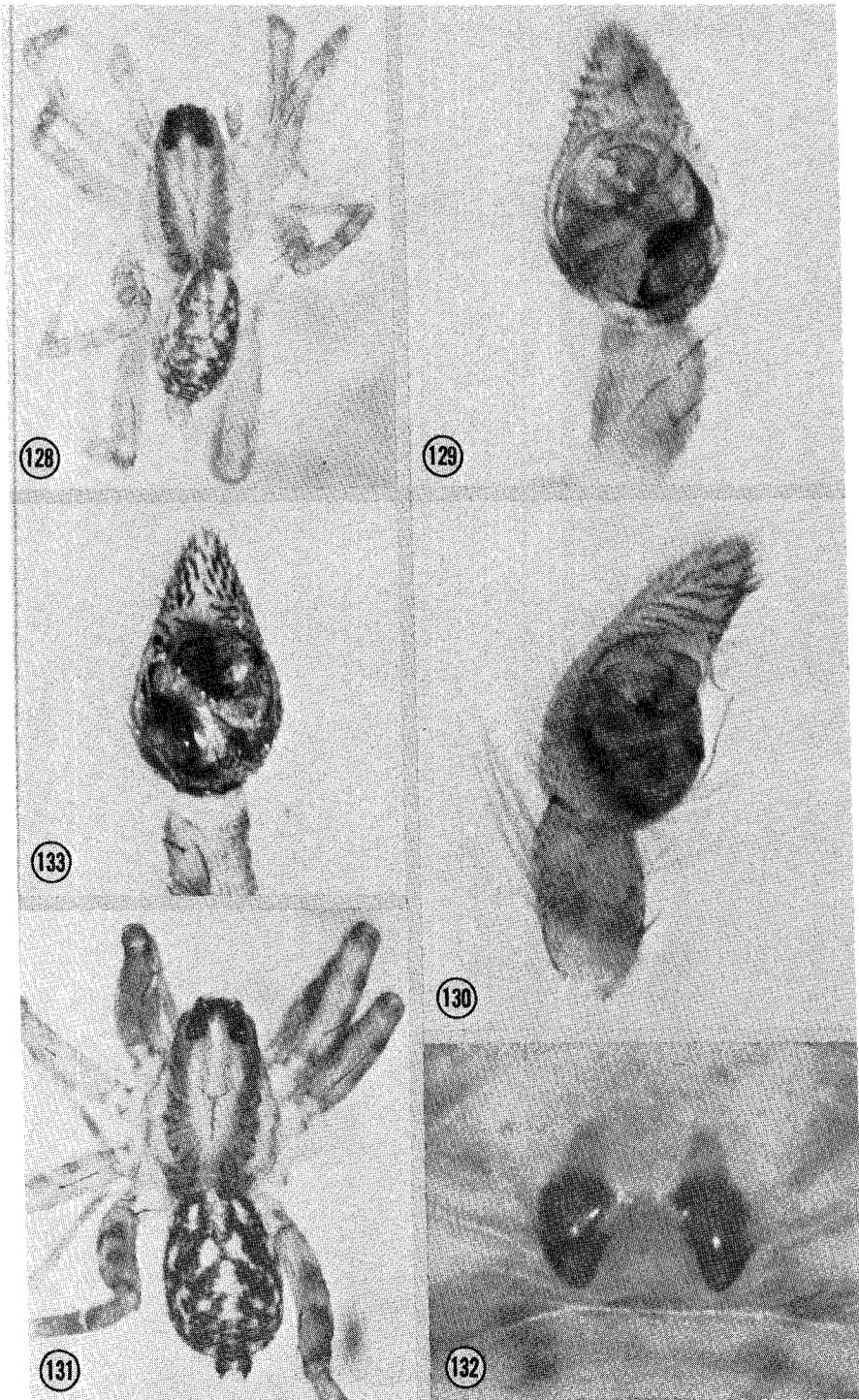
**Specimens examined.**—*British West Indies*: Crooked Island: Major Cay Settlement, Sept 58, A. W. Scott, Jr., male (M.C.Z.), SE of Gordon's Bluff, Sept. 58, A. W. Scott, Jr., female (M.C.Z.). *United States*: *Alabama*: Mobile County; *Arkansas*: Bradley, Conway Counties; *Florida*: Alachua, Bay, Brevard, Charlotte, Collier, Columbia, Dade, Highlands, Jefferson, Lake, Lee, Leon, Levy, Martin, Orange, Palm Beach, Putnam, Sarasota, St. Johns, Taylor Counties; *Louisiana*: St. Mary Parish; *Mississippi*: Camp Shelby; *North Carolina*: Carteret, Durham, Franklin, Orange Counties.

**Life history.**—In Florida adult females have been collected in every month of the year and adult males in every month from January through July. Egg sacs have been collected in all months except March, May, June and December.

Almost all records from north of Florida are from June, July and August. We have seen one male collected in Louisiana in April and one in Arkansas in September; two females in North Carolina in September and one female with egg sac in North Carolina in November. The only other egg sac from north of Florida is one collected in North Carolina in August. The male and female from the West Indies were collected in September.

**Ecology.**—In Florida *P. suwaneus* has been collected in a variety of wet situations: in pine flatwoods, pond margins, edge of lake, canal bank, Panama City beach, in low hammocks, cypress swamp bayheads. In Arkansas it was taken in pitfall traps in cotton fields and pastures. In North Carolina it was collected in pitfall traps in a variety of situations. Barnes (1953) demonstrated a definite habitat distribution for *P. suwaneus* in non-forest maritime communities at Beaufort, North Carolina, using pitfall traps. Barnes (1953a) listed this species as the most abundant *Pirata* in the coastal area of North Carolina.

**Remarks.**—The high proportion of specimens in the various collections that came from pitfall traps probably results from the small size of this species. It is easily overlooked during daylight hours and although the headlight facilitates locating them at night one might pass them by as immatures.



Figs. 128-133.—*P. suwaneus*: 128, holotype male, Florida, Port Mayaca; 129-130, holotype, palp; 131, allotype female, Florida, Port Mayaca; 132, allotype, epigynum; 133, palp, Florida, Palm Beach Co.

We have found *P. suwaneus* identified as *P. sedentarius*, *P. minutus*, *P. aspirans* and *P. insularis*, but one should be able to distinguish this small species by comparing the genitalia with the illustrations (Figs. 126-127, 129-130, 132-133). The median apophysis of *P. suwaneus* is chelate and the epigynum is characterized by the conical shaped lobes that project posteriorly beyond the epigastric furrow.

### THE *PIRATICUS* GROUP

#### *Pirata piraticus* (Clerck)

Figs. 134-139

*Araneus piraticus* Clerck, 1757, Svenska Spindlar, p. 102, pl. 5, tab. 4 (female, type not examined).

*Aranea piratica* Olivier, 1789, Encycl. Method., 4:218.

*Pirata prodigiosa* Keyserling, 1876, Verh. Zool.-Bot., Gesell. Wien, 26:669, pl. 2, fig. 2 (Bonnet, 1945, gives date 1877; Chamberlin, 1908, lists pl. 8, fig. 44; Petrunkevitch, 1911, lists pl. 2, fig. 44); Chamberlin, 1908, Proc. Acad. Nat. Sci. Philadelphia, 60:313.

*Lycosa febriculosa* Becker, 1881, Ann. Soc. Entomol. Belg., p. 45, pl. 2, figs. 2, 2a (female, New Orleans, Louisiana).

*Pirata febriculosa*, Chamberlin, 1908, idem, p. 311-313, pl. 22, figs. 1-2.

*Pirata piratica* (Clerck) var. *utahensis* Chamberlin, 1908, idem, p. 313 (male, Utah).

*Pirata arenicola* Emerton, 1909, Trans. Connecticut Acad. Arts. and Sci., 14:208-209, pl. 6, figs. 9-9c (female, not the male, Ipswich, Massachusetts; type examined).

*Pirata sylvestris* Emerton, 1909, Trans. Connecticut Acad. Arts. and Sci., 14:209, pl. 6, figs. 8b, 8c (female, not the male, see remarks).

*Pirata piratica*, Kaston, 1938, Canadian Entomol., 70:16, fig. 1; Kaston, 1948, Bull. Connecticut Geol. and Nat. Hist. Survey, 70:309, pl. 50, fig. 1003, pl. 51, fig. 1010.

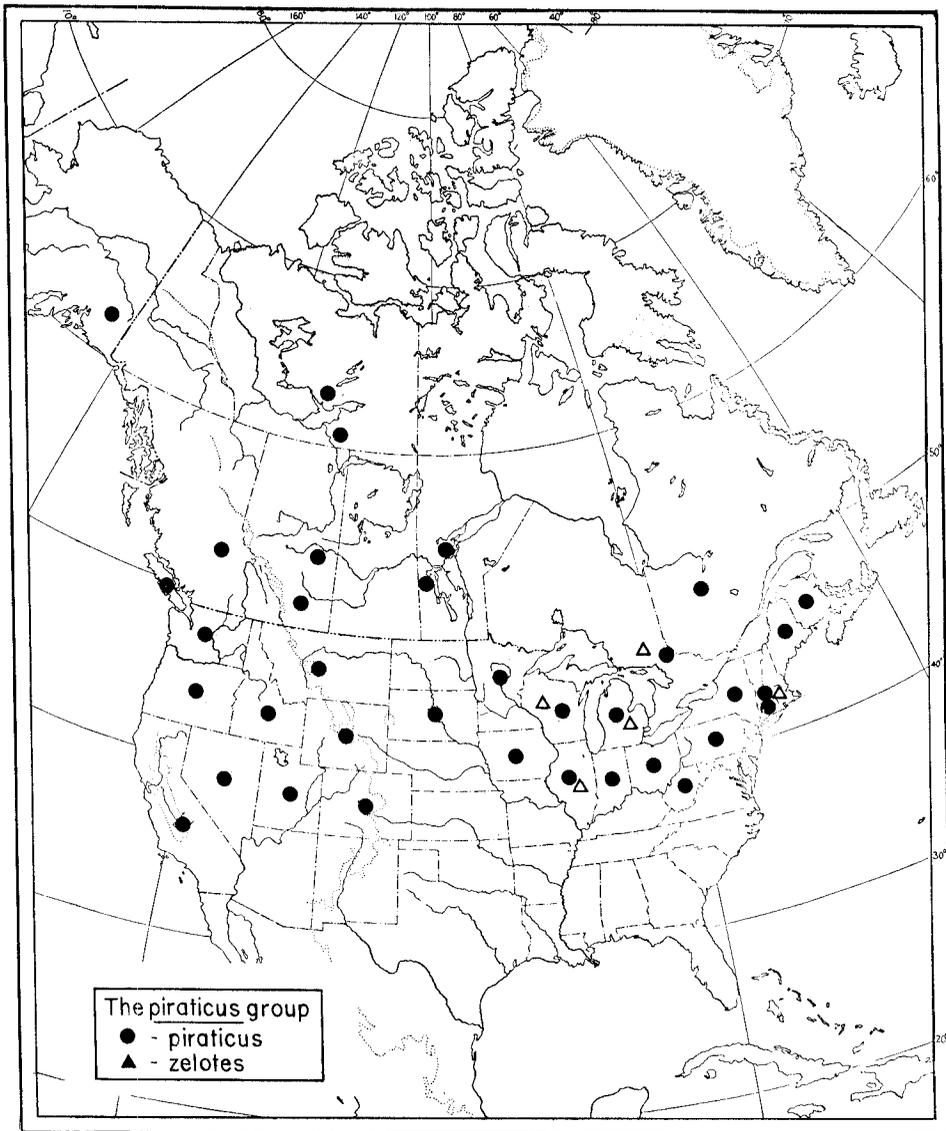
**Description of male.**—From the E. S. George Reserve, Livingston Co., Michigan, VII-3-1951, HKW 1448. Carapace 2.8 mm long, 2.1 mm wide with a wide marginal light area and distinct tuning-fork mark (Fig. 134). Edge of carapace with a narrow band of short white hair-like structures. Dorsum with a distinct hastate mark, three pairs of spots covered with short white hairs and distinct lateral stripes of white hairs. Sternum yellow, coxae, labium, endites and venter a little darker in color, immaculate.

Anterior eye row slightly narrower than the posterior median row, slightly procurved, anterior median eyes about twice the size of the laterals, closer to laterals than to each other. Height of clypeus about three-fourths the diameter of an anterior median eye. Lower margin of furrow of chelicerae with three, almost evenly spaced teeth which are almost equal in size.

Legs 4123, unbanded. Tibia I with three pairs of ventral spines, the distal pair apical. The proximal ventroprolateral spine on tibia II is much reduced.

**Description of female.**—With same data as male. Carapace 3.0 mm long, 2.3 mm wide. Pattern similar to male except white markings from short hairs or scales are more conspicuous (Fig. 135). Legs unbanded, venter dusky. Eye arrangement similar to male. Lower margin of furrow of chelicerae with three teeth, evenly spaced, equal in size.

Legs 4132, unbanded. Tibia I with two pairs of long ventral spines. Tibia II with two pairs of ventral spines; the prolateral ones much reduced in size.



**Distribution.**—Europe and, roughly speaking, north of the 35th parallel in North America.

**Specimens examined.**—Canada: *Alberta*: Altasasca Delta, Vermillion Lakes nr Banff, Edmonton, George Lake, McMurray; *British Columbia*: Field, Ft. St. James, Vancouver Island; *Manitoba*: Cedar Lake, Kettle Rapids, the Pas; *New Brunswick*: St. Andrews; *Northwest Territory*: Ft. Resolution, Great Slave Lake; *Ontario*: Algoma, Carleton, Cochrane, Hastings, Kenora, Lennox and Addington, Nipissing, Prince Edward, Thunder, York County or District, L. Nimissire, New Sarum, Mac Bay L.N.P.S., Mere Bleu, Long Point, Wilcox Lake, Garret Island, Holst Pt., Fround Lake, MacLerian, Ft. Severn, St. Joseph's Island, Ompah; *Quebec*: Gatineau, Lac St. Jean-Quest Counties; *Saskatchewan*: Besnard Lake, Emma Lake, Indian Head, Lady Lake, Moose Mtn. Creek; *Yukon Territory*: Whitehorse. United States: *Alaska*: Kodiak, Haines, Homer, Matunuska, Rudyerd

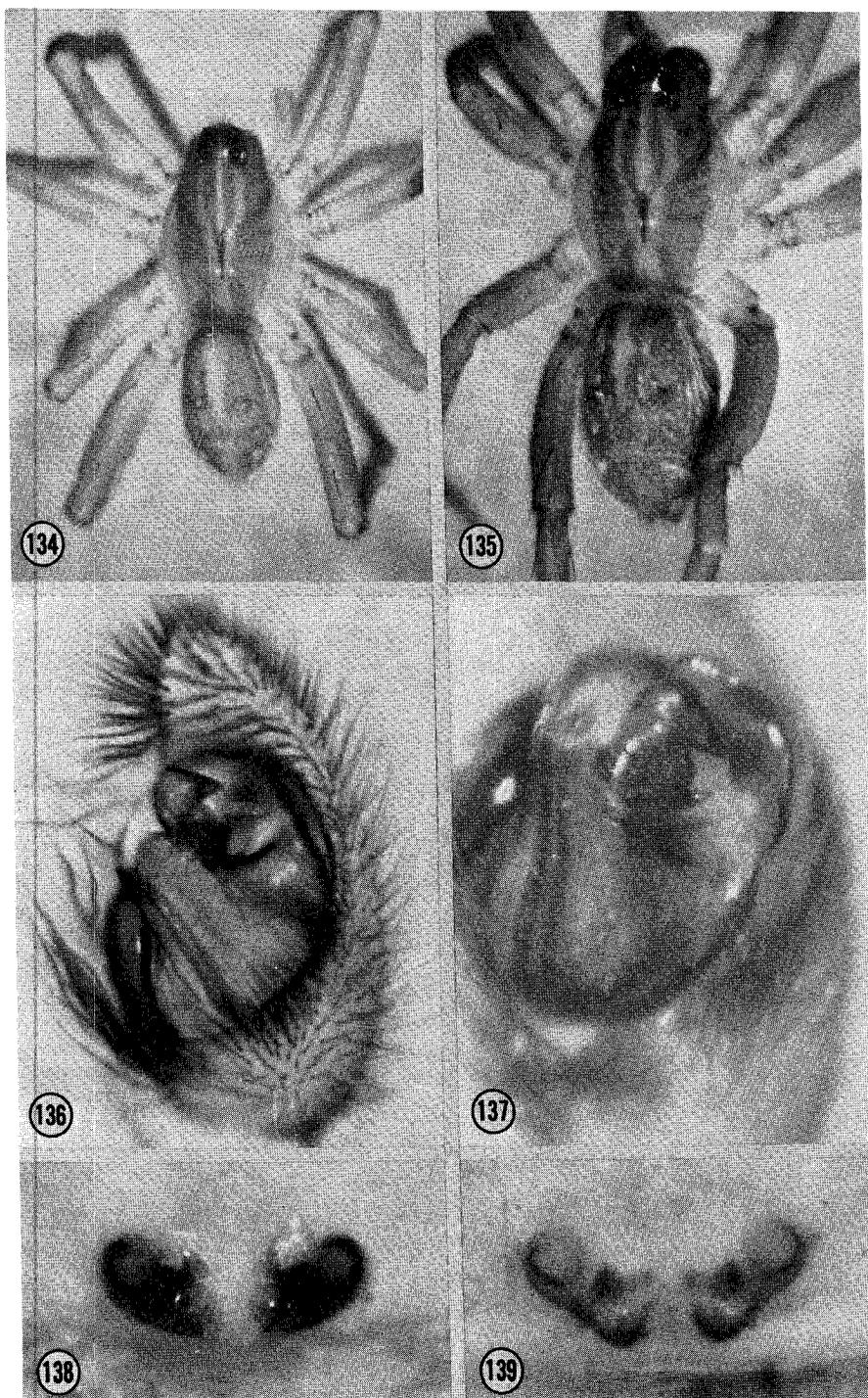
Bay Area; *California*: Alameda, Del Norte, Humboldt, Inyo, Los Angeles, Orange, Riverside, San Diego, Siskiyou, Shasta Counties; *Colorado*: Alamosa, Lake, Mesa, Larimer, Teller Counties; *Connecticut*: New Haven County; *Idaho*: Adams, Blaine, Franklin, Idaho, Latah, Oneida, Owyhee, Payette, Shoshone, Valley, Washington Counties; *Illinois*: Elkhart and La Porte Counties; *Iowa*: Cerro Gordo County; *Maine*: Washington County, Wals; *Massachusetts*: Hampden, Middlesex, Nantucket Counties; *Michigan*: Alger, Baraga, Berrien, Calhoun, Charlevoix, Cheboygan, Clare, Clinton, Delta, Emmet, Gogebic, Kalamazoo, Livingston, Luce, Macomb, Marguette, Menominee, Midland, Missaukee, Oakland, Ogemaw, Roscommon, Schoolcraft, Tuscola Counties; *Minnesota*: Crow Wing, Freeborn, Polk, Roseau, Stearns Counties; *Montana*: Carbon, Sanders Counties; *Nevada*: 20 mi W Elks, Wadsworth; *New York*: Columbia, Rensselaer, Schuylar, Tompkins, Wayne Counties; *Ohio*: Erie, Ottawa Counties; *Oregon*: Benton, Coos, Deschutes, Douglas, Harvey, Klamath, Lane, Linn, Multnomah, Umatilla Counties; *Pennsylvania*: Lancaster, Pike, Potter Counties; *South Dakota*: Grant County; *Utah*: Davis, Emery, Grand, Millard, Rich, Salt Lake, Utah Counties; *Washington*: Clark, Cowlitz, Grant, Jefferson, King, Lincoln, Okanogan, San Juan, Snohomish, Spokane Counties; *West Virginia*: Pocahontas County; *Wisconsin*: Dane, Dodge, Florence, Iron, Polk, Rock, Taylor, Waukesha Counties; *Wyoming*: Albany, Laramie, Platte, Teton Counties, Yellowstone National Park.

**Life history.**—In the United States 95 percent of the records are from May, June, July and August. We have two records of males and females from February, and several from October; none from November through January. We have records of males and females from California in March and one egg sac from March. Most records of egg sacs are from July, a few from June and August, and one from September. *P. piraticus* appears to mature about a month later in Canada; almost all of our Canadian records are from June, July, August and September.

**Ecology.**—The information available (mostly from labels) indicates that *P. piraticus* is usually found near water; in swamps, marshes, or on the shores of lakes, ponds and streams. One record by B. Malkin, June 21, 1951, from Hot Springs at the SE end of Harvey Lake has four males, four females, three immatures from "upper layer running on surface of hot water."

Wallace collected this species on numerous occasions on the E. S. George Reserve, Livingston Co., Michigan, from marsh, swamps, woods pond, and bog. *P. insularis* and *P. piraticus* were frequently taken together. On one occasion, collecting a marsh by separating plants along muskrat trails and by shining eyes, *P. aspirans*, *P. cantralli*, *P. minutus*, *P. piraticus* and *P. zelotes* were collected in the same part of the marsh.

**Remarks.**—We have found this species identified as follows: *P. aspirans*, *P. febriculosus*, *P. insularis*, *P. prodigiosus*, *P. sylvestris*, *P. utahensis*, *P. wacondana*. Chamberlin and Ivie (1944) listed two females from Georgia. The one from Marshallville, June-24-1910; R. V. Chamberlin, is *P. sedentarius*; the one from Gainesville we have not examined. Becker (1881) described *Lycosa febriculosa* from New Orleans, Oklahoma; various authors have since synonymized his species with *P. piraticus*. Although we have not seen the type we doubt that Becker's specimen was *P. piraticus* for two reasons: (1) we have examined no other *P. piraticus* from within hundreds of miles of New Orleans; (2) Becker illustrated the anterior row of eyes as wider than the posterior median row and this is not true of any *Pirata* that we have examined. Banks (1892) reported *P. piratica* as uncommon around Ithaca, New York; in 1895 he reported it as occurring on Long Island under leaves in swamps.



Figs. 134-139.—*P. piraticus*: 134, male, Michigan, Livingston Co., E. S. George Reserve; 135, female, Michigan, Livingston Co., E. S. George Reserve; 136, palp, Michigan, Livingston Co., E. S. George Reserve; 137, palp, Michigan, Gull Lake; 138, epigynum, Massachusetts, Ipswich (type of *P. arenicola*); 139, epigynum, Ontario, St. Josephs.

Emerton did not give a locality for *P. sylvestris*. We received a vial from the M.C.Z. labeled *Pirata sylvestris* Em., Lynn Woods, June 11, 1905, J. H. Emerton, coll., which contained a female *P. piratica* and a male *P. insularis*, evidently the same specimens he illustrated.

The number of ventral spines of tibia I and II have been used as a generic character. The following data from five male and 22 female *P. piraticus* indicates that this may be a consistent character in males, but not in females:

Apical-Tibia I		Apical-Tibia II		Number Cases	
Right	Left	Right	Left	Male	Female
0	0	0	1	0	4
0	0	1	0	0	2
0	0	1	1	0	10
0	0	0	0	0	3
1	1	0	1	0	2
1	0	1	1	0	1
2	2	2	2	5	0

***Pirata zelotes*, n. sp.**

Figs. 140-142, 145

**Holotype.**—Male, Michigan, Livingston Co., E. S. George Reserve, M-28 VII-15-54, H.K.W. 1789H (M.C.Z.).

**Allotype.**—Female, with same data (M.C.Z.).

**Etymology.**—The name of this species comes from the Greek word “zelotes” meaning “emulator,” selected because of its close resemblance to *P. piraticus*.

**Diagnosis.**—*Pirata zelotes* is most closely related to *P. piraticus* and in Michigan occurs in the same marsh or swamp with it, but they can be distinguished from each other by their patterns on the carapace and the structure of the genitalia. *P. zelotes* has a sub-marginal light band on the carapace, *P. piraticus* a wide marginal light band. The tip of the median apophysis is pointed in *P. piraticus* with the anterior border straight while in *P. zelotes* the tip is not so sharply pointed (Fig. 136) and the anterior border is rounded or convex (Fig. 142). The differences in epigyna can best be determined by studying the illustrations (Figs. 138-139, 145).

**Description of holotype.**—Carapace 2.8 mm long, 1.9 mm wide, with a distinct sub-marginal light band and the usual tuning-fork pattern. Dorsum of abdomen with light colored hastate mark and white scales forming four pairs of spots and lateral stripes. Ventral surface of body and coxae immaculate, sternum lighter in color than the rest, venter a little darker.

Anterior eye row narrower than median row, somewhat procurved. Anterior median eyes twice as large as laterals; closer to laterals than to each other. Clypeus height equals the diameter of an anterior median eye. Lower margin of the furrow of the chelicerae with three equally spaced teeth which are almost equal in size; the middle tooth is the largest, the median the smallest.

The palpus is similar in structure to that of *P. piraticus*, but differs in that the median apophysis is not as sharply pointed as it is in *P. piraticus*. Legs 4123, femora with faint annulae.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Palpus	1.02	0.48	0.63		0.83	2.96
Leg I	2.13	0.97	1.62	2.10	0.90	7.72
Leg II	1.90	0.83	1.38	1.78	0.80	6.69
Leg III	1.75	0.75	1.20	1.75	0.75	6.20
Leg IV	2.45	0.93	2.05	2.80	1.05	9.28

**Description of female allotype.**—Carapace 3.3 mm long, 2.3 mm wide, with a distinct submarginal light band and the usual tuning-fork pattern. Dorsum with light hastate mark and white scales forming indistinct paired spots. Venter and epigastric region unmarked, lighter than the sides of the abdomen. Sternum with heavily sclerotized rim and lightly pigmented each side of the light colored center. Labium much darker than endites.

Eye arrangement similar to that of the male. Lower margin of the furrow of the left chelicera with three, almost equal teeth; right chelicera with four teeth.

Legs 4123, femora with faint annulae.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Palpus	1.13	0.58	0.67		0.85	3.23
Leg I	2.30	1.07	1.67	1.80	0.80	7.64
Leg II	2.13	1.00	1.43	1.68	0.78	7.02
Leg III	2.05	0.95	1.38	1.75	0.80	6.93
Leg IV	2.75	1.10	2.30	3.10	1.10	10.35

**Variation.**—The number of cheliceral teeth varies from three on the left to four on the right in the allotype. This species is fairly uniform in size throughout its range. One female from Ontario has a very flat and wide carapace (2.50 mm long, 2.25 mm wide). We have also seen this characteristic in *P. piraticus* from the western United States.

**Distribution.**—We have examined specimens from Michigan, Illinois, Massachusetts and Ontario, Canada.

**Specimens examined.**—Canada: *Ontario*: Cordova Mines nr. Marmora, 12 July 62, J. H. Redner, female (A.M.N.H.). United States: *Illinois*: Lake Co., Volo, bog, June 8, 1941, D. C. Lowrie, female (D.C.L.); Volo bog, V-16-36, D. C. Lowrie, 1 male, 7 penultimate males, 3 penultimate females (D.C.L.); *Massachusetts*: Middlesex Co., Lexington, V-29-26, P.J.D., 1 male, 2 females (M.C.Z.); *Michigan*: Kalamazoo Co., Gull Lake Biol. Sta., 14-22 July 65, T. F. Hlavac, male (H.K.W.); Livingston Co., E. S. George Reserve, E-17, VI-26-51, H. K.W. 1430, female (H.K.W.); M-28, VII-14-54, H.K.W. 1788A, 1 female, 1 imm female (H.K.W.); M-28, VII-15-54, H.K.W. 1789 H, 4 males, 4 females (holotype and allotype, A.M.N.H.; paratypes, H.K.W.); M-28, VII-19-54, H.K.W. 1796 H, 2 females, 1 imm (H.K.W.); *Wisconsin*: Dane Co., Madison, 29 May 1957, Dunn's Marsh, J.L.K., female (H.K.W.).

**Life history.**—Very little is known about this species. One male was collected in Massachusetts on May 29, 1926, by P.J.D. (Darlington) and identified as *P. insularis* by Mr. Emerton or Miss Bryant, and as *P. piratica* by Miss Exline in 1965. D. C. Lowrie collected one male, seven penultimate males, and three penultimate females in Volo, Illinois, on May 16, 1936. They were in a vial with *P. piraticus*. Wallace collected the E. S. George Reserve in Michigan during June, July and August in 1951, 1954 and 1957. He got one female on June 26, 1951. All the other males and females and one sac were collected in July. It would appear to be a species that matures in mid-summer.

**Ecology.**—All of the specimens we have examined were collected in swamps or marshes. Wallace collected *P. zelotes*, *P. piraticus*, *P. insularis* and *P. aspirans* from Stone-

Ring Marsh on the E. S. George Reserve in a standing-water zone. This zone had clumps of willow (*Salix amygdaloides*), pure stands of spike rush (*Eleocharis obtusa*) and pure stands of *Dulichium arundinacium*. There were also present several species of *Carex*, *Scirpus*, and *Sagittaria latifolia*. Wallace also collected *P. minutus* along with *P. zelotes* and *P. piraticus* from the edge of a swamp on the Reserve.

**Remarks.**—The data on this and several other species of *Pirata* leads one to think that the surface has not been scratched very deeply in the collecting of members of the genus. Thorough collecting will probably extend the ranges of many of our species and turn up additional new ones.

### THE *SEDENTARIUS* GROUP

#### *Pirata sedentarius* Montgomery

Figs. 143-144, 146-162

*Pirata sedentarius* Montgomery, 1904, Proc. Acad. Nat. Sci. Philadelphia, 56:312-313, pl. 19, figs. 28-29 (male, female, Austin, Texas; A.M.N.H., examined).

*Pirata wacondana* Scheffer, 1904, Entomol. News, 15(8):260, pl. 17, fig. 7 (female, Waconda, Kansas; M.C.Z., examined).

*Pirata californica* Banks, 1904, Proc. California Acad. Sci., 3(13):356, pl. 39, fig. 13 (female, Mariposa Co., California; type is said to have been destroyed in San Francisco earthquake).

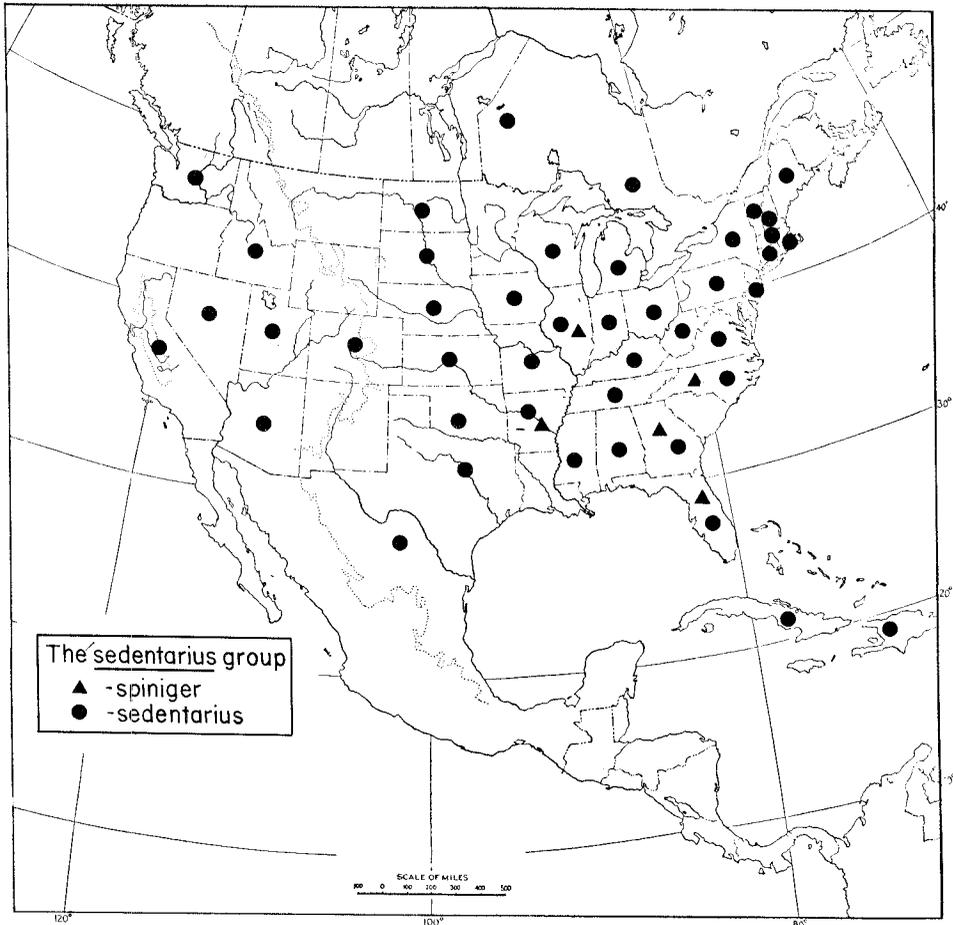
*Pirata maculatus* Emerton, 1909, Trans. Connecticut Acad. Arts and Sci., 14:209, pl. 6, figs. 10, 10a, 10b (female, Moosehead Lake, Maine; M.C.Z., examined); Kaston, 1938, Canadian Entomol., 70:16, fig. 3; Kaston, 1948, Bull. Connecticut Geol. and Nat. Hist. Survey, 70:311-312, pl. 49 (990-991), pl. 50 (fig. 1007), pl. 51 (fig. 1013). NEW SYNONYMY.

**Remarks on types.**—The “types” of *P. sedentarius* are in a vial bearing A.M.N.H. red holotype and allotype labels. Their carapace measurements are: male, 3.2 mm long, 2.4 mm wide; female, 3.0 mm long, 2.2 mm wide.

A female labeled *Pirata wacondana* Scheffer, Waconda, Kans., 23 Aug., N. Banks coll., received from M.C.Z., has a carapace 3.0 mm long by 2.1 mm wide. The ventral spines on tibia I are 2:2:0:0; on metatarsus I are 2:2:2. The anterior eye row is straight, about as wide as the median row; the anterior eyes are about evenly spaced, the anterior medians are about twice the size of the laterals. The posterior median eyes are separated by about one diameter; the clypeus height equals a diameter of an anterior median eye (Fig. 144).

A female labeled “*Pirata maculata* Em. Type. Me. Moosehead Lake, Aug. 7, 1904, J. H. Emerton. ‘Deer Is.’ Dried up, Relaced 1958” was received from the M.C.Z. This specimen matches Emerton’s figures. The carapace is 3.0 mm long, 2.2 mm wide. The anterior eye row is narrower than the median row, is almost straight; the anterior median eyes are larger than the laterals and closer to them than to each other.

**Description of male.**—From Austin, Texas, July 7, 1946, Don L. Frizzell. Carapace 2.80 mm long, 2.00 mm wide. The body and legs are very light amber color and the legs are conspicuously hirsute. Dorsally there is almost no pigment pattern and ventrally the animal is immaculate.



Anterior eye row narrower than the posterior median row, slightly procurved, the anterior median eyes about half again as large as the anterior laterals; these four eyes about evenly spaced. Clypeus height slightly greater than the diameter of an anterior median eye. Lower margin of the furrow of the chelicerae with three unequal teeth, the middle tooth the largest and closer to the lateral than to the median tooth.

Legs 4123, unbanded. Tibia I with four long overlapping, ventral, two lateral and one apical spines. Tibia II with four ventral, two lateral and one apical spines. The proximal ventro-prolateral spine is conspicuously reduced in size.

**Description of female.**—from Austin, Texas, July 7, 1946. Carapace 3.20 mm long, 2.37 mm wide, with a wide marginal light area and pigmented tuning-fork pattern. Dorsum with light hastate mark lightly bounded by scattered pigment; with four pairs of spots and the sides covered with white scales. Ventral surface immaculate.

Anterior eye row and clypeus similar to the male, lower margin of the furrow of the chelicerae armed as in the male.

Legs 4123, unbanded. Tibia I with two pairs of long, ventral, overlapping spines. Tibia II with four ventral, one prolateral, and one apical spines. The ventral prolateral spines are reduced to bristles.