

July with the number of records falling off in the northeast as winter approaches while there are only a total of five records for the southeast after July: a male and female from August and a male and two females from December. Data from the western states indicate a seasonality similar to the northeastern states while the Canadian data indicate the attainment of maturity about a month later.

We have records of egg sacs from the southeast from April, May and June; for the northeast from June, July, August and September; for the west from July and September; and for Canada from July and September.

Looking at the country as a whole we have males from every month except November and January, females from every month, and egg sacs from every month except January, February and November.

Pirata insularis matures at different times in the spring in different localities in the Gainesville, Florida, region. Thus, *P. insularis* will be mature in one spot during February, and immature at the same time in various other localities in the region. It is the species of *Pirata* most commonly found in the Gainesville region.

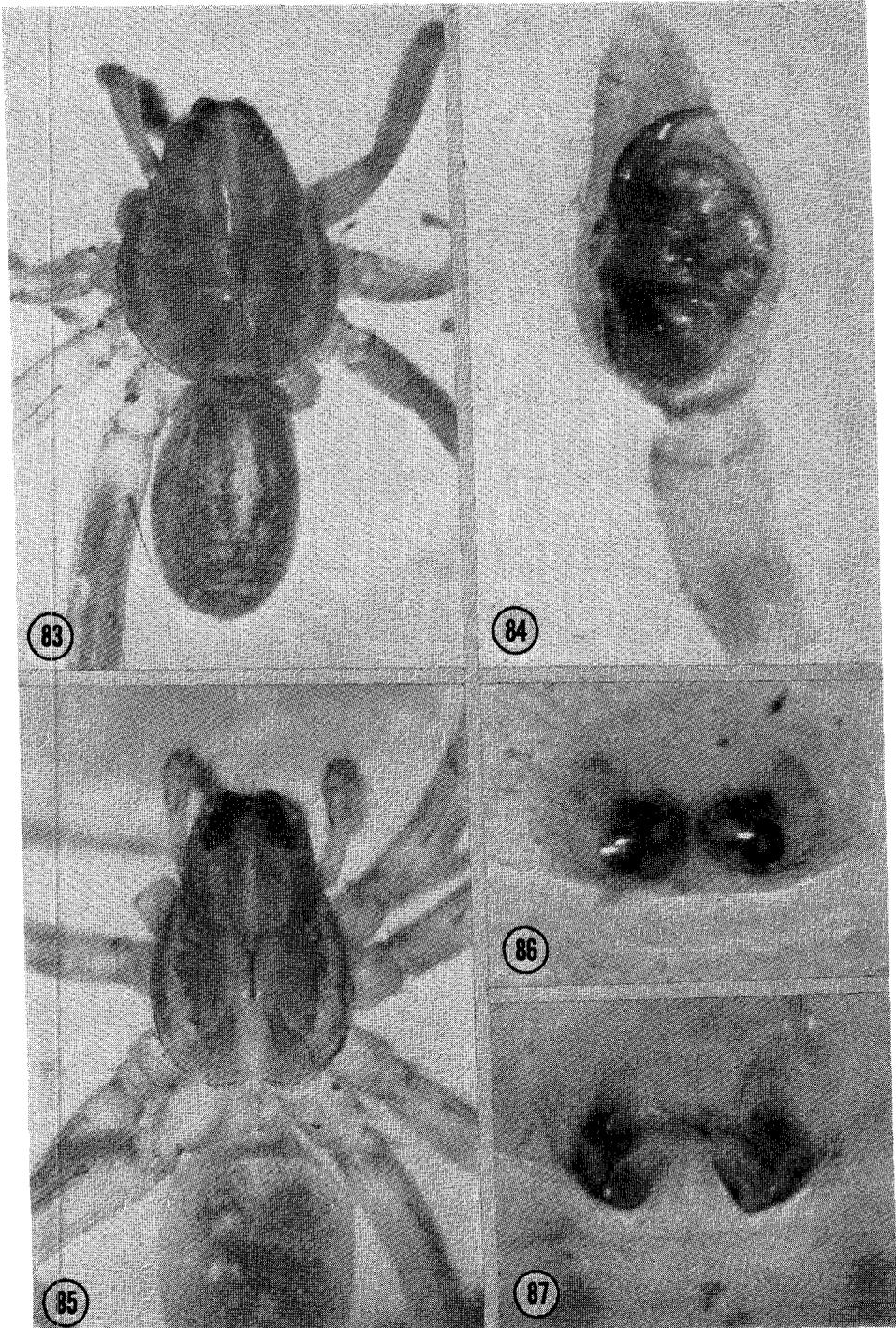
Ecology.—In the Gainesville, Florida, region this species apparently occurs in all kinds of moist situations except typical flatwoods. It occurs in wet situations in various types of hammocks, in swamps, and in the vegetational mattings of some of our marshes and all of our lakes. Records from other regions indicate that it is an inhabitant of marsh, and the edges of ponds and streams throughout its range. In Michigan it also occurs in bogs and swamps. It sometimes occurs in the same bog or marsh as *P. cantralli*, but our evidence indicates that these two species do not occupy the same niche. For example, in the "Big Cassandra" on the George Reserve in Michigan *P. insularis* was collected from sphagnum moss out in the leatherleaf bog proper while *P. cantralli* was taken around the edge of the Cassandra on mud flats covered with a dense growth of tiny moss plants.

In Stone-Ring Marsh on the Reserve *P. cantralli* appeared to be most numerous in zones of emergent vegetation while *P. insularis* was taken in wet zones where there was no standing water. *P. insularis* occurs in sphagnum whether it be in marsh or swamp.

Remarks.—Montgomery's types of *P. liber* are now in the American Museum of Natural History and the male is labeled holotype and the female allotype. The carapace of the male is 2.20 mm long, 1.80 mm wide; of the female is 2.35 mm long, 1.67 mm wide (Figs. 83, 85). His figures of the genitalia are recognizable and he considers his specimens to be distinct from *P. insularis* (Figs. 84, 86).

Six males and 24 females of *P. insularis* were checked for the number of apical spines on the ventral surface of tibia I and II. All the males had pairs on tibia I and II. The data for females follows:

Combination	Tibia I		Tibia II		Number Cases
	Right	Left	Right	Left	
1	0	0	1	1	5
2	1	1	2	2	4
3	2	2	2	2	2
4	0	1	1	1	1
5	0	0	0	1	1
6	1	1	1	1	2
7	1	1	1	2	2
8	1	1	2	1	1
9	0	0	0	0	1
10	1	2	2	2	1
11	1	1	1	0	1
12	0	1	2	2	1
13	1	0	1	1	1



Figs. 83-86.—*P. liber* Montgomery (= *P. insularis*): 83, male type, Pennsylvania, Philadelphia; 84, male type, palp; 85, female type, Pennsylvania, Philadelphia; 86, female type, epigynum.
 Fig. 87.—*P. mayaca*: Allotype, epigynum, Florida, Port Mayaca.

In Michigan *P. insularis* and *P. piraticus* were collected together in a cat-tail marsh on muddy ground; they were collected together on numerous occasions in marshy situations. On the other hand, sometimes *P. insularis* was the only *Pirata* collected.

In 1954 Wallace, while working on the Edwin S. George Reserve near Pinckney, Michigan, collected a marsh by vegetational zones and found that *P. insularis* and a very similar species, here described as *P. cantralli*, appeared to occupy different, but contiguous zones. Females are indistinguishable as are the palpi and epigyna, but the male of *P. cantralli* has swollen legs I and II and a conspicuous brush of hair-like structures on metatarsus I. Males with swollen front legs and brushes on the metatarsi have been collected in three other counties in Michigan, in Wisconsin, and in Ontario.

***Pirata cantralli*, n. sp.**

Figs. 81-82, 88-89

Holotype.—Male, Michigan, Livingston Co., E. S. George Reserve, M-28, VII.15.54, HKW 1789E (M.C.Z.).

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

Etymology.—Named after Irving J. Cantrall, who was resident naturalist on the Edwin S. George Reserve and who accompanied Wallace on many collecting trips and helped the spider work in many ways.

Diagnosis.—*P. cantralli* is very similar to *P. insularis* except for swollen legs I and II and the brush on metatarsus I of *P. cantralli*. Their genitalia, size, and appearance, except for legs I and II in the male, appear to be identical.

Description of holotype.—Carapace 2.4 mm long, 1.75 mm wide, with a distinct submarginal light band and distinct tuning-fork mark on the head. The submarginal band is slightly wavy laterally and has three distinct indentations medially. Basic color of body a light amber in alcohol. Dorsum with the usual hastate pattern and faint indications of paired small round white spots produced by scales. Coxae, labium and endites light yellow, covered with numerous short hair-like structures. Sternum slightly dusky with a median light area and covered with longer hair-like structures. Epigastric region light, venter a little darker. Lower margin of the furrow of the chelicerae with three evenly spaced teeth, the middle tooth the largest. Anterior eye row slightly procurved, narrower than posterior median eye row; anterior median eyes equal one and one-half times anterior lateral eyes; anterior eyes about equally spaced. Clypeus equals diameter of anterior median eyes.

Legs 4132, without annulae. Legs I and II swollen and heavily sclerotized; metatarsus I with a ventral brush of hair-like structures which are curled at their tips (Figs. 81-82). A few of these curled hairs also occur on the tarsus. Tibiae I and II with three pairs of non-overlapping ventrolateral spines, the distal pair apical; most of these spines, stout, but the proximal prolateral spine on tibia II is reduced to less than half the size of the retrolateral; a prolateral spine is present on tibia I between the middle and apical spines.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Palpus	0.83	0.43	0.43		0.78	2.47
Leg I	1.80	0.78	1.45	1.32	0.80	6.15
Leg II	1.65	0.70	1.25	1.28	0.72	5.60
Leg III	1.62	0.70	1.18	1.50	0.70	5.70
Leg IV	2.22	0.78	1.93	2.50	1.03	8.46

Metatarsi I and II with three pairs of stout, non-overlapping ventrolateral spines plus a third distal spine on the midline between the distal pair; none of the distal spines are apical in position. For palpus see Figs. 88 and 89.

Description of allotype.—Carapace 2.5 mm long, 1.77 mm wide; color and pattern similar to the male except for venter which is more heavily pigmented and punctate. Eye arrangement similar to male. Lower margin of furrow of chelicerae with three unevenly spaced teeth, the middle tooth the largest.

Legs 4132, without annulae. Tibia I with two pairs of ventrolateral spines, the proximal pair overlapping base of middle pair; and two prolateral spines, one apical, one between middle pair and the apical spine. Metatarsus I with three pairs of ventrolateral

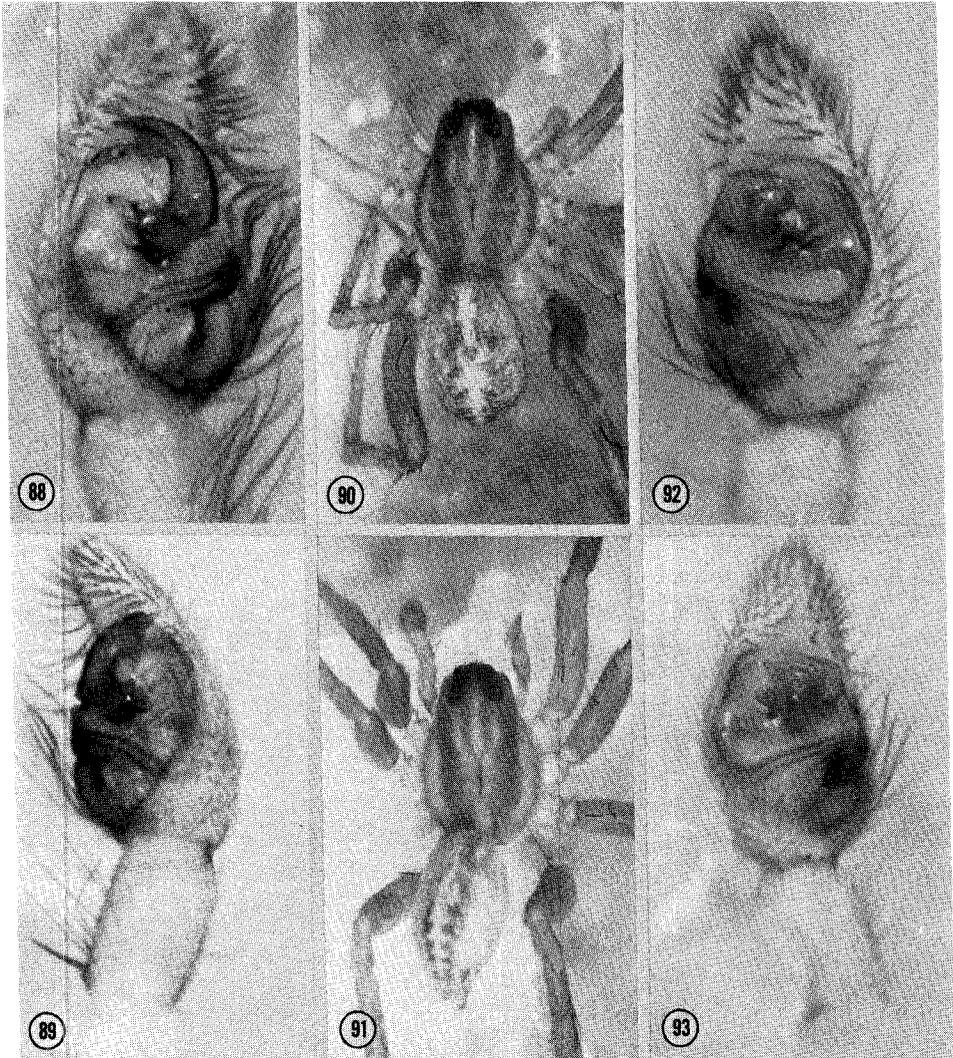


Fig. 88.—*P. cantralli*, n. sp.: Palp, Michigan, E.S.G.R., H.K.W. 1789E.

Fig. 89.—*P. cantralli*, n. sp.: Palp, Michigan, E.S.G.R., H.K.W. 1448.

Figs. 90-93.—*P. mayaca*: 90, allotype female, Florida, Port Mayaca; 91, holotype male, Florida, Port Mayaca; 92, palp, Florida, 50 mi. west of Miami; 93, holotype, palp.

spines, the proximal pair overlapping base of middle pair, the distal pair subapical in position. Tibia II with five ventral spines, the distal one apical, the medial of each pair much reduced, the proximal much more so than the middle. Metatarsus II with three pairs of spines and a seventh spine between the subapical distal pair.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Palpus	0.87	0.42	0.50		0.75	2.54
Leg I	1.87	0.80	1.45	1.42	0.75	6.29
Leg II	1.70	0.75	1.30	1.32	0.70	5.77
Leg III	1.65	0.70	1.22	1.57	0.68	5.82
Leg IV	2.24	0.87	1.93	2.50	0.97	8.51

Variation.—*P. cantralli* appears to be a rather uniform species; lightly sclerotized specimens are paler in color than heavily sclerotized ones, but this is true of all arthropods. The male from Ontario has swollen front legs, but the brush on metatarsus I is not as conspicuous as in Michigan specimens.

Distribution.—Ontario and Michigan.

Specimens examined.—Canada: *Ontario*: Sproule Bay, Lake Opeonga, Alg. Pl., June 26-July 7, 45, W 78° 22', N 45° 38', male, four females (R.O.M. 7817); United States: *Michigan*: Calhoun County: Tekonsha, 30.V.42, A.M.C., male (M.C.Z.); Clinton County: Bath, 14-24, July 66, DEB 59, male, female (D.E.B.); Kalamazoo County: Gull Lake, 1-7 July 1965, D.E.B., male (D.E.B.); Gull Lake Biol. Sta., 22 June-9 July 65, T.F.H., pitfall trap, *Typha* marsh, male, 2 females (D.E.B.); Gull Lake Biol. Sta., 15-22 July 65, female (T.F.H.); Gull Lake Biol. Sta., 29 July-4 Aug 65, male, 2 females (D.E.B.); Gull Lake Biol. Sta., 4-11 Aug 65, male (D.E.B.); Livingston County: E.S. George Reserve, D6-8, VI.19.51, HKW 1410, 2 males, 2 females (HKW); M-28, VII.3.51, HKW 1448, 3 males, 7 females with egg sacs (HKW); P-18, VII.4.51, F.N. Young, male (HKW); M-28, VII.14.54, HKW 1788, 1 male, 9 females (HKW); M-28, VII.14.54, HKW 1788A, male, four females (HKW); R-6, VII.30.54, HKW 1819, male, 6 females (HKW); M-28, VII.19.54, HKW 1796E, 3 males, 9 females, imms., egg sac (HKW); M-28, VII.19.54, HKW 1796H, male, 5 females, egg sac (HKW).

Life history.—We have examined males from May, June, July and August, females from June, July and August, and egg sacs from July. Wallace's records from Michigan were limited to the three months (June, July, August) he spent on the Reserve each of three summers. Adults probably are present over a longer period than that indicated above.

Ecology.—As stated in the discussion under *P. insularis*, *P. cantralli* appears to occur in emergent vegetational zones in marshy and in other situations in bogs, but not in the same niches as *P. insularis*. These conclusions are tentative and need careful checking.

THE MAYACA GROUP

Pirata mayaca Gertsch

Figs. 87, 90-96

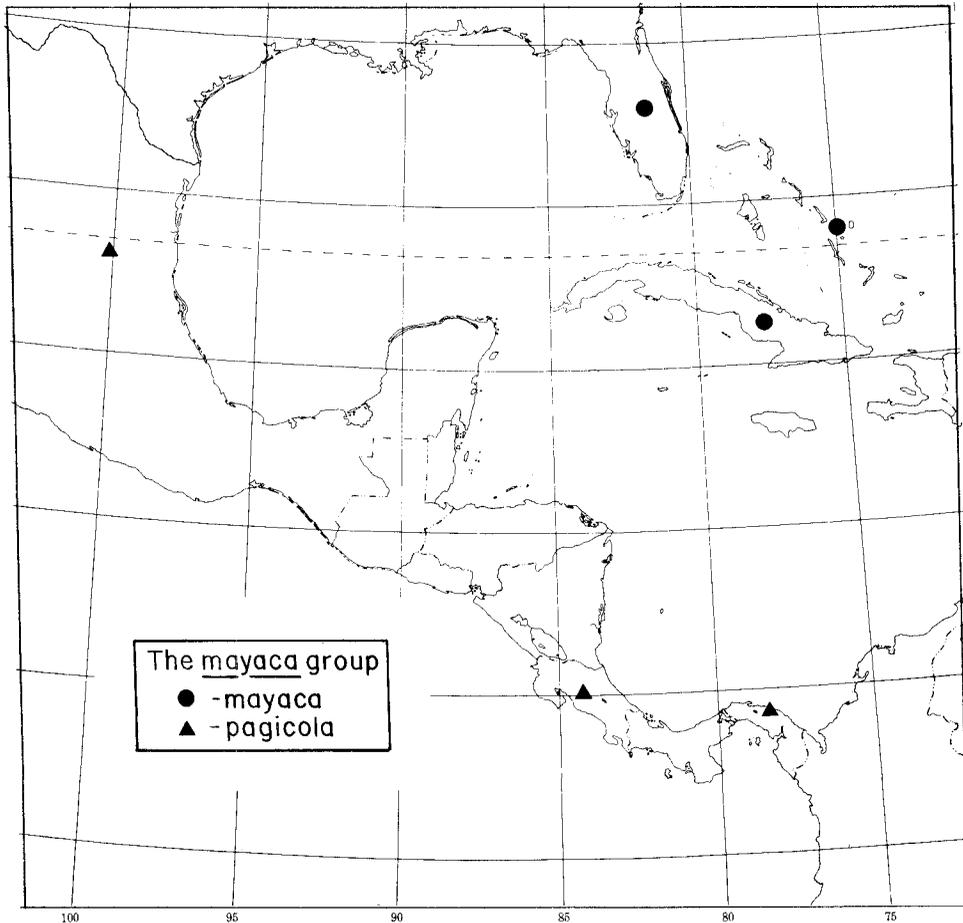
Pirata mayaca Gertsch, 1940, Florida Entomol., 23(2):21-22, figs. 5-6 (male, female, Port Mayaca, Florida, A.M.N.H., examined).

Pirata gertschi Chamberlin and Ivie, 1944, Bull. Univ. Utah, 35(9):149-150, figs. 190-191 (male, female, 3 mi SE Savannah, Georgia, not examined. See remarks). NEW SYNONYMY.

Description of holotype.—A male with carapace 1.8 mm long, 1.3 mm wide, with a wide submarginal light band (Fig. 91). Legs not banded. Dorsum with a distinct pattern of four triangular white markings on the midline with their apices pointing anteriorly. Anterior eye row narrower than the posterior median row, almost straight; anterior median eyes twice as large as anterior lateral eyes, closer to anterior lateral eyes than to each other. Clypeus equals $\frac{4}{5}$ the diameter of anterior lateral eyes. Tibiae I and II with three pairs of spines, the distal pair apical in position. The distal process of the median apophysis of the male palp is long and recurved (Fig. 93).

Description of allotype.—Carapace with a submarginal light band not as wide as in the holotype and a distinct tuning-fork pattern (Fig. 90). Legs unbanded. Eye arrangement similar to male. Tibiae I and II with two pairs of ventral spines. Epigynum (Fig. 87) somewhat similar to that of *P. aspirans*.

Description of male from Palm Beach Co., Florida.—U.S. Sugar Corp., Sand Cut, Pitfall, 31-VII.70, Carapace 1.62 mm long, 1.28 mm wide, with a submarginal light band with very irregular borders and a distinct tuning-fork pattern on the head. Dorsum with large light hastate mark and irregular pattern posteriorly. Sternum, coxae, venter yellow, immaculate. Lower margin of the furrow of chelicerae with three teeth, middle tooth the largest, lateral tooth the smallest. Anterior eye row narrower than the posterior median



row, procurved; anterior median eyes are twice as large as the anterior lateral eyes, closer to anterior lateral eyes than to each other. Clypeus height somewhat less than the diameter of an anterior median eye. Tibia I with three pairs of ventral spines, the distal pair apical in position. Tibia II with three pairs of ventral spines, the distal pair apical in position; the prolateral spines much reduced in size. Legs 4123, unbanded.

Description of a female paratype.—Port Mayaca, Fla., March 28, 1938., W. J. Gertsch, coll. Carapace 2.00 mm long, 1.50 mm wide, with a submarginal light band with irregular borders and a distinct tuning-fork pattern on the head. Dorsum with a light hastate mark and irregular dark, crease-like pattern behind. Sternum, coxae, venter yellow, immaculate. Lower margin of furrow of chelicerae with three teeth, evenly spaced, the middle tooth the largest. Anterior eye row slightly narrower than the posterior median row, almost straight, eyes about equally spaced, anterior median eyes twice as large as the anterior laterals. Clypeus receding, equal in height to the diameter of an anterior lateral eye. Tibia I with two pairs of long ventral spines and one prolateral apical spine. Tibia II with two pairs of ventral and one prolateral apical spine; the prolateral spines much reduced in size.

Legs 4123, unbanded.

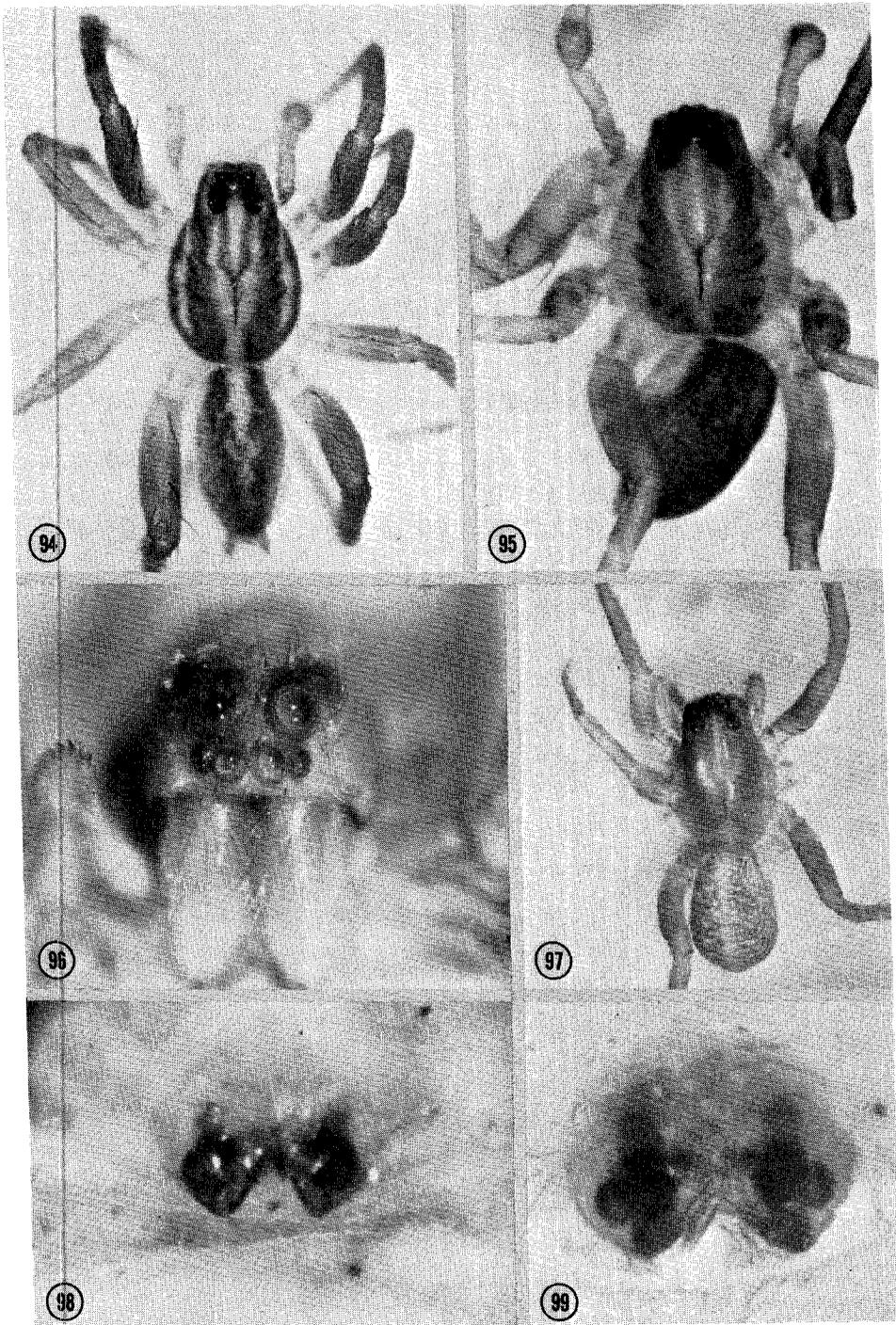
Distribution.—Florida, British West Indies, Cuba. Females from North Carolina and Cuba resemble *P. mayaca*, but males are needed to verify these records.

Specimens examined.—*British West Indies*: Crooked Island, S.E. of Gordon Bluff, Sept. 58, A. W. Scott, Jr., 1 male (M.C.Z.); *Cuba*: Trinidad Mts., Buenos Aires, 9 May 36, P. J. Darlington, 3 females (M.C.Z.); Soledad, Mar 1925, Salt and Mayers, female (M.C.Z.); United States: *Florida*: Royal Palm Park, 15-24 Mar 1930, Blatchley, male (M.C.Z.); Alachua County: II-2-37, HKW Sta 6c, male (H.K.W.), IV-19-37, HKW Sta 1, female (H.K.W.), VI-14-37, HKW 15, male (H.K.W.); Dade County: 2-5 mi. S. Florida City, April 1, 1957, Forester and Gertsch, female (A.M.N.H.), 50 mi. W. Miami, March 31, 1957, Forester and Gertsch, male (A.M.N.H.); Flagler County: 14.8 mi. S.E. County Line on Fla 28, IV-1-39, HKW 1073, male, 2 females (H.K.W.); (?) Franklin County: nr. Sebring, Highlands Hammock, Mar 24, 1938, Gertsch, female (A.M.N.H.), Archbold Bio. Sta., Feb., Neofiber burrows, female (A.M.N.H.); Indian River County: Sebastian, II-44, Nelson, female (M.C.Z.); Lee County: 6.3 mi. S. Ft. Myers on U.S. 41, 15 Apr 49, HKW 1306, male, 2 females (H.K.W.); Levy County: 6 mi. E. of Cedar Keys, IV-9-37, HKW 593, 1 male, 1 female (H.K.W.); Martin County: Port Mayaca, Lake Okechobee, May 29, 1938, 3 males, 14 females (Holotype, allotype, paratypes, A.M.N.H.; 1 male, 3 female paratypes, H.K.W.); Palm Beach County: Canal Point, 8-V-70, pitfall, male (D.P.I.); Putnam County: U.F.C.R., VI-1-47, H.K.W. 1264, male, female (H.K.W.).

Life history.—All of the records for *P. mayaca* but one are from spring and early summer; males from February through June, females February through May. The exception is the male from Crooked Island in September.

Ecology.—The information available indicates that this species always occurs near water.

Variation.—Males vary in carapace size from 1.5 mm long, 1.0 mm wide to 1.8 mm long, 1.3 mm wide; females from 1.4 mm long, 1.0 mm wide to 2.2 mm long, 1.6 mm wide. In Florida this species has a submarginal band on the carapace, but in the three females from the Trinidad Mountains in Cuba the pattern varies from light to medium dark with a wide marginal light band on the carapace and faint annulae on the legs; one of these has indications of marginal pigment. The carapaces of these three females measure 2.05 mm long, 1.55 mm wide; 2.0 mm long, 1.45 mm wide; 2.0 mm long, 1.50 mm wide.



Figs. 94-96.—*P. mayaca*: 94, male, Florida, Palm Beach Co.; 95, male, British West Indies, Crooked Island; 96, male, eyes, Florida, Putnam Co.

Figs. 97-99.—*P. pagicola*: 97, holotype female, Barro Colorado Island; 98, holotype, epigynum; 99, epigynum, Mexico, Tamaulipas, Rancho del Cielo.

The male from Crooked Island, British West Indies, has a carapace measuring 1.7 mm long, 1.3 mm wide. Wallace noted that it had a submarginal band on the carapace and distinct annulations on the legs, but a photograph of the specimen makes it appear to have a wide marginal light band and indistinct annulae.

Remarks.—The median apophysis of *P. mayaca* is quite distinctive and males can be identified with certainty. Females, on the other hand, are hard to identify and any locality record based on females should be considered tentative until confirmed by collection of males.

Remarks.—Dr. Cooke wrote that he was unable to locate the types of *P. gertschi* in the A.M.N.H. so they may be lost. The figure of the epigynum of *P. gertschi* does not represent anything we have seen, but the figure of the palp is that of *P. mayaca*; only *P. mayaca* in Georgia has the recurved distal arm of the median apophysis.

This species has been identified as *P. felix* by various authors. The type of *P. felix* is a smaller spider with a much different epigynum (Fig. 109).

P. pagicola and *P. mayaca* have very similar genitalia, but differ in size and pattern. *P. mayaca* has a submarginal band on the carapace, but in *P. pagicola* it is marginal. *P. mayaca* is much smaller than *P. pagicola*.

The specimens listed as *P. mayaca* from Cuba and the British West Indies have the pattern of *P. pagicola* and size of *P. mayaca*.

Pirata pagicola Chamberlin

Figs. 97-104

Pirata pagicola Chamberlin, 1925, Bull. Mus. Comp. Zool., 67(4):225 (female, M.C.Z., 1,292, Barro Colorado Island, examined).

Pirata felix Gertsch and Davis, 1940, Amer. Mus. Nov., 1059:9-10, examined. NEW SYNONYMY.

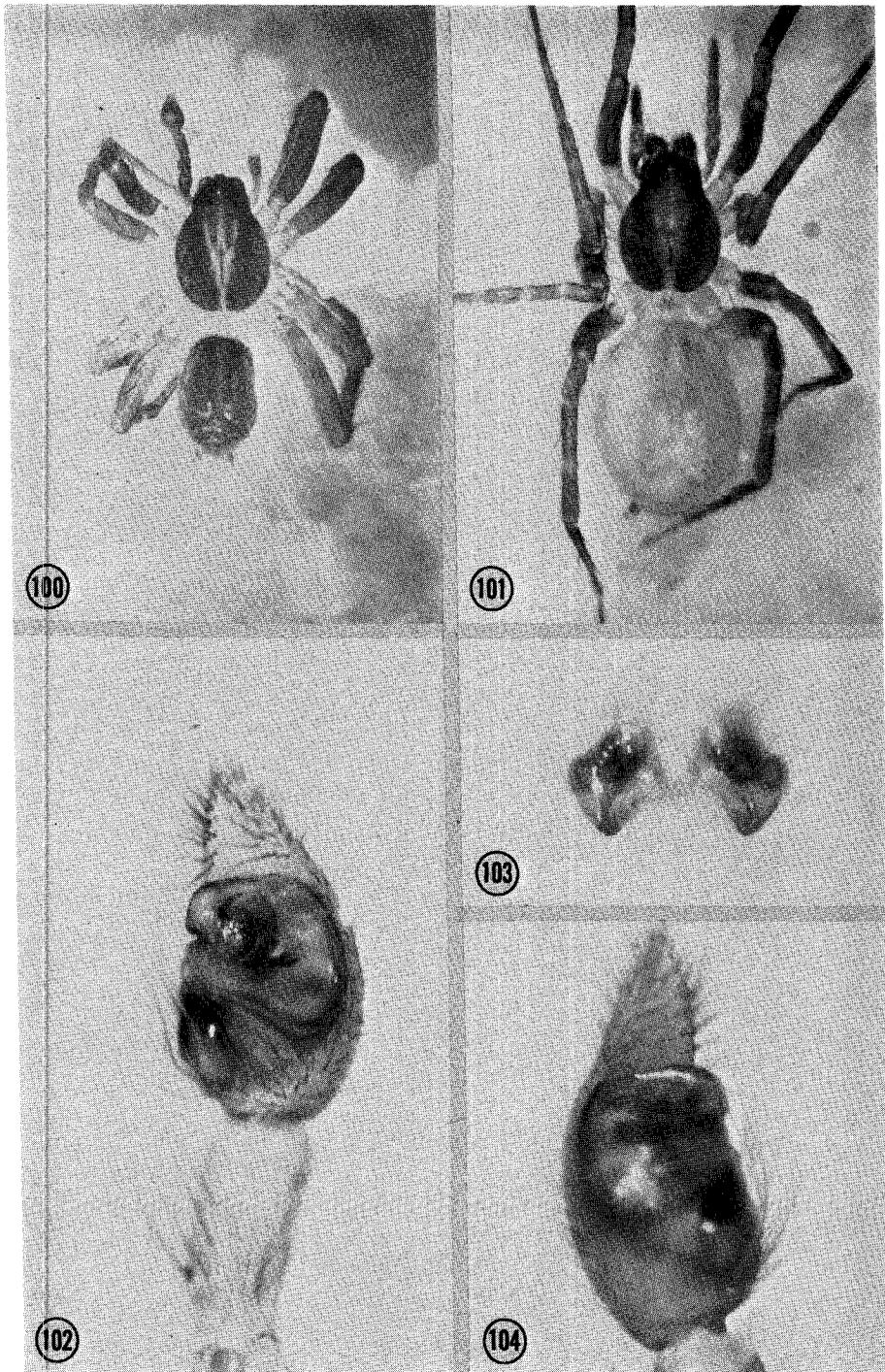
Remarks on the holotype.—Chamberlin's description still fits the specimen. Carapace 1.9 mm long, 1.3 mm wide, with a wide marginal light band, but it looks like it might be interpreted as a submarginal band. The anterior eye row is slightly narrower than the posterior row, almost straight; anterior eyes evenly spaced, anterior median eyes are twice as large as the anterior laterals.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Leg I	1.40	0.63	1.17	1.17	0.55	4.92
Leg IV	1.75	0.70	1.75	1.90	0.90	7.00

Chamberlin did not figure the epigynum (Fig. 98) which resembles *P. aspirans* and *P. mayaca*. The palpi of *P. mayaca* and *P. pagicola* are very similar and differ from *P. aspirans*.

Distribution.—Panama: Barro Colorado Island; México: Tamaulipas, Veracruz, and San Luis Potosí; Costa Rica.

Specimens examined.—*Costa Rica*: Turrialba, I.I.C.A., 13 Mar 67, W. Peck, ground, opening in jungle, female (Exline). México: *San Luis Potosí*: 5 mi. N. Tamazunchale, July 2, 1936, L. I. Davis, female (A.M.N.H.); San Luis Potosí, Picolo, May 21, 1952, W. J. G., 4 males, 10 females (A.M.N.H.); *Tamaulipas*: Rancho del Cielo, 6 mi. N.W. Gómez Farías, 9 Mar 1969, J. Reddell etc., male, female (A.M.N.H.), Mar 24, 1967. R. W. Mitchell. 3



Figs. 100-104.—*P. pagicola*: 100, male, Mexico, Tamaulipas, Rancho del Cielo; 101, female, Mexico, Tamaulipas, Rancho del Cielo; 102, palp, Mexico, San Luis Potosi, May 21, 1952, W.J.G.; 103, epigynum, Mexico, San Luis Potosi, May 21, 1952, W.J.G.; 104, palp, Mexico, Tamaulipas, Rancho del Cielo.