

STUDIES IN THE GROUP ISCHNOPTERITES
(ORTHOPTERA, BLATTIDAE, PSEUDOMOPINAE)

BY MORGAN HEBARD

In studying the Blattidae of North America north of Mexico and material of the family adventive in that region, it has been found necessary to treat fully a number of tropical American species, in order to clarify the proper relationships of the North American forms and in some cases to determine their correct nomenclatorial status.

The present paper treats those forms involved, found in the Group Ischnopterites, and is the seventh and last of this series of supplementary studies which have appeared in two publications.¹

The Group Ischnopterites, like the Group Blattellites, is extremely large, comprehending a vast array of species. Among these, the number which should be referred to the genus *Ischnoptera* is very great, but many species which have been placed there belong properly to distinct genera. One of these, *Symploce*, here described, is represented in the United States by a single species, but to determine the characters of importance, both generic and specific, we have here fully treated all of the species represented in the series before us. The same is true of the genus *Xestoblatta*, also described in the following pages, a single species of which is represented in the material before us adventive to the United States. In addition, to locate the correct position of the remaining species of the Group found in the United States, we have considered fully the genotype of the genus *Ischnoptera* and the forms of that genus showing nearest relationship, of which *I. rufa occidentalis* Saussure, alone, is known from the United States, probably from adventive material.

In studying the forms here treated and those found in North America north of the Mexican boundary, the entire series of the group in the Philadelphia collections has been carefully examined, this including over sixty exotic species, the majority of which have as yet not been recorded.

¹ Trans. Am. Ent. Soc., and Ent. News.

The species treated in the present paper are the following:

	PAGE
<i>Ischnoptera morio</i> Burmeister	340
<i>Ischnoptera atrata</i> new species	341
<i>Ischnoptera angustifrons</i> new species	343
<i>Ischnoptera vulpina</i> new species	344
<i>Ischnoptera rufa rufa</i> (De Geer)	346
<i>Ischnoptera rufa debilis</i> new subspecies	350
<i>Ischnoptera rufa occidentalis</i> Saussure	352
<i>Symploce lita</i> new species	357
<i>Symploce jamaicana</i> (Rehn)	359
<i>Symploce capitata</i> (Saussure)	361
<i>Symploce morsei</i> new species	365
<i>Symploce flagellata</i> new species	367
<i>Symploce bicolor</i> (Beauvois)	369
<i>Xestoblatta nyctiboroides</i> (Rehn)	373
<i>Xestob'atta carrikeri</i> new species	374
<i>Xestoblatta festae</i> (Griffini)	376

The number of specimens recorded is 179. Of these 117 are in the Philadelphia collections; the others have been most kindly loaned by the curators of the United States National Museum, American Museum of Natural History, Museum of Comparative Zoology and University of Kansas Collections and by Dr. Albert P. Morse. In return for the determinations, a share of the duplicate material has been retained for the author's collection.

The Porto Rican material was secured in connection with the New York Academy-Porto Rico Survey. The first set of this is in every case the property of the American Museum of Natural History.

ISCHNOPTERA Burmeister

(Plate XVI, fig. 3, A; Plate XVII, figs. 1, 2 and 3.)

1838. *Ischnoptera* Burmeister, Handb. Ent., ii, abth. ii, pt. I, p. 500.

The genus was based on four species, three of which were at that time described, while an additional species was doubtfully included.

We here restrict the genus to the forms showing the features given below, which we are able to ascertain from a specimen of the type species before us; other species, which have been generally referred to *Ischnoptera*, but which do not agree in various

characters here given, are properly referable to other distinct though closely related genera.

GENOTYPE.—*I[schnoptera] morio* Burmeister, selected by Kirby in 1906.²

Generic Description.—Head elongate; ocelli distinct with flat surfaces of ocellar areas forming a rather sharp angle with the interocellar space.³ Pronotum weakly convex, becoming strongly so narrowly laterad; disk in males with two distinct sulcations mesad which converge caudad, in females showing reduced tegmina and wings these sulci are usually obsolete; lateral margins of pronotum fully as chitinous as the disk, the immediate margins cingulate; caudal margin of pronotum very weakly and broadly convex.⁴ Tegmina with discoidal sectors (these including the median and ulnar veins and their branches, of which the branches of the ulnar vein are the more numerous) weakly radiating so that the branches near the sutural margin are weakly oblique to that margin. Wings with area between discoidal vein and costal margin narrow throughout; mediastine vein extending more than half the distance to the apex of the wing, from which vein spring a number of the costal veins; none of the costal veins enlarged distad; discoidal vein percurrent to apex of wing, undivided, with a number of distinct, well spaced, nearly perpendicular veinlets connecting with the median vein; ulnar vein weakly curved with a number (3 to 7) of proximal incomplete rami and a number (4 to 6) of moderately arcuate distal rami extending to the distal margin of the wing; intercalated triangle small and inconspicuous.⁵ Males with median segment not specialized, but with sixth and seventh dorsal abdominal segments greatly specialized. Sixth dorsal segment emarginate mesad to near its

² Synon. Cat. Orth., I, p. 80.

³ As in other genera of the group, the ocellar area becomes less strongly defined as tegminal and wing reduction takes place. Where such reduction is decided the well defined ocelli are usually likewise reduced, represented by mere ocellar spots.

⁴ As in many genera of the Blattidae, the caudal margin of the pronotum is seen to become more truncate and more nearly transverse in material showing decided tegminal and wing reduction.

⁵ None of the species of *Ischnoptera* considered in the present paper show very great tegminal and wing reduction. That this occurs in the genus is shown by the female sex of both *I. vilis* and *I. deropeltiformis*.

proximal margin, with sides of emargination convex (Plate XVI, fig. 3, A), bearing beneath on each side near the apex of the emargination a minute chitinous projection armed dorso-distad with close-set delicate microscopic teeth, which are directed cephalad (Plate XVII, fig. 3); seventh dorsal abdominal segment in greater part lying under sixth segment, but with a narrow, medio-longitudinal, decidedly elevated ridge lying between the armed projections of the sixth segment. Eighth dorsal abdominal segment unspecialized. Cephalic femora with ventrocephalic margins armed with (usually about four) heavy, elongate, well separated, proximal spines, succeeded distad by a row of minute, closely set, piliform spines, which is terminated distad by three heavy, elongate (in increasing ratio) spines. Other ventral margins of femora supplied with widely spaced, heavy, elongate spines. Median and caudal femora in addition supplied with a single elongate genicular spine. Small arolia are present.

THE MORIO GROUP

This group is very close to the Rufa Group. The two species known to us differ from those of that group in their larger size, very dark general coloration and particularly in the male supra-anal plate, which in the present group is chitinous proximad and laterad, the remaining portion occupied by an ample, soft, whitish integument.

Ischnoptera morio Burmeister (Plate XVII, figs. 1, 2, 3, 4 and 5.)

1838. *I[schnoptera] morio* Burmeister, Handb. Ent., ii, abth. ii, pt. I, p. 500. [Colombia.]

Burmeister's very inadequate description agrees with the specimen before us. This insect is closely related to the new species, *I. atrata*, under which the two are compared.⁶

Characters of ♂.—(Caracas, Venezuela.) Size very large for the genus; form moderately slender. Interocular width three-fifths ocular depth, subequal to interocellar width. Ocelli large, flattened surfaces of ocellar areas forming a sharp angle with interocellar area. Maxillary palpi rather short; fourth joint slightly shorter than third, fifth (distal) joint distinctly the longest and moderately enlarged, the ventral margin weakly convex from the rather sharp apex to near the base where the convexity is more decided.

⁶ We have not seen the female sex of *morio*. We feel that it will probably be found to resemble that sex of the closely related *atrata*.

Tegmina with numerous discoidal sectors; the portion of the dextral tegmen, concealed when at rest, hyaline. Sixth and seventh dorsal abdominal segments greatly specialized as given in generic description; eighth segment the same with distal margin briefly straight laterad and broadly but rather decidedly sinuato-concave mesad. Supra anal plate well produced; narrow lateral and proximal marginal portions chitinous; remaining large mesal and distal portion occupied by an ample, soft, whitish integument, its margin joining the chitinous portions forming a large part of a perfect circle, its distal margin truncate; lateral chitinous portions not enlarged but rather broadly rounded distad, their apices supplied with a number of bristles. Cerci moderately elongate, slender, tapering to acute apex, with twelve joints; dorsal surface deplanate, ventral surface decidedly convex. Subgenital plate strongly asymmetrical, produced, with rather broad produced portion concave, dextral margin oblique produced to transverse distal margin of production, on this latter margin is situated, decidedly sinistrad of the middle, the larger style, produced portion terminated rather suddenly at internal margin of sinistral cercus, there rather sharply rounded rectangulate, forming with remaining brief portion of sinistral margin, which is weakly oblique, nearly a rectangulate emargination, at the apex of which is situated the smaller style; meso-distal portion of plate internally moderately convex with surface thickly covered with short bristles directed cephalad. The larger dextral style is four times as long as broad, with distal half slightly bent sinistrad and armed with minute spines.

Measurements (in millimeters)

♂	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen	Length of caudal tibia
Caracas, Venezuela	17.8	4.9	7.1	22.1	5.5	7

Coloration.—Eyes, pronotum and underparts blackish brown; head, dorsal surface of abdomen and limbs very slightly paler. Ocelli buffy. Dextral tegmen dark chestnut brown fading rather abruptly at portion concealed when at rest, which is colorless hyaline; sinistral tegmen dark chestnut brown, becoming slightly paler distad. Wings and veins colorless hyaline, except area of costal veins which is tawny olive, more buffy mesad.

Specimens Examined: 1; 1 male.

Caracas, Venezuela, (E. Hartert), 1♂, [A. N. S. P.].

Ischnoptera atrata new species (Plate XVI, figs. 1 and 2.)

Closely related to *I. morio*, bearing that species a close general resemblance, but differing decidedly in the darkened veins of

the wings, distinctive male supra-anal plate and somewhat differently formed male subgenital plate and styles.⁷

Type.—♂; Caparo, Trinidad. June, 1912. (S. M. Klages.) [Acad. Nat. Sci. Phila., Type no. 5308.]

Description of Type.—Size very large for the genus; form moderately slender. Head elongate, much as in *morio* but with interocular slightly narrower than interocellar space. Pronotum with discal sulci strongly defined as in *morio*. Tegmina and wings much as in that species, but with wing veins embrowned. Dorsal surface of abdomen likewise in general similar, but with distal margin of eighth segment very broadly and evenly concave. Supra-anal plate with a meso-distal nearly circular portion, occupied by a soft integument which is much less extensive than in *morio*, leaving large proximal and lateral chitinous areas; lateral chitinous portions with distal area expanded and almost circular, bearing distad a number of bristles. Cerci elongate with thirteen apparent joints. Subgenital plate strongly asymmetrical, produced, with free margin dextrad straight transverse to slightly beyond mesal point, there directed caudad, forming slightly more than a right angle with angle rather sharply rounded, there at the apex of this produced portion is situated a heavy style of similar size and character to that found in *morio* except that it curves evenly sinistrad, thence the free margin is oblique to its sinistral base, furnished beneath the sinistral cercus with a small, slender, straight style of half the length of the conspicuous style.

Allotype.—♀; same data as the type. [Acad. Nat. Sci. Phila.]

Description of Allotype.—Similar to male except in the following features. Size slightly larger; form broader, particularly in abdominal region. Portion of dextral tegmen concealed when at rest, hyaline, but weakly embrowned, with veins embrowned. Dorsal surface of abdomen not specialized. Supra-anal plate triangularly produced with sides rather deeply angulato-concave and apex broadly rounded; the distal portion less strongly chitinous. Subgenital plate large and convex; free margin broadly convex, showing a broad weak flattening mesad and at the cerci.

Measurements (in millimeters)

	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen
Caparo, Trinidad ♂					
<i>Type</i>	19.8	4.8	6.5	21.9	5.5
♀					
<i>Allotype</i>	20.5	5.3	7.2	23.3	5.9
<i>Paratypes</i> (5) . . .	20.2–23.8	5.1–5.4	6.4–6.9	22–23.1	5.3–6.1

Coloration.—General color of head, pronotum and ventral surface of abdomen polished blackish brown. Limbs and dorsal

⁷ The female of *morio* is unknown to us and we are consequently unable to make comparisons with that sex.

surface of abdomen dark chestnut brown. Tegmina shining deep chestnut brown with an auburn tinge, becoming slightly paler distad; marginal field in male briefly buffy distad; area of dextral tegmen concealed when at rest, hyaline with a weak brownish suffusion, in male with veins hyaline, in females with veins embrowned, oblique channel of dextral tegmen with structural color brilliantly metallic blue and green.⁸ Wings hyaline, very faintly tinged with brown; entire area of costal veins brilliant deep chestnut brown with an auburn tinge, other veins deep chestnut brown.

The Guiana specimen differs from the typical series in having the marginal field of the tegmina more extensively buffy and the limbs distinctly paler, ochraceous tawny.

Specimens Examined: 8; (probably) 2 males and 6 females.

Caparo, Trinidad, VI, 1912, (S. M. Klages), 1 ♂, 6 ♀, *type, allotype, paratypes*, [A. N. S. P.].

Chenapowu to Saweritik, British Guiana, VIII, 21, 1911, (Crampton and Lutz), 1 ♂?,⁹ [A. M. N. H.].

THE RUFA GROUP

Very close to the Morio Group. The species of the present group differ in being not as large, more reddish in general coloration and particularly in having the male supra-anal plate showing only a limited subchitinous area meso-distad.

Ichnoptera angustifrons new species (Plate XVII, fig. 7.)

The female of this species is unknown. The male may be separated from this sex of *I. vulpina* by the distinctly narrower interocular space, more transverse pronotum with discal sulci less decided, less decidedly ferruginous general coloration, proportionately shorter organs of flight and different proportions of subgenital plate.

These two species show near relationship to *I. rufa rufa*, which form, however, has the interocular space decidedly wider, the organs of flight in proportion decidedly shorter and the mesal production of the male subgenital plate much more conspicuous, with styles decidedly more widely separated.

Type.—♂; Rio Pacaya, Peru. July, 1912. [Acad. Nat. Sci. Phila., Type no. 5307.]

⁸ This is conspicuous only in a bright light.

⁹ The abdomen is missing in this specimen.

Description of Type.—Size large for genus; form slender, nearly as slender as in *vulpina*. Head with interocular space very narrow, its width about one quarter of a millimeter, but two-fifths as wide as interocellar space which is narrower than in *vulpina*. Ocelli and maxillary palpi as in that species. Pronotum broader, approximately as broad in proportion as in *I. morio*, with discal sulci very weakly indicated. Tegmina and wings elongate, though not as decidedly so as in *morio* or *vulpina*. Supra-anal plate as in *vulpina*. Subgenital plate of similar structure (see description of *vulpina*), but with produced portion less extensive and in position situated slightly more sinistrad of mesal point; free margin dextrad strongly convex then very weakly concave; sinistral style very small, less than half as long as large dextral style and separated from it by only its own length, thus the styles are more nearly adjacent than in *vulpina* as the sinistral style is smaller in the present species.

Measurements (in millimeters)

♂	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen
Rio Pacaya, Peru, type	15.2	4	5.2	17.7	4.2

Coloration.—Head to ventral margins of ocelli shining blackish brown, there shading to cinnamon rufous with maxillary palpi buffy. Pronotum ochraceous tawny, very faintly paler laterad and cephalad. Tegmina translucent tawny, the marginal field ochraceous buff. Limbs and underparts warm buff, the abdomen shading to ochraceous tawny distad.

The type is unique.

Ischnoptera vulpina new species (Plate XVI, fig. 8; pl. XVII, fig. 6.)

Near relationship to *I. rufa rufa* is shown by this species and to *I. angustifrons*, under which latter insect full comparisons are made.

Type.—♂, Caparo, Trinidad. August, 1913. (S. M. Klages.) [Hebard Collection, Type no. 422.]

Description of Type.—Size large for genus; form slender, more slender than in *I. morio*. Head with interocular space slightly narrower than interocellar space, both dimensions proportionately appreciably less than in *rufa rufa*. Ocelli conspicuous, with flat surfaces of ocellar areas slanting strongly mesad. Maxillary palpi more elongate than in *rufa rufa*. Pronotum less transverse than in *morio*, with discal sulci decided as in that species. Tegmina and wings much as in *morio*, proportionately decidedly more elongate than in *rufa rufa*, but, as in the latter species, with portion of dextral tegmen, concealed when at rest, not as strikingly transparent. Dorsal abdominal segments specialized as given in generic description; all of sixth segment, except the small elevated lateral portions, more delicate than in *morio*, entirely weakly chitinous. Supra-anal plate much as in *rufa rufa*, but even more

strongly produced, broader distad, with subchitinous area more extensive; lateral margins nearly straight, weakly converging distad where the plate is very broadly truncate with distal margin weakly convex; mesad the entire produced portion of the plate is subchitinous to near the heavy chitinous narrow lateral portions and more delicate chitinous narrow distal portion.¹⁰ Subgenital plate convex except meso-distad, where it is weakly concave and weakly triangularly produced; at the apex of this production is situated a stout cylindrical style four times as long as broad, directed dorso-sinistrad with blunt apex covered with minute, short, stout, chitinous spines; sinistrad of this style and also on the free margin is situated a small cylindrical style with apex rounded, about half as long and distant from the larger style by only its own length; free margin dextrad decidedly convex to base of mesal production, where with the dextral margin of this production a distinct and broadly rounded concavity is formed; from the apex of the mesal production the sinistral portion of the free margin is nearly straight and oblique to the base of the plate.

Allotype.—♀; same data as type. [Hebard Cln.]

Description of Allotype.—Agrees with male in ambisexual characters, differing in the following features. Size slightly larger, form slightly more robust. Interocular space very slightly broader than interocellar space, both dimensions slightly greater than in male, but distinctly less than in this sex of *rufa rufa*. Tegmina and wings proportionately very slightly shorter than in male, extending well beyond the cercal apices. Dorsal surface of abdomen unspecialized. Supra-anal plate rather strongly produced mesad, trigonal but with lateral margins strongly concave and apex rounded, the distal portion extending beyond the subgenital plate a full millimeter.¹¹ Subgenital plate decidedly transverse, convex, with free margin evenly and broadly convex.

Measurements (in millimeters)

	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen
Caparo, Trinidad ♂					
<i>Type</i>	16.5	4.4	5.3	19.7	5.3
<i>Paratypes</i> (2).....	18.2–19.8	4.6–4.6	5.6–5.7	19.6–20.1	5–5.2
♀					
<i>Allotype</i>	19.6	4.9	6	20.7	5.6
<i>Paratypes</i> (6).....	18.2–20.5	4.7–5.2	5.4–6.4	18.8–20.7	4.9–5.7

¹⁰ Thus indicating a condition nearly intermediate between that of *morio* and that of *rufa*.

¹¹ Though this is the normal condition in the series before us, paratype females also show individual differences in having the apex narrower or wider, and in the degree of concavity of the lateral margins; these latter also are occasionally strongly concave proximad, thence nearly straight convergent to the apex. The material of *rufa* here studied shows the supra-anal plate of the female to be decidedly variable in form, and of little specific diagnostic importance in the present group.

Coloration.—♂. Head shining blackish brown, ventrad shading rapidly at clypeal suture to clay color. Pronotum and tegmina kaiser brown, sometimes a shade darker at the discal sulci of the former. Wings hyaline, veins very weakly ochraceous tawny, area of costal veins and, to a less degree, distal portion of anterior field, ochraceous tawny. Coxae, cephalic limbs and median and caudal femora clay color, median tibiae very slightly darker, caudal tibiae russet. Dorsal surface of abdomen buffy, shading to tawny distad. Ventral surface of abdomen apricot orange, shading laterad and distad through hazel to chestnut brown. Female similar but with slightly deeper and more extensive darker abdominal colors.

Specimens Examined: 10; 3 males, 7 females.

Caparo, Trinidad, VIII, 1913, (S. M. Klages), 3♂, 7♀, *type*, *allotype*, *paratypes*, [Hebard Cln.].

Ischnoptera rufa rufa (DeGeer) (Plate XVII, figs. 3 and 4.)

1773. *Blatta rufa* DeGeer, Mém. l'Hist. Ins., iii, p. 539, pl. 44, fig. 7. [Surinam.]

1805. *Blatta rufescens* Beauvois, Ins. Recueil. Afr. Amér., p. 183, Orth. pl. I b, fig. 7. [San Domingo.]

1838. ?*Ischnoptera* *fumata* Burmeister, Handb. Ent., ii, abth. ii, pt. 1, p. 500. [Brazil.]

1868. *Ischnoptera terminalis* Walker, Cat. Blatt. Br. Mus., p. 122. [♂, ♀, Jamaica.]

1893. *Ischnoptera conformis* Saussure and Zehntner, Biol. Cent.-Amer., Orth., i, p. 37, pl. 3, fig. 25. [♀, Nicaragua.]

We are satisfied, from the examination of the large series of Guianan roaches before us and study of the original description and figure, that DeGeer's *rufa* is correctly applicable to the present form. It is also evident that *rufescens* of Beauvois is an absolute synonym, material from San Domingo being at hand, and the same is true of Walker's *terminalis* from Jamaica, from which island we have a considerable series. This latter name has already been correctly synonymized under *rufescens* by Kirby;¹² that author, however, confused with the present, the species *capitata* and *blattoides* of Saussure, which species are widely distinct members of different genera. Burmeister's *fumata* is based on so inadequate a description that, without examination of the type, the name can not be satisfactorily located, though it is very possibly a synonym of *rufa*. Saussure

¹² Synon. Cat. Orth., I, p. 82, (1904.)

and Zehntner have described *conformis* from a single female, the only feature of distinction there given from *consobrina* (synonym of *rufa occidentalis*), being the distinctly more triangular form of the supra-anal plate. The material before us shows this feature to be surprisingly variable in the present species, occasional examples showing even greater differences in this respect, and *conformis* consequently falls as an absolute synonym of the present race.

Rehn's record of *I. rufa* from Misiones, Argentina, applies to an exceptionally pale specimen of *I. vilis*.

The present species divides into three geographic races: typical *rufa* is found throughout the West Indies (excepting Cuba) and on the continent from Nicaragua southward to British Guiana; *rufa debilis* occurs in the higher country of Costa Rica, while *rufa occidentalis* occurs from Nicaragua northward as far as New Orleans, Louisiana.¹³

The race *rufa debilis* represents an extremely depauperate condition, with tegmina and wings decidedly reduced in both sexes and other structural modifications. The production of the male subgenital plate is decidedly more conspicuous and abrupt in *rufa occidentalis* than in *rufa rufa*.

From *I. morio* this insect differs in its smaller size and reddish coloration, the male supra-anal plate is distinctive but the subgenital plate, though different, shows a development similar in many respects.

Characters of ♂.—(Old Panama, Panama.) Size medium large; form moderately stout, not as slender as in *morio*. Head with interocular and interocellar spaces subequal in width. Ocelli distinct, flattened surfaces of ocellar areas slanting rather strongly mesad. Maxillary palpi rather short. Tegmina in general much as in *morio*, but not as elongate and with portion of dextral tegmen, concealed when at rest, not as strikingly transparent. Wings colorless hyaline, except area of costal veins which is moderately embrowned, this suffusion also present to a lesser degree in the distal portion of the anterior field, veins brown. Supra-anal plate produced, with lateral margins weakly convergent and rounding sharply into the broad transverse distal margin, which is nearly as wide as the length of the plate; surface convex, except mesad where it is weakly concave, this strongest in a large, distinct, subchitinous, transverse oval area just proximad of the distal margin; ventral surface thickly covered with short stout bristles distad

¹³ The records of this species from north of the state of Vera Cruz, Mexico, are based, we believe, on introduced material.

and less thickly so mesad. Subgenital plate strongly asymmetrical, convex except at production where it is very weakly concave; dextral free margin weakly convex to moderate mesal production, with which it forms a rounded obtuse-angulation, margin of production roughly convex, bearing at its blunt apex a heavy cylindrical style, directed evenly sinistrad, about three times as long as broad, with bluntly rounded apex slightly deflexed sinistrad and with dorsal and distal surface supplied with stout but minute teeth: sinistrad the free margin from the apex of the plate's production is evenly and weakly concave, with sinistral style, situated at base of production and less than half as long as dextral style, small and weakly tapering to rounded apex.

Characters of ♀.—(Bartica, British Guiana.) Similar to male in ambisexual characters. Size slightly larger, form appreciably broader with pronotum more ample. Head with interocular space slightly wider than interocellar space. Tegmina and wings proportionately somewhat less elongate than in male, scantily surpassing the cercal extremities. Supra-anal plate triangularly produced, with apex broadly rounded, showing a broad and weak concavity at the cercal bases.¹⁴ Subgenital plate convex, very broad and weakly produced, with free margin evenly and very broadly convex.¹⁵

Measurements (in millimeters)

	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen
♂					
Montego Bay, Jamaica	13.8	3.8	4.8	14.6	4.3
Sanchez, San Domingo	14.1	3.9	5	15.7	4.4
Arecibo, Porto Rico	14	3.8	5.1	14.8	4.3
Roseau, Dominica	13.5	3.7	4.8	15.1	—
Old Panama, Panama	15	3.8	4.8	15.7	4.4
♀					
Montego Bay, Jamaica	15.6	4	5.1	14.7	4.3
Ensenada, Porto Rico	14.5	4.6	5.7	16.8	4.7
St. Croix, Danish West Indies	15.2	3.9	5	14.1	—
Bartica, British Guiana	16	4.1	5.7 ¹⁶	15.4	4.6

Decidedly greater variation appears to occur in the present species in very mountainous regions (see measurements of *rufa debilis* and *rufa occidentalis*).

The variation in the present race is apparently slight; the

¹⁴ This plate shows decided variation, being sometimes distinctly angulato-emarginate distad, or with apex acute and sharply rounded, while the lateral margins are sometimes quite decidedly concave at the cercal bases, and sometimes with no emargination there. Such differences led Saussure and Zehntner to consider that the triangular type represented a distinct species, resulting in the synonym *conformis*.

¹⁵ Often, in the series before us, truncate, straight transverse, mesad.

¹⁶ The pronotum of this specimen has been somewhat flattened out in being prepared.

entire series before us from Jamaica are all very similar, in size and coloration, to the pair measured above.

Coloration.—General coloration Sanford's brown to argus brown and chestnut; usually weakly suffused, Sanford's brown. Head slightly paler, with occiput to below the ocelli blackish tinged with bay. Ocelli warm buff. Pronotum of general coloration, occasionally slightly paler laterad. Tegmina translucent and of general coloration, but with portion of dextral tegmen concealed when at rest, becoming rather gradually transparent, very weakly tinged with brown. Wings hyaline with veins weakly tinged with brown, embrowned in area of costal veins and to a less degree in the distal portion of the anterior field. Limbs buffy, often tinged with ochraceous orange. Ventral surface of abdomen proximad of the same color, rapidly shading through chestnut to blackish brown distad; this individually varying in extent and intensity and usually more decided in the female sex.

Though the series before us shows no striking differences in coloration, our material of *rufa occidentalis* indicates that probably very decided individual color differences will be found also in the present race.

Specimens Examined: 38; 14 males, 16 females and 8 immature individuals.

Montego Bay, St. James Parish, Jamaica, III, 4 and 5, 1911, (J. A. Grossbeck; under dried cocoanut palm petioles in grassy area), 1 ♀, 1 juv. ♀, [A. M. N. H.]; X, 29 to XI, 4, 1913, (Hebard; under logwood on docks, under litter on limestone and near beach), 5 ♂, 5 ♀, 3 juv. ♂, 1 juv. ♀, [Hebard Cln.].

Palm Beach, Montego Bay, Jamaica, III, 17, 1911, (J. A. Grossbeck; under logs), 1 ♀, [A. M. N. H.].

Mandeville, Manchester Parish, Jamaica, 2100 feet, XI, 6, 1913, (Hebard; under logs in upland pasture), 3 ♀, 1 juv. ♂, [Hebard Cln.].

Sanchez, San Domingo, V, 11 to 16, 1915, (F. E. Watson; about street light), 1 ♂, [A. M. N. H.].

Arecibo, Arecibo, Porto Rico, late VII, 1914, (F. E. Watson; under stones in cultivated area), 1 ♂, [A. M. N. H.].

Ensenada, Guanica Harbor, Aguadilla, Porto Rico, VI, 14 to 19, 1915, (A. J. Mutchler; under débris on alkali flat), 1 ♀, 1 juv. ♂, [A. M. N. H.].

Eveques Valley, St. Croix, Danish West Indies, VI, 4, 1911, (R. W. Miner), 1 ♂, 1 ♀, [A. M. N. H.].

Dominica, (H. M. Lefroy), 1 ♂,¹⁷ [A. N. S. P.].

Roseau, Dominica, VII, 3, 1911, (Crampton and Lutz), 1 ♂, [A. M. N. H.].

Barbados, VII, 17, 1903, (H. A. Ballou), 1 ♀,¹⁸ [A. N. S. P.].

¹⁷ Recorded by Rehn as *Ischnoptera occidentalis*.

¹⁸ Recorded by Rehn as *Ischnoptera occidentalis*.

Bartica, British Guiana, I, 7, 1913, (H. S. Parish), 1 ♀, [A. N. S. P.].

Old Panama, Panama, XI, 13, 1913, (Hebard; under drift on edge of coral sand beach), 1 ♂, [Hebard Cln.].

Ancon, Canal Zone, Panama, (A. H. Jennings), 1 ♂, [U. S. N. M.].

Zone limit five miles west of Empire, Canal Zone, Panama, XI, 14, 1913, (Hebard; under rubbish on edge of jungle), 1 ♂, [Hebard Cln.].

Empire, Canal Zone, Panama, XI, 14, 1913; (under débris on edge of jungle), 1 juv. ♂, [Hebard Cln.].

Gatun, Canal Zone, Panama, VII, 17 to VIII, 5, 1916, (D. E. Harrower), 1 ♂, 2 ♀, [Hebard Cln.].

Ischnoptera rufa debilis new subspecies (Plate XVI, figs. 5 and 6.)

The present geographic race evidently represents the response in this species to high altitudes in Costa Rica.

When compared with typical *rufa*, this race is found to differ in average decidedly smaller size, decidedly reduced tegmina and wings in both sexes, and more delicate male supra-anal plate with distal transverse portion of free margin narrower.

Type.—♂; Santa Maria de Dota, Costa Rica. Elevation 1600 meters. January, 1907. (J. F. Tristan.) [Acad. Nat. Sci. Phila., Type no. 5306.]

Description of Type.—Similar to *rufa rufa*, differing in the following features. Size very small for the group. Ocelli with flattened surfaces slanting very strongly mesad. Pronotum with caudal margin abruptly transverse.¹⁹ Tegmina and wings decidedly reduced, leaving distal portion of abdomen, including specialized segments,²⁰ exposed. Supra-anal plate much as in typical *rufa* but more delicate in structure, with transverse distal portion of free margin narrower and with ventral surface supplied with fewer short, stout bristles. Subgenital plate with angle at the dextral base of production weakly obtuse angulate.

Allotype.—♀; same data as type but taken in January, 1909. [Acad. Nat. Sci. Phila.]

Description of Allotype.—Agrees with male except in the following features. Size somewhat larger, form slightly more robust. Head, as in typical *rufa*, with interocular space slightly wider than interocellar space. Ocelli represented by rather weakly defined spots. Supra-anal plate triangularly produced, less than half as long as wide, with lateral margins weakly concave²¹ and apex rather sharply rounded. Subgenital plate as in *rufa rufa*.

¹⁹ This condition appears to accompany tegminal reduction frequently in the Blattidae. We have already discussed this as found in *Cariblatta lutea*. Trans. Am. Ent. Soc., xlii, p. 166, footnote 23, (1916).

²⁰ See generic description.

²¹ This varies in the series before us to a condition in which the lateral margins are very weakly convex from the cercal bases.

Measurements (in millimeters)

	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen
♂					
Santa Maria de Dota, Costa Rica, <i>type</i> . . .	11.2	3.7	4.3	8	3.6
Santa Maria de Dota, Costa Rica, <i>para-</i> <i>type</i>	11.4	3.7	4.3	7.8	3.3
Monte Redondo, Costa Rica	11.7	3.7	4.3	7.7	3.1
Azahar de Cartago, Costa Rica	12.5	3.6	4.2	7.2	3.1
Pacayas, Costa Rica	10.4	3.3	3.9	6.4	2.8
♀					
Santa Maria de Dota, Costa Rica, <i>allo-</i> <i>type</i>	13	4.2	5	8.7	3.8
Santa Maria de Dota, Costa Rica, <i>para-</i> <i>types</i> (6)	11.4-12.5	3.7-4.1	4.6-4.8	8-9.8	3-3.7
El Tablazo, Costa Rica (2)	11-11.5	3.8-3.9	4.3-4.6	7.9-8.9	3.2-3.7
Volcán Irazú, Costa Rica	12.3	3.8	4.6	6.9	3.1

The specimen from the Volcán Irazú was probably taken at a greater elevation than any of the other specimens of the series. It is exceptionally dark in coloration and shows the maximum tegminal abbreviation among the females.

Coloration.—Type. Head blackish brown to clypeal suture. Mouth parts, proximal antennal joints, palpi, limbs and cerci, ochraceous tawny. Pronotum kaiser brown washed with mars brown, this decided caudad. Tegmina translucent cinnamon brown, the marginal field and narrow area of dextral tegmen concealed when at rest, slightly paler and more nearly transparent. Abdomen with dorsal surface dark chestnut brown laterad and distad. *Allotype.* Much darker. Head, pronotum and dorsal surface of abdomen shining blackish brown, the pronotum with lateral margins narrowly Hays russet. Tegmina translucent russet. Ventral surface of abdomen Hays russet, shading to blackish brown laterad and distad. Proximal antennal joints, palpi and limbs tawny.

Specimens Examined: 15; 5 males and 10 females.

Volcán Irazú, Costa Rica, II, 22, 1902, (L. Bruner), 1 ♀, [Hebard Cln.].

Pacayas, (Atlantic drainage), Costa Rica, 1430 meters, III, 1906, (P. Biolley), 1 ♂, [A. N. S. P.].

Azahar de Cartago, Costa Rica, I, 1903, 1 ♂, [Hebard Cln.].

El Tablazo, Costa Rica, 1900 meters, (J. F. Tristan), 2 ♀, [A. N. S. P.].

Monte Redondo, Costa Rica, I, 1903, 1 ♂, [Hebard Cln.].

Santa Maria de Dota, Costa Rica, 1600 meters, I, 1907 and 1909, (J. F. Tristan), 2 ♂, 7 ♀, *type, allotype, paratypes*, [A. N. S. P.].

***Ischnoptera rufa occidentalis* Saussure** (Plate XVI, fig. 7.)

1862. *I[schnoptera] occidentalis* Saussure, Rev. et Mag. Zool., 2e Sér., XIV, p. 170. [New [Orleans, Louisiana].]

1862. *I[schnoptera] consobrina* Saussure, *ibid.*, p. 170. [[Cordoba, Mexico.]]

This geographic race can best be separated from typical *rufa* by differences in the form of the male subgenital plate and by the facial coloration, which in the present race is normally concolorous, pale or dark, while in *rufa rufa* the area from the occiput to below the ocelli is decidedly darker than the remaining portions.

The material before us shows great variation in size, development of tegmina and wings and in coloration. These features, to the extent found in the present series, are in part clearly due to individual variation, but may also to some extent be attributable to differences in elevation with the resultant decided environmental changes.

Characters of ♂.—(Vera Cruz, Mexico.) Similar to typical *rufa* except in the following features. Supra-anal plate with lateral margins very slightly more convergent. Mesal production of subgenital plate more decided, its dextral margin straight and forming nearly a right angle with the dextral portion of the free margin of the plate, rather broadly transverse distad, with dextral angle sharply rounded and rectangulate, sinistrad oblique to sinistral style.²² Largest style slightly dextrad of mesal point of production.

The female sex agrees throughout with that of typical *rufa* except in the cephalic coloration discussed above; similar decided variability in the form of the supra-anal plate is shown. Decided tegminal reduction is sometimes encountered, these organs reach only to the apex of the supra-anal plate in a few specimens (1, Atoyac, Mexico; 1, Costa Rica; 1, San José, Costa Rica), and in one, only to the fifth dorsal abdominal segment (San José, Costa Rica).

²² The Costa Rican males have the disto-dextral angle of the mesal production less sharply rounded, the one from San José also has the angle at the dextral base of the production weakly obtuse. These differences showing the condition nearly intermediate between the present race and typical *rufa*.

Measurements (in millimeters)

♂	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen
Vera Cruz, Mexico	18.8	4.8	5.9	19.7	5.4
Atoyac, Mexico	14.7	3.8	4.7	17	4.9
La Palma, Costa Rica	13.5	3.7	4.6	16.7	4.6
Juan Viñas, Costa Rica	17.7	4.7	5.6	19.1	5.4
San José, Costa Rica	14.1	4	4.8	16.5	4.7
Monte Redondo, Costa Rica . . .	13.4	3.8	4.8	14.8	4.3
Monte Redondo, Costa Rica . . .	18.2	4.2	5.3	20.4	5.8
Pózo Azúl, Costa Rica	18.9	4.8	6	19.4	5.8
♀					
Gulf Coast of Texas	15.2	4.3	5.5	14.8	4.7
Atoyac, Mexico	21.5	4.8	6	17.7	5.5
Orizaba, Mexico	16.5	4	4.8	14.8	4.7
Benque Viejo, British Honduras	21	5.2	6.7	20	5.7
Juan Viñas, Costa Rica	17	4.8	5.8	20.6	5.1
San José, Costa Rica	17.9	5	6.1	12.3	4.8
Pózo Azúl, Costa Rica	19.3	4.9	6	20.4	5.7
Costa Rica	14.6	4.5	5.3	12.2	4.5

The decided size differences in the present race appear to represent responses to local environmental conditions, these found particularly in regions of decided diversity in elevation. The very large and richly colored specimens from Juan Viñas and particularly Pózo Azúl, Costa Rica, represent almost certainly the response to rich upland jungle conditions. Tegminal reduction apparently occurs at higher altitudes (see *rufa debilis*).

That more than one type is found at the same locality, though probably in distinctly different local environment, is shown by the decided differences found in the two males from Monte Redondo, Costa Rica, at which place and at Azahar de Cartago, Costa Rica, both this race and *rufa debilis* have been secured. Very large series from the mountainous sections of the race's distribution will be needed, accompanied by local environmental data, before the causes and exact significance of such diversity can be definitely ascertained.

Coloration.—Normally very close to typical *rufa* though frequently of a slightly darker shade, but with head entirely pale (usual) or entirely dark (often in dark individuals) and very rarely with the area from occiput to just below the ocelli con-

spicuously darker than the remaining portions of the face (as is normal in *rufa rufa*). A few unusually dark specimens before us have the pronotum blackish chestnut, shading to morocco red meso-cephalad (Santa Ana and San José, Costa Rica). Three specimens (Pózo Azul, Costa Rica) are not only very large and robust, but are dark in general coloration with pronotum deep bay, in one of these strongly and in one weakly but broadly margined cephalad and even more broadly laterad with tawny, and with the marginal field of the tegmina in all ochraceous buff. These specimens would at first glance appear widely distinct from *rufa occidentalis*, but careful examination of the series clearly shows that they represent no more than the maximum intensive coloration in the series before us, accompanied by very decided size development. Decided differences in size, tegminal and wing development, with or without such variation in color, is found throughout the present inextensive series.

Specimens Examined: 28; 14 males, 13 females and 1 immature individual. Gulf coast of Texas, (Aaron), 1 ♀,²³ [M. C. Z.].

Vera Cruz, Vera Cruz, Mexico,²⁴ (Rev. T. Heyde), 1 ♂, [Hebard Cln.].

Atoyac, Vera Cruz, Mexico, X, 11, 1887, (L. Bruner), 1 ♀; XII, (L. Bruner), 1 ♂, 1 ♀, [all Hebard Cln.].

Fortin, Vera Cruz, Mexico, XI, 1887, (L. Bruner), 1 ♂, [Hebard Cln.].

Orizaba, Vera Cruz, Mexico, I, 1898, 1 ♀; XI, 1887, (L. Bruner), 1 ♀, [both Hebard Cln.].

Motzorongo, Vera Cruz, Mexico, II, 1892, (L. Bruner), 1 ♀, [Hebard Cln.].

Benque Viejo, British Honduras, VII, 1906, (W. A. Stanton), 1 ♀, [U. S. N. M.].

La Palma, Costa Rica, 1500 meters, V, 1906, (W. R. Maxon), 2 ♂, [U. S. N. M.].

Juan Viñas, Costa Rica, 1 ♂, 1 ♀, 1 juv. ♀, [Hebard Cln.].

Azahar de Cartago, Costa Rica, X, 1902, 1 ♀, [A. N. S. P.].

San José, Costa Rica, IX and XII, 1902, 1 ♂, 2 ♀, [A. N. S. P.].

Santa Ana de Escazú, Costa Rica, XI, 1902, 2 ♂, [A. N. S. P.].

Monte Redondo, Costa Rica, III, 1902, (L. Bruner), 2 ♂, [Hebard Cln.].

Pózo Azul de Pirris, Costa Rica, V to VI, 1902, 1 ♂, [A. N. S. P.]; (M. A. Carriker Jr.), 2 ♀, [Hebard Cln.].

Costa Rica, 2 ♂, 1 ♀,²⁵ [A. N. S. P.].

²³ This specimen and the type described from New Orleans, Louisiana, are the only records of the species from north of Vera Cruz, Mexico. Rather extensive study and field work along the Gulf coast in the United States, leads us to be strongly of the opinion that these two northern records are based on adventive, rather than indigenous, material.

²⁴ One specimen labelled "Mexico", has been recorded by Rehn as the synonymous *I. consobrina*.

²⁵ These specimens were presented to the Academy by Saussure, who labelled them *I. consobrina*.

SYMPLOCE²⁶ new genus

(Plate XVII, figs. 8 and 9; pl. XVIII, fig. 4.)

This genus is closely related to *Ischnoptera*, differing in the weak but evident mesal production of the caudal margin of the pronotum,²⁷ even convexity of the same without discal sulci, longitudinal discoidal sectors of the tegmina,²⁸ strikingly bifurcate discoidal vein of both tegmina and wings, spines of cephalic femora of heavy type throughout and differently specialized distal dorsal abdominal segments in males.²⁹ The majority of the species also have the median segment specialized in the males, a feature not found in *Ischnoptera*.

Six American species are found in the material before us, those previously described being referred without exception in recent literature to the genus *Ischnoptera*.

GENOTYPE.—*Symploce capitata* (*Ischnoptera capitata*) (Saussure).

Generic Description.—Pronotum much as in *Ischnoptera*, except that the disk is smooth and evenly convex without sulci, and the caudal margin is weakly obtuse-angulate produced with broadly rounded apex mesad. Tegmina and wings fully developed.³⁰ Tegmina with discoidal sectors (these including branch of discoidal vein, median and ulnar veins and their branches; the ulnar vein normally showing more branches than the median vein) longitudinal. Wings with area between discoidal vein and costal

²⁶ From *συμπλοκή* = woven together, in allusion to the position of the present genus when compared with *Ischnoptera* and other genera of the *Ischnopterites*.

²⁷ This feature is also shared by numerous African and Asiatic forms, which should properly be assigned to a closely related genus or genera, but all of which are referred at present to *Ischnoptera*. A somewhat *Epilamprine* facies results, which led Saussure to describe one of the exotic forms as *Epilampra blattoides*. This distinctive species has been confused in past literature with species of *Symploce*, similar alone in general appearance, and has been incorrectly synonymized by Kirby under *I. rufescens* (= *I. rufa rufa*), a species well separated in every way.

²⁸ This is naturally not apparent in the female of *S. lita*, owing to the great tegminal reduction there found.

²⁹ The striking and peculiar specialization of the sixth and seventh dorsal abdominal segments, characteristic of the males of all the species of true *Ischnoptera*, is not found in any of the species of the present genus.

³⁰ Except in the female of *S. lita*.

margin moderately narrow, slightly broader than in *Ischnoptera*, the width greatest a little distad of the mesal point. Mediastine vein extending slightly more than half the distance to the apex of the wing, from which vein spring a number of the costal veins, none of these latter enlarged. Discoidal vein dividing mesad, the two portions equally decided and showing only inconspicuous distal furcations; a number of weak, well spaced, nearly perpendicular veinlets connect this vein with the median vein. Ulnar vein weakly curved, with few (1 to 3) incomplete proximal rami and more (4 to 5) distal rami extending to the margin of the wing. Intercalated triangle small. Median segment of males specialized.³¹ When other specialization of the dorsal abdominal segments occurs in males, this is confined to the sixth and eighth segments; no appendages occur as in *Ischnoptera*. Male subgenital plate asymmetrical with variously highly specialized styles. Cephalic femora with ventro-cephalic margins armed with rather heavy elongate spines, which decrease gradually in length meso-distad and are terminated distad by three longer (in increasing ratio) distal spines. Other ventral margins of femora furnished with not numerous heavy elongate spines. Median and caudal femora, in addition, supplied with a single elongate, heavy genicular spine. Small arolia are present.

All of the species of this genus known to us are pale in general coloration—buffy, in some species moderately to strongly tinged with ochraceous. Distinctive characters of coloration are entirely lacking in nearly all of the forms.

With the exception of the anomalous *S. lita*, which is here described from Key West, Florida, and San José del Cabo, Lower California, the species of the genus are confined to the Bahamas, the Greater Antilles and the islands adjacent.

THE LITA GROUP

This Group includes but a single species, known from southern Florida and San José del Cabo, Lower California. The sexes are very dissimilar, the females having the eyes very widely separated, the tegmina decidedly reduced, subquadrate, and the wings vestigial. The males show the normal tegminal and wing development and venation for the genus, but have the median

³¹ Except in *S. lita*.

segment unspecialized and the supra-anal plate not produced, with lateral margins furnished with a row of minute chitinous spines.

Symploce lita³² new species (Plate XVII, fig. 8; pl. XVIII, figs. 1, 2, 3, 4.)

The present species is very distinctive. In the interocular space and form of ocelli the males agree more closely with *S. jamaicana* than with any of the other, all widely separated, species of the present genus.

Type.—♂; ³³Key West, Florida. July 4, 1912. (M. Hebard.) [Hebard Collection, Type no. 423.]

Description of Type.—Very similar in general structure to *jamaicana*, size medium small, slightly larger than in that species; form moderately slender as in *jamaicana*; slightly more slender than in *S. capitata*. Head with eyes larger than in *jamaicana* or *capitata*. Interocular space three-fifths as wide as interocellar space. Ocelli distinct, with surfaces of ocellar areas flat and almost perpendicular to the plane of the interocellar area, their margins there sharply rounded. Maxillary palpi with third and fifth (distal) joints subequal in length, fourth joint slightly shorter. Pronotum of same form as in *capitata* but proportionately deeper. Tegmina and wings fully developed, as given in generic description, structure of same very delicate. Median segment unspecialized. Sixth dorsal abdominal segment with two small, moderately deep, meso-proximal depressions, between which it is triangularly raised with apex proximad, this portion thickly clothed with hairs, caudal margin of segment rather strongly concave; seventh segment concealed except narrowly laterad; eighth segment with narrow distal portion exposed, distal margin strongly concave. Supra-anal plate transverse, not extending to distal extremity of subgenital plate, lateral margins strongly convergent and rounding into the broadly transverse mesal portion, lateral margins furnished with a well spaced row of minute chitinous spines. Cerci slender with lateral margins crenate, with eleven and twelve distinct joints, dorsal surface flattened, ventral surface convex. Subgenital plate weakly produced, asymmetrical; dextral free margin produced oblique, nearly straight but strongly upcurved to just beyond mesal point, there supplied with a minute stout projection (style) with apex flat and margin slightly produced sinistrad, at the dextral base of which is a sharp, chitinous, curved spine of equal length, sinistrad of this point the margin is sharply and briefly concave, from which springs a projection (style) which is over twice as long but more slender than the dextral style, and curved dextrad with apex tapering and armed meso-distad with two minute, chitinous spines; beyond this the sinistral portion of the free margin is straight, transverse. Limbs and armament of same as given in generic description.

³² From $\lambda\iota\tau\eta$ = unadorned.

³³ We have described this specimen as type, since those of the Lower California series are all dried alcoholic and complete data for them is not available.

Allotype.—♀;³⁴ San José del Cabo, Lower California, Mexico. [Hebard Cln.]

Description of Allotype.—Similar to type in ambisexual characters, differing very decidedly in the following features. Head with eyes decidedly reduced; interocular space very broad, slightly broader than space between antennal sockets. Ocelli but weakly defined, with area in which they are located not as deep as in male and rounding more evenly into interocellar area. Pronotum with caudal margin very weakly angulato-produced.³⁵ Tegmina greatly reduced, sub-rectangulate, transversely truncate at apex of anal field with a weak concavity in discoidal field, distal angle on costal margin broadly rounded, distal angle on sutural margin rectangulate and sharply rounded, sutural margins straight and overlapping. Wings shorter than tegmina, greatly atrophied, but with anterior and posterior fields still defined. Supra-anal plate triangularly produced; lateral margins nearly straight, very weakly and broadly concave; apex blunt but evenly rounded. Subgenital plate convex, very weakly produced, with free margin weakly convex except at base of cerci, where a very weak, broad concavity is apparent.

The remaining males and females from Lower California show scarcely any variation in structure from those described.

Measurements (in millimeters)

	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen
♂					
Key West, Florida, <i>type</i>	14	3.6	4.6	12.8	3.6
San José del Cabo, Lower California	11.5	3.2	3.7 ³⁶	11.1	3.1
San José del Cabo, Lower California	12.7	3.7	4.2	12.7	3.7
♀					
San José del Cabo, Lower California, <i>allotype</i>	12.3	3.7	4.6	4.1	3.1
San José del Cabo, Lower California	11.4	3.7	4.3	4.8	3
San José del Cabo, Lower California	11	3.4	4.1	3.9	3.1

³⁴ The Lower Californian series is certainly conspecific with the Floridian example; no other species of the group is known from these extremely different and widely separated regions. It is possible that the alcoholic series has been incorrectly labelled.

³⁵ This condition apparently accompanies the tegminal reduction found in this sex of the present species. See footnote 19.

³⁶ Shrivelling, due to drying after immersion in alcohol, has caused some reduction in this dimension in a number of Lower Californian specimens.

Coloration.—Type. Translucent ochraceous tawny, eyes dark mummy brown, median portion of face ochraceous tawny. Limbs and abdomen ochraceous buff, the latter shading to tawny distad. Cerci ochraceous tawny. The males from Lower California are paler than the type, probably due to alcoholic bleaching. This must be considered likewise in the females from that locality, which are chestnut to hair brown on head and abdomen, the pronotum and tegmina slightly paler, kaiser brown to hazel. The tegmina are translucent and in two specimens very slightly paler than the pronotum.

Specimens Examined: 6; 3 males and 3 females.

Key West, Florida, VII, 4, 1915, (Hebard; in cupboard of hotel with swarms of *Blattella germanica* and a few *Supella supellectilium*), 1 ♂,³⁷ type, [Hebard Cln.].

San José del Cabo, Lower California, Mexico, 2 ♂, 3 ♀, (dried alcoholic), [Hebard Cln.].

THE CAPITATA GROUP

This group includes species known only from the Bahamas and the Greater Antilles, all of which show rather general affinity except *S. bicolor*, the male genitalia of which are extraordinarily specialized. Both sexes have fully developed tegmina and wings, while the males have the median and distal dorsal abdominal segments specialized and the supra-anal plate produced.³⁸

Symploce jamaicana (Rehn) (Plate XVIII, figs. 5, 6 and 7.)

1903. *Ischnoptera jamaicana* Rehn, Trans. Am. Ent. Soc., xxix, p. 264. [♂, Jamaica; ♀, [Port Antonio,] Portland [Parish], Jamaica.]

Of the species of the Capitata Group, the Bahaman *S. morsei* shows the nearest resemblance to the present species, the specialization of the dorsal surface of the male abdomen being in several respects more similar than in any of the other closely related species. The interocular space is appreciably less in *jamaicana* than in the other species of the present group, in this respect and in the ocelli, males agreeing more closely with that sex of *S. lita*.

Single type here selected.—♂; Jamaica. [Acad. Nat. Sci. Phila., Type no. 5153.]

³⁷ Recorded by Rehn and Hebard as *Ischnoptera rufescens* (Beauv.), (1914). At that time the nomenclatorial confusion of *rufa*, *rufescens*, *capitata* and *blattoides* was at its height.

³⁸ The character of this production in *S. bicolor* is, however, very different from the type found in the other species.

Characters of ♂.—Size somewhat variable but averaging smaller than in *S. capitata*, form a little more slender. Head with eyes no larger than in *capitata*; interocular space distinctly narrower than interocellar space, slightly more than three-fifths as wide. Ocelli much as in *lita* but slightly smaller.³⁹ Maxillary palpi with third joint rather elongate, fourth slightly shorter, fifth (distal) joint slightly shorter than fourth. Tegmina and wings as given in generic description, fully developed. Dorsal surface of abdomen with median segment distinctly specialized as in *S. morsei*, sixth and eighth segments greatly specialized as in that species, supra-anal plate of similar character but somewhat more produced mesad with margin evenly convex, this portion not as strongly defined, as the emarginate angulation of the margins at the bases of the cerci are weaker. Cerci slender, with twelve distinct joints. Subgenital plate asymmetrical: dextral free margin weakly oblique produced and weakly convex to mesal point, there the plate is suddenly produced in a small delicate scute, slightly broader than long with surface concave, this scute terminating disto-dextrad in a small chitinous thorn directed sinistrad, and terminated disto-sinistrad in a longer process with aciculate chitinous apex directed dorsad, sinistral free margin weakly oblique produced nearly straight to base of mesal scute. Limbs and armament of same as given in generic description.

Allotype by elimination.—♀; [Port Antonio,] Portland [Parish], Jamaica. [Acad. Nat. Sci. Phila.]

Characters of ♀.—Similar to type in ambisexual characters, differing in the following features. In form not distinctly broader than male. Interocular width nearly equal to that between ocelli. Dorsal surface of abdomen unspecialized. Supra-anal plate twice as broad as long, triangularly produced with immediate apex angulato-emarginate. Subgenital plate convex, brief, with free margin briefly but decidedly convex proximad, then distinctly concave at base of cerci, thence weakly convex to mesal point, which is shallowly angulato-emarginate.

Measurements (in millimeters)

	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen
♂					
Jamaica, <i>type</i>	10.7	2.8	3.8	11.3	3.7
Montego Bay, Jamaica (3)	10.7–11	3.1–3.2	4–4.2	11.4–12.4	3.6–4.1
Palm Beach, Jamaica	11.5	3.3	4.3	13	3.9
♀					
Port Antonio, Jamaica, <i>allotype</i>	10 ⁴⁰	3	3.8	11.3	3.8
Little Cayman Island	11.4	3.3	4.2	11.9	3.7

³⁹ The pale ocellar color is frequently obliterated in specimens when drying and in consequence the ocellar spots appear obsolete in such examples.

⁴⁰ Abdomen drawn up.

Coloration.—Head, underparts and limbs warm buff to light ochraceous buff. Eyes sepia. A dot of this color is found at the base of each coxa and laterad on the second to sixth ventral abdominal segments. Pronotum warm buff, very weakly washed with tawny on the disk. Tegmina transparent warm buff. Dorsal surface of abdomen narrowly but conspicuously bordered laterad with warm buff, mesal portion disto-laterad blackish chestnut brown, shading to cinnamon brown and dresden brown mesad and proximad; supra-anal plate of male warm buff with proximo-mesal portion blackish chestnut brown, of female warm buff.

Immature examples are very differently colored. Abdomen beneath blackish brown, limbs ochraceous tawny, the head often darker. Pronotum deep chestnut brown, paler caudad, with lateral margins rather broadly, and cephalic margin more narrowly, ochraceous buff. Mesonotum and metanotum likewise rather broadly bordered laterad and mesal portions similarly marked. Dorsal abdominal segments with lateral margins narrowly and inconspicuously pale, mesal portions blackish chestnut brown with each segment narrowly margined distad with russet.

Specimens Examined: 13; 5 males, 2 females, 6 immature examples.

Jamaica, (C. W. Johnson), 1 ♂, *type*, [A. N. S. P.].

Port Antonio, Portland Parish, Jamaica, (C. W. Johnson), 1 ♀, *allotype*, [A. N. S. P.].

Gregory Park, St. Andrew Parish, Jamaica, X, 25, 1912, (Hebard; dead leaves under acacia and other shrubs in desert tract), 2 juv. ♀, 1 small juv. ♀, [Hebard Cln.].

Montego Bay, St. James Parish, Jamaica, III, 17, 1911, (J. A. Grossbeck; under log), 1 ♂, [A. M. N. H.]; X, 28, 1912, (Hebard; under rubbish on limestone sand near beach in open), 3 ♂, 2 juv. ♂, 1 juv. ♀, [Hebard Cln.].

Little Cayman Island, IV, 1888, 1 ♀, [M. C. Z.].

Symploce capitata (Saussure) (Plate XVII, fig. 9; pl. XVIII, figs. 8, 9, 10.)

1862. *Bl[atta] capitata* Saussure, Rev. et Mag. Zool., 2e Sér., xiv, p. 167. [♂, Cuba.]

The original description is poor, but the species was much more fully and satisfactorily described by Saussure in 1864.⁴¹

This distinctive species was unfortunately synonymized under *blattoides* Saussure, by that author, in 1870.⁴² That species bears

⁴¹ Mém. Mex., Blatt., p. 114, pl. I, fig. 19.

⁴² Miss. Sci. Mex., Rech. Zool., Orth., p. 54.

to the present one a superficial resemblance, but belongs to an Old World division of the Ischnopterites.

The present species, which is abundant over the island of Cuba, has since 1870 been frequently recorded as *blattoides* and since 1904 as *rufescens*, both of those species being generally referred to the genus *Ischnoptera*. The change in 1904 was due to Kirby's incorrect placing in that year of *capitata* and *blattoides* under *rufescens*.

Nearest relationship is found to *S. morsei* and *S. flagellata*, both of which species, however, show distinctive and decidedly more specialized primary and secondary sexual features in the male. The present insect is normally more reddish in general coloration and the female is normally distinctly more robust than the male, representing the most robust condition found in the present genus.

Very decided size, tegminal and wing variation occurs in *capitata*; such variation, it is probable, will be found in other species of the genus when more extensive series are available.

Characters of ♂.—(Havana, Cuba.) Size (in series) extremely variable, medium small to large compared with the allied species, averaging medium large. Form moderately robust. Head with eyes large, not as large as in *S. lita*, and well separated. Interocular space slightly narrower than interocellar space. Ocelli small, with surfaces of ocellar areas slanting more weakly to, and rounding more evenly into, the interocellar area than in *lita*. Pronotum moderately transverse, surface weakly convex and moderately declivent laterad, with lateral margins cingulate; cephalic margin transverse, rounding broadly at an obtuse angle into convex lateral margins, which are divergent caudad and round broadly into the caudal margin, which is very weakly produced, forming mesad a weak but distinct rounded angle. Tegmina and wings as given in generic description; when reduction occurs this is found to affect only the distal portions; structure of tegmina (normally) slightly more corneous than in the allied species. Median segment bisulcate proximo-mesad, in and about this area clothed with numerous long hairs, and immediately caudad furnished with a large flat tuft of agglutinated hairs directed cephalad. Succeeding dorsal abdominal segments to sixth with latero-caudal angles each briefly acute-angulate produced caudad, and with a small oval convexity laterad; sixth segment little specialized, moderately depressed, with a weak medio-longitudinal carina; seventh segment concealed; eighth segment mesad with free margin bearing a fringe of short hairs, with free margin alone showing except latero-caudad, where the segment is produced in subtriangular, very deeply concave projections.⁴³ Supra-anal plate slightly but not strikingly raised proximo-mesad; free margin

⁴³ It is these projections which Saussure has described, mistaking them for part of the penultimate ventral abdominal segment. Mém. Mex., Blatt., p. 114.

concave at base of cerci, thence moderately convergent and very weakly convex, rounding into the broad transverse distal portion which is roundly angulato-emarginate mesad, thus the mesal produced portion of the plate is weakly bilobate and is over twice as broad as long. Subgenital plate convex, distad on both sides more flattened and sloping upward to free margin; free margin dextrad nearly straight produced, weakly convex to mesal point, sinistrad similar but slightly more convex; at mesal point the plate just within the margin is produced in a very small scute curving outward with apex acute and directed sinistrad, at the sinistral base of this projection is situated a chitinous spine which extends as far as the apex of the projection. Limbs and armament of same as given in generic description.⁴⁴

Characters of ♀.—(Cabañas, Havana, Cuba.) Similar to male in ambisexual characters, differing in the following features. Form normally decidedly broader. Interocular width appreciably greater than (normal), to slightly less than (rare), that between the less distinct ocelli. Dorsal surface of abdomen not specialized. Supra-anal plate about twice as broad as long, triangularly produced with immediate apex angulate emarginate, free margin laterad weakly concave to nearly straight. Subgenital plate convex, brief, with free margin much as in *S. jamaicana* but less sinuous, the mesal point being often merely broadly and shallowly concave.

Measurements (in millimeters)

♂	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen
Cabañas, Pinar del Rio, Cuba..	12.5	3.6	4.8	15.2	4.7
Havana, Cuba.....	10.2	2.9	3.9	11.2	3.6
Havana, Cuba.....	12	3.6	4.8	13.4	4.2
Isle of Pines.....	12.3	3.7	4.7	14.4	4.4
♀					
Cabañas, Pinar del Rio, Cuba..	13.2	3.9	4.9	12.9	4.3
Cabañas, Pinar del Rio, Cuba..	14.8	4.1	4.9	14.2	4.7
Cayamas, Cuba.....	11.2	3.4	4.4	7.9	3.3
Cayamas, Cuba.....	12.7	3.8	4.7	10.5	4
Havana, Cuba.....	10.2	3	3.8	9.7	3.1
Havana, Cuba.....	13.5	3.9	5.2	12.1	4.3

⁴⁴ Though the concealed male genitalia may afford additional specific characters, we have not sufficient material to examine these in the different species. In *capitata* they are as follows: from within two elongate processes project, just dextrad of the production on the subgenital plate; a stout, straight, chitinous process with surface shagreenous and with apex blunt, above which projects to an equal distance a slender, straight, chitinous process with apex aciculate. Within at base of dextral cercus is a chitinous process shaped like a pair of tarsal claws and directed mesad, the dorsal claw longer than the ventral. At base of sinistral cercus is a chitinous plate produced in a stout, chitinous, curved finger directed mesad.

The very decided variation, in size and in length of tegmina and wings, has evidently no geographic correlation. Though the series is not sufficiently large to determine the full range of variation, there appears to be sufficient material to show that the normal size is approximately that of the nearly largest examples measured above; that the males normally have the tegmina and wings extending beyond the apices of the cerci, while the females are normally stouter with tegmina and wings extending just beyond the apex of the abdomen. A single female has the tegmina and wings decidedly reduced, falling short of the base of the supra-anal plate, while two of this sex have these organs as fully developed as in any of the males.

Coloration.—Head warm buff to cinnamon buff, often suffused with ochraceous orange, eyes sepia. Pronotum ochraceous tawny to buff (rare), usually slightly paler laterad. Tegmina translucent, tawny to ochraceous buff (rare). Wings hyaline with a faint brownish tinge, veins brownish, the mesal area of the costal veins at the margin buffy. Dorsal surface of abdomen: (♂) suffused with brownish, with lateral margins narrowly buffy; (♀) suffused with blackish brown particularly distad, the buffy margins in consequence much more conspicuous, these continued on and often extending over the entire supra-anal plate. General color of ventral surface and limbs warm buff to cinnamon buff, rarely suffused with ochraceous salmon, and with prouts brown laterad on the abdomen; lateral dots of sepia are present at base of each coxa and laterad on the second to sixth ventral abdominal segments.

Specimens Examined: 20, 7 males and 13 females.

Vinales, Pinar del Rio, Cuba, IX, 16 to 22, 1913, (F. E. Lutz), 1 ♀, (large, caudate tegmina), [A. M. N. H.].

Cabañas, Pinar del Rio, Cuba, V, 21, (Palmer and Riley), 1 ♂, 2 ♀, (♂, 1 ♀, large, caudate tegmina), [U. S. N. M.].

Havana, Cuba, I, 26, 1904, (Hebard; cemeterio), 1 ♂, 1 ♀,⁴⁵ (depauperate), [Hebard Cln.]; (C. F. Baker), 4 ♂, 1 ♀, (normal), [Univ. of Kansas Cln.].

Cabañas, Havana, Cuba, I, 23, 1904, (Hebard), 2 ♀,⁴⁶ (normal), [Hebard Cln.].

San Antonio, Havana, Cuba, IV, 9, 1905, (G. Dimmock), 2 ♀, (normal), [U. S. N. M.].

Cienfuegos, Santa Clara, Cuba, II, 13, 1902, 1 ♀, (large), [Hebard Cln.].

⁴⁵ Recorded by Rehn as *Ischnoptera rufescens* (Beauv.).

⁴⁶ Recorded by Rehn as *Ischnoptera rufescens* (Beauv.).

Cayamas, Oriente, Cuba, II, 2 and 11, (E. A. Schwarz), 2 ♀, (1 small, abbreviate tegmina), [U. S. N. M.].

San Carlos Estate, Guantanamo, Cuba, X, 4 to 8, 1913, (F. E. Lutz), 1 ♀, (large), [A. M. N. H.].

Isle of Pines, 1 ♂, [M. C. Z.].

Symploce morsei⁴⁷ new species (Plate XVIII, figs. 11, 12, 13.)

This insect represents the Bahaman development of the present group, showing nearest relationship to *S. capitata* in the male subgenital plate, which, however, is distinctly more highly specialized. In general appearance, *S. jamaicana*, *morsei*, *flagellata* and occasionally rather slender and less reddish examples of *capitata*, are very similar.

Type.—♂; Nassau, New Providence Island, Bahamas. February 3, 1904 (M. Hebard.) [Hebard Collection, Type no. 124.]

Description of Type.—Size small, nearly as small as depauperate examples of *capitata*; form moderately slender for the group, much as in *jamaicana*. Head with eyes of normal size, as in *capitata*. Interocular space slightly narrower than that between ocelli. Ocelli small, with surfaces of ocellar areas rounding evenly into interocellar area, as in *capitata*. Pronotum as in that species. Tegmina and wings as given in generic description, structure of same delicate. Median segment decidedly specialized, exactly as in *capitata*. Sixth segment with latero-caudal angles acute-angulate produced so that the distal margin is deeply concave, entire surface deeply concave, but with a high medio-longitudinal carina and a bulbous swelling laterad on each side; seventh segment concealed; eighth segment with brief distal portion showing, distal margin deeply concave and latero-caudal angles produced to base of cerci, this segment slightly raised for a brief space mesad, where it is clothed with a heavy fringe of long hairs. Supra-anal plate with surface ascending to a distinct, rounded, proximal, transverse ridge opposite the elevation of the eighth segment, in this region supplied laterad with rather numerous short hairs; free margins straight and weakly oblique produced, then suddenly produced in meso-distal half with margins briefly straight divergent, then convex convergent to a point forming a weak mesal emargination, this produced portion more than twice as wide as long. Subgenital plate showing an evident decidedly greater specialization of the type found in *capitata*; dextral free margin moderately oblique from base of cercus to mesal point, there the plate is produced in a delicate rounded scute with ventral surface decidedly concave, this occupying half of the remaining free margin of the subgenital plate, at its dextral base

⁴⁷ We take great pleasure in dedicating this interesting species to Dr. Albert P. Morse, whose Orthopterological work stands on a plane of exceptional excellence and accuracy, and to whom we are indebted for one of the few contributions on Bahaman Orthoptera.

is situated a gently curved, chitinous, flagellate process, which is slightly longer than the mesal production, the sinistral portion of the free margin is weakly oblique and straight to this flagellate process. Limbs and armament of same as given in generic description.

Allotype.—♀; same data as type. [Hebard Cln.]

Description of Allotype.—Similar to male in ambisexual characters, differing in the following features. Size larger, form a little broader. Interocular width very slightly less than that between the less distinct ocelli. Dorsal surface of abdomen not specialized. Supra-anal plate much as in *capitata*. Subgenital plate much as in that species, but with emargination at bases of cerci more decided and with scarcely any mesal emargination indicated.⁴⁸

Measurements (in millimeters)

	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen
♂					
Nassau, Bahamas, <i>type</i>	11.7	3	3.8	11.4	3.6
Andros Island, Bahamas	12.6	3.4	4.2	13.2	3.9
Eleuthera Island, Bahamas	12	3.1	4	11.7	3.7
♀					
Nassau, Bahamas, <i>allotype</i>	11.8	3.3	4.3	12.7	3.9
Nassau, Bahamas	13.1	3.6	4.4	14	4.2
Eleuthera Island, Bahamas	11.3	3.7	4.7	12	4

The series is not sufficiently large to determine the degree of variability which occurs.

Coloration.—Head, underparts and limbs light buff to ochraceous buff; head with interocular area often more suffused with tawny; dots on coxae and ventral abdominal segments as in *capitata*, but normally very minute. Pronotum antimony yellow to ochraceous tawny, very slightly paler laterad. Tegmina translucent, warm buff to weak ochraceous tawny. Dorsal surface of abdomen much as in *capitata*, darker markings usually not strongly defined.

A single immature example before us has the head ochraceous tawny, limbs buckthorn brown, ventral surface of abdomen blackish chestnut. Pronotum, mesonotum and metanotum mars brown becoming darker laterad, there narrowly bordered with ochraceous buff. Dorsal surface of abdomen blackish chestnut, very narrowly bordered laterad with ochraceous buff.

⁴⁸ Were two of the species of the *Capitata* Group present in the same locality, it would be a difficult task to separate the females, except in *capitata* and *bicolor*. In the former a different, though slight, general facies from the others is usual, in the latter this is more decided and constant.

Specimens Examined: 11; 5 males, 5 females and 1 immature individual.

Bahamas, II, 11, 1905, (E. Wright; flew to trap), 1 ♀, [Morse Cln.].

Nassau, New Providence Island, Bahamas, II, 3, 1904, (Hebard; Fort Charlotte), 1 ♂, 2 ♀, ⁴⁹ *type, allotype, paratype*, 1 juv. ♀, [Hebard Cln.].

Mangrove Cay, Andros Island, Bahamas, 1904, (O. Bryant), 1 ♂, ⁵⁰ [Morse Cln.].

Eleuthera Island, Bahamas, IV, 11 to 20, 1907, (C. J. Maynard), 3 ♂, 2 ♀, [M. C. Z.].

Symploce flagellata new species (Plate XVIII, figs. 14, 15, 16 and 17.)

Nearest in relationship to *S. capitata*, strikingly differing from that species in the remarkable development of the male sinistral specialized style. The present species does not show the ferruginous tone of general coloration so frequent in *capitata*, nor are the females as distinctly more robust than the males.

Type.—♂; Desecheo Island, Porto Rico, West Indies. February 18, 1914. (F. E. Lutz.) [Am. Mus. Nat. Hist.]

Description of Type.—Size medium small and form moderately slender for the group, much as in *S. jamaicana* and *S. morsei*. Head with eyes of normal size, as in *capitata*. Interocular space slightly narrower than interocellar space. Ocelli, tegmina, wings and limbs as in *capitata*. Median segment decidedly specialized as in *jamaicana*, *capitata* and *morsei*. Sixth dorsal abdominal segment with latero-caudal angles acute-angulate produced, so that the distal margin is deeply concave, entire surface deeply concave, but with a high medio-longitudinal carina and a bulbous swelling proximo-laterad on each side, this segment as in *jamaicana* and *morsei*; seventh segment concealed; eighth segment with free margin mesad bearing a fringe of short hairs, with free margin alone showing except at the latero-caudal angles, which are produced in subtriangular very deeply concave projections, this segment as in *capitata*. Supra-anal plate with surface ascending to a moderately distinct, rounded, proximal, transverse ridge opposite the hairs on the eighth segment, in this region supplied laterad with rather numerous short hairs; this plate almost exactly intermediate in contour and form between that of *capitata* and of *morsei*. Subgenital plate moderately convex, free margin convex but in places somewhat flattened, at mesal point the plate just within the margin is produced in a very small scute curving outward with apex rounded, at its dextral base is situated a minute knob (dextral style), at the sinistral base a tremendously elongate, chitinous, flagellate production over half as long as the width of the subgenital plate, curving gently dextrad, with distal portion curved dorsad and projecting slightly beyond the distal margin of the supra-anal plate (sinistral style).

⁴⁹ Recorded by Rehn as *Ischnoptera blattoides*.

⁵⁰ Recorded by Morse as *Ischnoptera blattoides*.

Allotype.—♀; same data as type. [Am. Mus. Nat. Hist.]

Description of Allotype.—Similar to male in ambisexual characters, differing in the following features. Size very slightly larger, form appreciably broader. Interocular width very slightly less than that between the less distinct ocelli. Dorsal surface of abdomen unspecialized. Supra-anal plate much as in *capitata*. Subgenital plate much as in that species, but with emargination at bases of cerci more decided and without a mesal emargination.⁵¹

Measurements (in millimeters)

	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen
♂					
Desecheo Island, <i>type</i>	10.9	3.4	4.3	11.2	3.8
Mona Island	12.5	3.6	4.6	11.7	3.8
Mona Island	12.3	3.6	4.6	12.3	3.8
♀					
Saona, Haiti	10.5	3.6	4.7	11.8	3.8
Desecheo Island, <i>allotype</i>	12	3.8	4.8	12.2	4
Desecheo Island	11.6	3.7	4.5	11.9	3.9
Aguas Claras, Porto Rico	12	3.4	4.6	12.6	3.9
St. John, Danish West Indies	12.2	3.7	4.7	12.2	4.1

Coloration.—Head light buff to ochraceous buff, rarely washed with ochraceous tawny between the eyes. Limbs and underparts of same general coloration, the ventral surface of the abdomen occasionally ochraceous tawny, the segments and coxae with lateral dots of sepia as in *capitata*, these sometimes represented by large spots on the abdominal segments, while one female has a dark brown spot mesad on the subgenital plate. Pronotum ochraceous buff to ochraceous tawny, usually distinctly paler and buffy laterad. Tegmina translucent, pale buckthorn brown. Dorsal surface of abdomen suffused to varying degrees with dark brown, narrowly margined laterad with buffy, supra-anal plate blackish brown proximad with produced mesal portion buffy.

Specimens Examined: 17; 3 males, 6 females⁵² and 8 immature individuals. Saona, Hayti, VII and VIII, (N. L. Orme Jr.), 1 ♀, [A. M. N. H.].

⁵¹ One paratype shows a very slight emargination at this point; the female subgenital plate can hardly be said to afford differential features between this and the closely allied species of this group.

⁵² As we have no males from Hayti, Porto Rico proper and the Danish West Indies, there is a possibility that other species are included. These specimens agree so closely with unquestioned females of *flagellata*, however, that we believe additional material will substantiate their proper assignment here.

Desecheo Island, Porto Rico, II, 18 and 19, 1914, (F. E. Lutz; dead leaves in sea-grape thicket and under low trees on hillside at 100 feet elevation), 1 ♂, 2 ♀, *type*, *allotype* and *paratype*, 4 juv. ♂, 3 small juv. ♂, 1 small juv. ♀, [A. M. N. H.].

Mona Island, Porto Rico, II, 22 and 24, 1914, (F. E. Lutz), 2 ♀, *paratypes*, [A. M. N. H.].

Aguas Claras, Porto Rico, I, 19, 1914, 2 ♀, [U. S. N. M.].

St. John, Danish West Indies, 1 ♀, [M. C. Z.].

Symploce bicolor (Beauvois) (Plate XVIII, figs. 18, 19, 20 and 21.)

1805. *Blatta bicolor* Beauvois, Ins. Rec. Afr. Amér., p. 183, pl. Ib., fig. 6. [San Domingo.]

Beauvois' figure is very rough and the line intended to show the natural size of the specimen was omitted; his description is also decidedly unsatisfactory. With a considerable series of roaches before us from San Domingo, however, we find that the material, here assigned to the species, alone agrees in every way.

The present insect and *S. lita* are much the most distinctive of the genus; this is particularly shown here by the remarkable and very unusual specialization of the male supra-anal plate.

Characters of ♂.—(San Francisco Mountains, San Domingo.) Size rather small and form moderately slender for this genus of moderately robust species. Head with eyes not as large as in *lita*. Interocular space slightly narrower than that between the ocelli, agreeing in this respect and in the ocelli with *S. capitata*.⁵³ Pronotum very slightly more transverse than in that species. Median segment specialized as in *capitata*, and with succeeding dorsal abdominal segments to sixth as in that species; sixth segment as in *S. flagellata* but without any median elevation; seventh segment concealed; eighth segment with entire distal margin fringed with hairs, otherwise as in *flagellata*. Supra-anal plate with distal portion produced mesad in a very slender, elongate, tapering structure, which is considerably longer than the remaining proximal portion of the plate and reaches to the distal margin of the subgenital plate, this structure is blunt at the apex, its lateral margins are briefly upcurled, between which it is subchitinous; the remaining lateral portions of the free margin proximad are weakly convex and almost transverse; surface of proximal portion of plate with a medio-longitudinal ridge and a similar transverse ridge proximad, between these it is weakly concave. Subgenital plate with surface more strongly convex than in the other species of the Capitata Group, free margin convex except just sinistrad of mesal point, where a brief but distinct concavity occurs, above this from the inner edge of the margin springs a recurved rounded scute, with a minute knob (dextral style) at its dextral base, and an elongate chitinous

⁵³ Usually with a distinctive interocular marking.

flagellate production, which is directed sinistrad at base but curves strongly dextrad and then caudad and extends beyond apex of production of supra-anal plate (sinistral style).

Characters of ♀.—(Azua, San Domingo.) Size and form, interocular width and ocelli as in male. Supra-anal plate triangularly produced with apex blunt, about as long as wide. Subgenital plate similar to that of the female of *capitata*. Inconspicuous but distinctive features of coloration present.

Measurements (in millimeters)

	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen
♂					
San Francisco Mountains, San Domingo (5)	11.2–12.7	3–3.1	3.7–4	11.7–12.6	3.7–3
♀					
Azua, San Domingo	9.9	3	3.8	11.6	3.7

Coloration.—Head, limbs and ventral surface of abdomen cinnamon buff, sometimes shading on the male subgenital plate to ochraceous tawny. Head with a cinnamon brown suffusion at the interocellar area, rarely with merely a weak cinnamon suffusion there. Lateral dots of sepia at base of each coxa and laterad on the second to sixth ventral abdominal segments, these expanding into blackish brown areas in female. Pronotum with disk cinnamon brown to ochraceous buff, washed with ochraceous orange, lateral margins paler and areas above bases of wings distinctly transparent.⁵⁴ Dorsal surface of abdomen dark prouts brown, shading to cinnamon brown proximad, in female dark brown margined with buffy.

Specimens Examined: 6; 5 males and 1 female.

San Francisco Mountains, San Domingo, IX, 1905, (A. Busck), 5 ♂, [U. S. N. M.].

Azua, San Domingo, III, 17, 1913, (P. G. Russell), 1 ♀, [U. S. N. M.].

XESTOBLATTA⁵⁵ new genus

(Plate XIX, figs. 1, 2 and 5.)

This genus shows affinity to *Symploce*, agreeing in the weak but evident mesal production of the caudal margin of the pronotum, even convexity of the same without discal sulci, longi-

⁵⁴ This is noticeable, but to a lesser degree, in the other species of the *Capitata* Group.

⁵⁵ From *ξεστός* and *βλαττα* = polished roach.

tudinal discoidal sectors of tegmina and spines of cephalic femora of heavy type throughout. The discoidal vein of the wings, however, not only forks at slightly more than half the distance to the apex, but beyond this point shows other distinct furcations. The features of the male dorsal abdominal segments are of a different general character, as are those of the supra-anal and subgenital plates. The species are large and very broad for the *Ischnopterites*, the tegmina have a strongly chitinous appearance and the limbs are stout and, for the group, supplied with heavy spines. These features give the species a distinctly *Epilamprine* facies, a feature which, in part, led Griffini to refer his *festae* to *Epilampra*.

Three tropical American species are before us. From careful study of the literature it is clear that five species are members of the present genus, four being referred in recent literature to the genus *Ischnoptera* and one here described as new.

The species of which we have no material are:—

Xestoblatta hamata (Giglio-Tos)

1898. *I[schnoptera] hamata* Giglio-Tos, Boll. Mus. Zool. Anat. comp. Univ. Torino, xiii, No. 311, p. 4. [2 ♀, Santiago, Ecuador; 1 ♂, Gualaquiza, Ecuador.]

Xestoblatta sancta (Giglio-Tos)

1898. *I[schnoptera] sancta* Giglio-Tos, Ibid., p. 5. [5 ♀, San José, Ecuador.]

In sequence *hamata* would appear to follow *festae*. Until the male sex is known, the nearest relationship of *sancta* can not be accurately determined.

The characters defining the present genus are given in part by Giglio-Tos, in section I of his key before the descriptions of the species listed above, the species there associated being all referable to *Xestoblatta*.

Saussure and Zehntner's treatment in the *Biologia*,⁵⁶ of Saussure's previously described *Ischnoptera ignobilis*, though brief and unsatisfactory, leaves little doubt but that material of a different species is included. The position of *ignobilis* is apparently near *Ischnoptera vilis* Saussure, but the *Biologia* material from Guatemala apparently represents a species of

⁵⁶ Biol. Cent.-Amer., Orth., I, p. 37, (1894).

Xestoblatta, near or the same as the species later described by Griffini as *festae*.

No other species in the literature can be referred without question to the present genus.⁵⁷

GENOTYPE.—*Xestoblatta carrikeri* new species.

Generic Description.—Structure robust. Head broad for the group. Pronotum proportionately broader than in *Ischnoptera* or *Symploce*, with disk smooth and evenly convex without sulci, latero-caudal angles situated at caudal margin, which is weakly obtuse-angulate produced with broadly rounded apex mesad. Tegmina and wings fully developed.⁵⁸ Tegmina with discoidal sectors (these including the branch of discoidal, median and ulnar veins and their branches; the ulnar vein not showing as many branches as the median vein) longitudinal. Wings with area between discoidal vein and anterior margin broad, decidedly broader than in *Ischnoptera* or *Symploce*, the width greatest a little distad of the mesal point, this area heavily suffused but with costal veins not enlarged. Mediastine vein extending slightly more than half the distance to the apex of the wing, from which vein spring a number of the costal veins. Discoidal vein conspicuously forked mesad, with succeeding irregular but decided furcations.⁵⁹ Numerous weak perpendicular veinlets connect the discoidal and median veins. Ulnar vein distinctly curved, with few (0–3 to 5) incomplete proximal rami and generally more (1–2 to 5) distal rami extending to the margin of the wing.⁶⁰ Intercalated triangle large and distinct, larger than in any other genus of the Ischnopterites. Median segment of males not, or but little, specialized. Dorsal surface of male abdomen with disto-lateral angles of sixth segment moderately or greatly produced, or with median area specialized. Male supra-anal plate little produced with brief meso-distal portion subchitinous to different degrees. Male subgenital plate

⁵⁷ Saussure's *Ischnoptera peruana*, described in 1862, may possibly be a member of this or a closely allied genus. The description does not give sufficient characters to place the species, though it is clearly not a member of *Ischnoptera*.

⁵⁸ These are much more elongate in the male than in the female of *carrikeri* and *festae*, but of subequal length in *nyctiboroides* and *hamata*.

⁵⁹ In specimens with more elongate wings, the number of forks of the discoidal vein is greater.

⁶⁰ The considerable differences here apparently due to the differences in wing length.

armed with variously elongate, inflexed, mobile, chitinous styles.⁶¹ Limb armament as in *Symploce* but with spines heavier. Cephalic femora with ventro-cephalic margins armed with heavy elongate spines, which decrease gradually in length meso-distad and are terminated by three longer (in increasing ratio) distal spines. Other ventral margins of femora supplied with moderately numerous heavy, elongate spines. Median and caudal femora, in addition, supplied with a single heavy, elongate, genicular spine. Small arolia are present.

All of the species of this genus known to us are moderately dark in coloration with pronotum and tegmina having a decided gloss. But one species, *nyctiboroides*, has the pronotum distinctively colored; this insect is rather widely separated from the others, all four of which are closely related.

The forms of the genus will probably be found widely distributed from Costa Rica southward throughout the Amazon Basin.

Xestoblatta nyctiboroides (Rehn) (Plate XIX, figs. 1, 2, 3 and 4.)

1906. *Ischnoptera nyctiboroides* Rehn, Proc. Acad. Nat. Sci. Phila., 1906, p. 266. [1 ♀, Demerara, British Guiana.]

A specimen before us of the male sex agrees fully with the original description and color diagnosis, but is apparently somewhat darker. The insect is distinctive in coloration; the head and pronotum being solid shining blackish brown with a chestnut tinge, the pronotum narrowly margined laterad with ochraceous buff, this continued around the cephalic margin as a narrow thread of the same color. The tegmina are rich and shining russet, except the marginal fields which are ochraceous buff and the portion of the dextral tegmen concealed when at rest, which is less polished and shows, in some lights, a metallic purplish lustre along its inner margin (structural color).

As the male was previously unknown the following characters are here given.

♂; Igarapé Assu, Pará, Brazil. January 23, 1912. (H. S. Parish.) [A. N. S. P.]

⁶¹ Consequently, as the styles, when at rest, are directed across the inner surface of the plate at the distal margin, they are almost entirely concealed from below, and the plate's convex exterior would lead one, on hurried examination, to mistake the sex.

Head broad, interocular space equal to that between the pale ocelli, ocellar areas weakly defined. Tegmina extending to apices of cerci. Wings suffused with brown, this decided between discoidal vein and costal margin. Ulnar vein with 0-1 incomplete and 1-2 complete rami. Dorsal surface of abdomen weakly modified: median segment with few minute, stout hairs in latero-proximal depressions; disto-lateral angles of proximal segments slightly acute produced, this increasing very slightly to sixth segment; seventh segment almost entirely concealed; eighth narrowly visible but moderately angulato-produced laterad and there comprehending base of supra-anal plate. Supra-anal plate transverse, not strongly rotundato-trigonal produced between cerci, this portion subchitinous and, like the cerci, supplied with a number of long slender scattered hairs. Subgenital plate transverse, broadly deplanate mesad, convex laterad; distal margin weakly and irregularly undulating, narrowly subchitinous and supplied with slender hairs between the highly specialized styles. Within, at this margin, beneath the sinistral cercus, a minute chitinous cone projects caudad with acute apex directed dextrad, and adjacent dextrad a second more slender but longer projection, with acute apex, is directed dextro-dorsad (sinistral style). The dextral margin of the plate is produced dorsad in a narrow shelf slightly proximad of the dextral cercus, which is continued in an elongate, weakly and irregularly undulating, mobile, cylindrical shaft, with its rounded apex supplied with a few minute hairs, this shaft directed sinistrad and extending along the distal margin of the plate to its mesal point.

Measurements (in millimeters)

♂	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen	Length of cercus
Igarapé Assu, Brazil	17.5	4.2	5.9	16.4	4.8	3.2

Only the male here discussed is before us.

Xestoblatta carrikeri⁶² new species (Plate XIX, figs. 5, 6 and 7.)

The present species is apparently nearest *X. hamata*, differing from that species and from *X. festae* in the dorsal surface of the male abdomen having the sixth⁶³ segment specialized mesad and its latero-caudal angles but weakly produced. The male genitalia, particularly the styles, are also very different from those of *festae* and, as far as we can determine from the description, very dissimilar also from those of *hamata*.

In the female the tegmina and wings are much more abbreviate than in *hamata*, the latero-caudal angles of the sixth seg-

⁶² We dedicate this species to the collector of the type, Mr. M. A. Carriker, Jr., whose work in tropical America has been very extensive and fruitful.

⁶³ Giglio-Tos, in his description of *hamata*, gives this as the seventh segment, evidently counting the median segment as the first.

ment are but weakly produced and the coloration is generally paler. Compared with the description of the female of *X. sancta*, that sex of the present species is slightly smaller, with distinctly shorter tegmina and wings, and differs, as from *hamata*, in the dorsal abdominal features; also, though agreeing in the paler coloration, the anterior margin of the wing is unicolorous, dark, with no pale marking as described for *sancta*.

Type.—♂; Cincinnati, Santa Marta, Colombia. 4500 feet. July 10, 1913. (M. A. Carriker Jr.) [Hebard Collection, Type no. 427.]

Description of Type.—Size rather large, form robust. Interocular space about one and one-half millimeters wide, equal in width to interocellar space. Ocellar areas weakly defined, but ocelli strikingly pale. Pronotum much as in *festae*.⁶⁴ Tegmina and wings reaching well beyond apices of cerci, the wings have 2 incomplete and 4 complete rami of the ulnar vein.⁶⁵ Median segment unspecialized. Sixth dorsal abdominal segment with a large median depression heavily clothed with minute hairs, its latero-caudal angles weakly acute-angulate produced caudad; seventh segment concealed; eighth with latero-caudal angles more sharply and strongly produced than those of sixth, and embracing the proximo-lateral portion of supra-anal plate to near cercal bases. Supra-anal plate transverse; weakly produced and weakly bilobate between the cerci, this portion strongly subchitinous and fringed distad with fine hairs. Subgenital plate subdeplanate in large mesal portion, rounding sharply into narrow lateral portions which are nearly perpendicular; lateral margins straight to distal third, which is straight, transverse and subchitinous, these margins fringed with fine hairs. At the disto-lateral angles formed by the free margin, spring from the inner surface of the plate elongate chitinous, mobile, cylindrical arms, when at rest directed across the dorsal surface of the plate above the distal margin (specialized styles); the sinistral is slender, extending nearly to the disto-dextral angle, tapering slightly to the slightly enlarged and roughly rounded apex; the dextral extends slightly beyond the disto-sinistral angle, is moderately stout to a moderate mesal swelling, then slender to its elongate clubbed apex, which bears a sharp dorsal thorn with point directed sinistrad.

Allotype.—♀; same data as type. [Hebard Cln.]

Description of Allotype.—Agrees with male except in the following features.

⁶⁴ The general contour of the pronotum appears to be much the same in all the known species. In *X. nyctiboroides*, however, the even convexity of the inner margin of the narrow pale border gives the pronotum a false appearance of its margin being more evenly convex cephalad.

⁶⁵ From slight irregularities in the structure of these forks in the small series of the genus before us, it appears probable that considerable individual numerical diversity will be found to occur in the species.

Form slightly broader, thus interocular space is slightly wider. Tegmina and wings distinctly less elongate. The wings have 1 incomplete and 4 complete rami of the ulnar vein. Sixth dorsal abdominal segment unspecialized mesad, but with latero-caudal angles weakly acute-angulate produced caudad; seventh segment almost hidden, but with minute, conical, chitinous projections laterad at production of sixth segment; eighth segment narrowly visible with latero-caudal angles hardly produced. Supra-anal plate rotundato-trigonal produced between cerci, with traces of a medio-longitudinal sulcation strongest at the apex. Subgenital plate strongly convex; free margin convex, this weakest mesad.

Measurements (in millimeters)

Cincinnati, Colombia	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen	Length of cercus
♂						
<i>Type</i>	19	4.6	6.3	20.4	5.9	3.7
♀						
<i>Allotype</i>	17.6	4.8	6.8	17	5.3	2.8

Coloration.—The sexes are very similar in coloration, the female having the face markings darker and the abdomen more suffused. Head dark ochraceous buff, the vertex to immediately below the clear ochraceous buff ocelli, deep chestnut brown, and below the ocelli a narrow transverse band of the same showing some ventral convexity. Pronotum buckthorn brown with disk heavily washed with russet, this fading gradually into the marginal portions. Tegmina translucent dresden brown, the marginal field slightly paler. Wings with anterior field from costal margin to discoidal vein and in area of ulnar forks, heavily washed with cinnamon brown, posterior field washed with cinnamon brown, heavily in area of axillary forks. Dorsal surface of abdomen, in male, buckthorn brown washed with chestnut brown laterad and distad, with subchitinous portion of supra-anal plate buckthorn brown; in female, much more heavily washed with blackish chestnut brown laterad and caudad, including all of supra-anal plate. Cerci above dark briefly proximad, remaining portion pale; below dark. Limbs ochraceous buff washed with russet distad. Ventral surface of abdomen, of male, chestnut becoming ochraceous tawny laterad, subgenital plate strikingly blackish brown, very narrowly margined laterad and caudad with ochraceous tawny; of female, shining blackish chestnut brown, becoming paler meso-proximad.

The species is known from the described pair.

Xestoblatta festae (Griffini) (Plate XIX, figs. 8, 9, 10 and 11.)

1896. *E[pilampra] festae* Griffini, Boll. Mus. Zool. Anat. comp. Univ. Torino, xi, No. 236, p. 2. [[1 ♀], Punta de Sabana, Darien.]

1898. *I[schnoptera] festae* Giglio-Tos, ibid., xiii, No. 311, p. 3. (Same material.)

The present species is closely related to the two which follow in the genus, *hamata* and *sancta*. This we are able to determine for *hamata*, from the male specimen of *festae* now before us. Compared with Giglio-Tos' description of *hamata* very close relationship is found, but in that species the male abdomen apparently shows some differences of structure, while the females apparently differ in having tegmina and wings as long as in the male, and the supra-anal plate with a medio-distal incision. Compared with the description of *sancta* the same differences for the female appear to occur, in that species a feature of different wing coloration also being remarked.

Compared with the male of *X. carrikeri* that sex of the present species is found to be very distinct; the females are less easily separated, though the present species is less robust, more reddish in general coloration, with latero-caudal angles of dorsal abdominal segments, particularly of the sixth, more produced, and longer cerci. In both sexes of the present insect the wings are less deep, and the cephalic markings, though of the same general character, show a distinctive difference, the chestnut brown of the vertex not extending below the dorsal margins of the ocelli; the ventral surface of the abdomen is pale in both sexes, suffused with darker brown distad.

As the male of this species is undescribed we here give the following characters.

Description of Male.—(Rio Machuca, Costa Rica.) Size large, form robust. Interocular space about one and one-fourth millimeters wide, slightly narrower than interocellar space. Ocellar area weakly defined and interocular space as pale as ocelli. Pronotum weakly convex to narrow lateral portions, which are rather strongly but evenly deflexed.⁶⁶ Tegmina and wings with veins more pronounced than in *carrikeri* and wings less deep, with intercalated triangle narrower.⁶⁷ Median segment with low lateral ridges which, converging, meet meso-cephalad and are supplied on their inner faces with minute hairs,

⁶⁶ The general pronotal form is the same for all the species of the genus, as given in the generic description.

⁶⁷ The ulnar vein has 5 incomplete and 5 complete rami.

the mesal area between these ridges subchitinous. Dorsal abdominal segments all with latero-caudal angles similarly acute-angulate produced to sixth segment; sixth segment narrowly visible, except laterad where the latero-caudal angles are very strongly produced, with rounded apex extending beyond median portion of eighth segment, and external margin curled over; seventh segment with apparent portion nearly as narrow as sixth but not produced laterad; eighth segment more broadly visible, with caudal margin showing a small triangular production above each cercus, and strongly concave mesad between these. Supra-anal plate weakly produced and weakly bilobate between cerci, and fringed distad with fine hairs, the structure showing only traces of a subchitinous condition along the distal margin. Subgenital plate weakly convex, narrowly but strongly reflexed along the sinistral portion of its free margin, which is heavily chitinous and armed with three widely spaced, stout, short dorsal teeth, this part extending to beneath the sinistro-distal curve of the supra-anal plate, thence the free chitinous margin is weakly oblique, nearly transverse, to beneath the dextral style, but a narrow cartilaginous mantle covered with numerous minute hairs occupies this margin, the remaining brief dextral portion of the margin is straight, longitudinal to the base of the plate, in greater part occupied by the cartilaginous integument connecting the stout chitinous base of the dextral style with the plate. From within at the base of the plate, at its sinistral margin, an elongate, stout but tapering, chitinous arm is weakly curved dextrad, extending to the distal extremity of the heavy, sinistral, marginal portion of the plate; this greatly specialized sinistral style is armed on its outer face at the extremity of its stout proximal third with a short stout tooth, the distal portion of the style is strongly curved to its acute apex. Dextrad, beneath the cercus, from the inner surface of the subgenital plate at its dextral margin, springs another heavier, elongate, chitinous arm, stout at its base, but slightly beyond bearing two elongate, slender, adjacent, dorsal, membranous cylindrical processes, which spring from a brief chitinous base and have acute chitinous apices, from this point the main shaft is more slender, slightly tapering and curving weakly caudad to the apex, which bears two minute, chitinous teeth and nearly reaches the apex of the sinistral arm. These arms (highly specialized styles) are mobile, connected with the subgenital plate at their bases by a cartilaginous integument; when at rest they lie along the inner surface of the subgenital plate at its free margin.⁶⁸

The females before us agree closely with Griffini's description. We would note the following features.

Characters of ♀.—(On S. S. Tenadores, en route.) Similar to male, but with much shorter tegmina and wings.⁶⁹ Dorsal abdominal segments of the general character of those of *carrikeri*, but all showing a slightly greater production. Supra-anal plate convex produced between cerci, showing hardly a trace of

⁶⁸ Thus, in dried material, their form can probably seldom be seen without relaxing.

⁶⁹ The ulnar vein of the wings has 1 to 2 incomplete and 2 to 3 complete rami in the two females before us.

a medio-longitudinal sulcus.⁷⁰ Subgenital plate convex, with distal portion between cerci somewhat flattened, leaving apertures between this and the supra-anal plate at the cercal bases.

Measurements (in millimeters)

	Length of body	Length of pronotum	Width of pronotum	Length of tegmen	Width of tegmen	Length of cercus
♂						
Rio Machuca, Costa Rica	18	4.8	7	22.7	5.8	4.4
♀						
Gatun, Panama	18.5	4.8	6.4	18	5.3	3.4
Adventive	16.3	4.3	6	17	5	3.7

The important features of coloration are discussed above.

Specimens Examined: 3; 1 male and 2 females.

Rio Machuca, Costa Rica, 150 meters, I, 1907, (P. Biolley), 1 ♂, [A.N.S.P.].

Gatun, Panama, VII, 19 to 22, 1916, (D. E. Harrower), 1 ♀, [Hebard Cln.].

S. S. Tenadores, en route New York, to Colon, Panama, X, 19, 1913, (Hebard; dead in hold), 1 ♀, [Hebard Cln.].

⁷⁰ Taken in its entirety, the supra-anal plate roughly shows a somewhat trapezoidal contour, as described by Griffini.

EXPLANATION OF PLATES

Plate XVI

Figures greatly enlarged.

- Fig. 1.—*Ischnoptera atrata* new species. ♂, type. Caparo, Trinidad. Dorsal view of supra-anal plate.⁷¹
- Fig. 2.—*Ischnoptera atrata* new species. ♂, type. Ventral view of subgenital plate.
- Fig. 3.—*Ischnoptera rufa rufa* (DeGeer). ♂. Arecibo, Porto Rico. Dorsal view of supra-anal plate and preceding segments.⁷² A. Characteristic specialization of the sixth and seventh dorsal abdominal segments in males of *Ischnoptera*.
- Fig. 4.—*Ischnoptera rufa rufa* (DeGeer). ♂. Arecibo, Porto Rico. Ventral view of subgenital plate.
- Fig. 5.—*Ischnoptera rufa debilis* new subspecies. ♂, type. Santa Maria de Dota, Costa Rica. Dorsal view of supra-anal plate⁷³ and preceding segments.
- Fig. 6.—*Ischnoptera rufa debilis* new subspecies. ♂, type. Ventral view of subgenital plate.
- Fig. 7.—*Ischnoptera rufa occidentalis* Saussure. ♂. Vera Cruz, Mexico. Ventral view of subgenital plate.
- Fig. 8.—*Ischnoptera vulpina* new species. ♂, type. Caparo, Trinidad. Dorsal view of supra-anal plate.

Plate XVII

Full figures and wing, three times natural size. Other figures greatly enlarged, except dorsal secondary sexual process which is highly magnified.

- Fig. 1.—*Ischnoptera morio* Burmeister. ♂. Caracas, Venezuela. Cephalic view of cephalic femur.⁷⁴
- Fig. 2.—*Ischnoptera morio* Burmeister. ♂. Caracas, Venezuela. Diagram of wing.⁷⁵

⁷¹ In figures 1, 3, 5 and 8 of this plate, and figure 4 of Plate XVII, the areas of the supra-anal plates figured, which are occupied by a soft or subchitinous integument, are indicated by faint irregular lines.

⁷² The specialization of the sixth and seventh dorsal abdominal segments is of the same character throughout the genus *Ischnoptera*, showing no specific diagnostic differences.

⁷³ The outline and extent of the subchitinous area of the male supra-anal plate shows considerable individual variation in the races of *I. rufa* and, in consequence, this feature is not of as great importance as might otherwise be inferred from consideration of figures 3 and 5.

⁷⁴ Characteristic for the genus *Ischnoptera*.

⁷⁵ Characteristic for the genus *Ischnoptera*.

- Fig. 3.—*Ischnoptera morio* Burmeister. ♂. Caracas, Venezuela. Lateral outline of one of the paired secondary sexual processes of the sixth dorsal abdominal segment.⁷⁶
- Fig. 4.—*Ischnoptera morio* Burmeister. ♂. Caracas, Venezuela. Dorsal view of supra-anal plate and preceding segment.
- Fig. 5.—*Ischnoptera morio* Burmeister. ♂. Caracas, Venezuela. Ventral view of subgenital plate.
- Fig. 6.—*Ischnoptera vulpina* new species. ♂, *type*. Caparo, Trinidad. Ventral view of subgenital plate.
- Fig. 7.—*Ischnoptera angustifrons* new species. ♂, *type*. Rio Pacaya, Peru. Ventral view of subgenital plate.
- Fig. 8.—*Symploce lita* new species. ♂, *type*. Key West, Florida. Dorsal outline.
- Fig. 9.—*Symploce capitata* (Saussure). ♂. Havana, Cuba. Dorsal outline.

Plate XVIII

Figures all greatly enlarged.

- Fig. 1.—*Symploce lita* new species. ♂, *type*. Key West, Florida. Cephalic view of head.
- Fig. 2.—*Symploce lita* new species. ♂, *type*. Dorsal view of supra-anal plate and preceding segment.⁷⁷
- Fig. 3.—*Symploce lita* new species. ♂, *type*. Ventral view of subgenital plate.
- Fig. 4.—*Symploce lita* new species. ♂, *type*. Cephalic view of cephalic femur.⁷⁸
- Fig. 5.—*Symploce jamaicana* (Rehn). ♂, *type*. Port Antonio, Jamaica. Dorsal view of supra-anal plate and preceding segment.
- Fig. 6.—*Symploce jamaicana* (Rehn). ♂, *type*. Lateral outline of dorsal contour of supra-anal plate and preceding segment.
- Fig. 7.—*Symploce jamaicana* (Rehn). ♂, *type*. Ventral view of subgenital plate.
- Fig. 8.—*Symploce capitata* (Saussure). ♂. Havana, Cuba. Dorsal view of supra-anal plate and preceding segment.
- Fig. 9.—*Symploce capitata* (Saussure). ♂. Havana, Cuba. Lateral outline of dorsal contour of supra-anal plate and preceding segment.
- Fig. 10.—*Symploce capitata* (Saussure). ♂. Havana, Cuba. Ventral view of subgenital plate.
- Fig. 11.—*Symploce morsei* new species. ♂, *type*. Nassau, Bahamas. Dorsal view of supra-anal plate and preceding segment.

⁷⁶ Characteristic for the genus *Ischnoptera*.

⁷⁷ The figures of the supra-anal plate are, as in the other plates of the present paper, placed with outline of free caudal margin directed toward the bottom of the plate.

⁷⁸ Characteristic for the genus *Symploce*.

- Fig. 12.—*Symploce morsei* new species. ♂, type. Lateral outline of dorsal contour of supra-anal plate and preceding segment.
- Fig. 13.—*Symploce morsei* new species. ♂, type. Ventral view of subgenital plate.
- Fig. 14.—*Symploce flagellata* new species. ♂, type. Desecheo Island, Porto Rico. Dorsal view of supra-anal plate and preceding segment.
- Fig. 15.—*Symploce flagellata* new species. ♂, type. Lateral outline of dorsal contour of supra-anal plate and preceding segment.
- Fig. 16.—*Symploce flagellata* new species. ♂, type. Ventral view of subgenital plate.
- Fig. 17.—*Symploce flagellata* new species. ♂, type. Caudal view of sub-genital plate showing greater portion of flagellate production.
- Fig. 18.—*Symploce bicolor* (Beauvois). ♂. San Francisco Mountains, San Domingo. Dorsal view of supra-anal plate and preceding segment.
- Fig. 19.—*Symploce bicolor* (Beauvois). ♂. San Francisco Mountains, San Domingo. Lateral outline of dorsal contour of supra-anal plate and preceding segments, showing the very decided declivity cephalad.
- Fig. 20.—*Symploce bicolor* (Beauvois). ♂. San Francisco Mountains, San Domingo. Ventral view of subgenital plate.
- Fig. 21.—*Symploce bicolor* (Beauvois). ♂. San Francisco Mountains, San Domingo. Caudal view of subgenital plate showing flagellate production.

Plate XIX

Specialized styles highly magnified.

- Fig. 1.—*Xestoblatta nyctiboroides* (Rehn). ♂. Igarapé Assu, Brazil. Dorsal outline of pronotum.⁷⁹ ($\times 7$)
- Fig. 2.—*Xestoblatta nyctiboroides* (Rehn). ♂. Igarapé Assu, Brazil. Cephalic view of cephalic femur.⁸⁰ ($\times 5$)
- Fig. 3.—*Xestoblatta nyctiboroides* (Rehn). ♂. Igarapé Assu, Brazil. Caudal view of subgenital plate showing specialized styles.
- Fig. 4.—*Xestoblatta nyctiboroides* (Rehn). ♂. Igarapé Assu, Brazil. Dorsal view of distal portion of abdomen. A. Sixth dorsal abdominal segment. ($\times 3\frac{1}{4}$)
- Fig. 5.—*Xestoblatta carrikeri* new species. ♂, type. Santa Marta, Colombia. Diagram of wing.⁸¹ ($\times 4$)

⁷⁹ The contour of this figure is characteristic for the species of the genus *Xestoblatta*. The dotted line indicates the inner margin of the pale border in the species.

⁸⁰ Characteristic for the species of the genus *Xestoblatta*.

⁸¹ Characteristic for the genus *Xestoblatta*.

Explanation of diagram of wing in *Xestoblatta*.

- C. M. Costal Margin.
- C. Costal Veins. These are simple, not clubbed, in the species of the Group Ischnopterites, the proximal costal veins springing from the Mediastine Vein.
- I. T. Intercalated Triangle. Weakly indicated in the majority of species of the Group Ischnopterites, this area shows its greatest development in *Xestoblatta* of the known genera.
- M. Median Vein. This vein very rarely divides distad as shown. Normally undivided in the Group Ischnopterites, such inconspicuous distal division as here figured is attributable to individual variation only. In this portion of the wing, similar individual variation in the adjacent veins is frequently found.
- Ax. Axillary Vein.
- A. Anal Vein. This vein becomes subobsolete at the apex of the Intercalated Triangle.
- F. D. Fork of Discoidal Vein. Characteristic of *Xestoblatta* and *Symploce*.
- D. Discoidal Vein. The branches of the distal divisions of this vein are heavier and more striking in *Xestoblatta* than in *Symploce*; in that genus, the arms of the first fork alone are equally heavy and conspicuous.
- U. Ulnar Vein. The number of rami of this vein is greatly reduced in individuals of *Xestoblatta* showing wing reduction.
- Ms. Mediastine Vein.
- P. Peripheral Margin. Into which run; the Axillary Vein, its rami and the Radiate Veins.
- R. Radiate Veins.

-
- Fig. 6.—*Xestoblatta carrikeri* new species. ♂, type. Santa Marta, Colombia. Caudal view of portion of subgenital plate showing specialized styles.
 - Fig. 7.—*Xestoblatta carrikeri* new species. ♂, type. Dorsal view of distal portion of abdomen. A. Depressed median specialization of sixth dorsal abdominal segment.
 - Fig. 8.—*Xestoblatta festae* (Griffini). ♂. Rio Machuca, Costa Rica. Dorsal view of sinistral specialized style.
 - Fig. 9.—*Xestoblatta festae* (Griffini). ♂. Rio Machuca, Costa Rica. Caudal view of sinistral specialized style and sinistral margin of subgenital plate, showing the armament of that margin. (× 3)
 - Fig. 10.—*Xestoblatta festae* (Griffini). ♂. Rio Machuca, Costa Rica. Caudal view of dextral specialized style.
 - Fig. 11.—*Xestoblatta festae* (Griffini). ♂. Rio Machuca, Costa Rica. Dorsal view of distal portion of abdomen. A. Latero-caudal production of sixth dorsal abdominal segment. (× 3)



Hebard, Morgan. 1916. "Studies in the group Ischnopterites (Orthoptera, Blattidae, Pseudomopinae)." *Transactions of the American Entomological Society* 42, 337–383.

View This Item Online: <https://www.biodiversitylibrary.org/item/30352>

Permalink: <https://www.biodiversitylibrary.org/partpdf/13612>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Smithsonian

Copyright & Reuse

Copyright Status: NOT_IN_COPYRIGHT

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.