

ward found to be rather common in the region thereabouts as well as in Knox, Perry, Dubois, Crawford, Orange and Lawrence counties; the northernmost point at which it has been observed being near Mitchell, Lawrence County. Since its known general range is southern it probably does not occur in the northern half of the State. With us it is found in company with a half dozen species of ants, the most common of which is a rather large yellowish-red form, *Camponotus melleus* Say. The cricket seems to be always on the move, and when disturbed leaps with great agility. Those taken in Crawford County in September were almost double the size of those noted in the spring and probably more accurately represent the mature insect.

At Dunedin four specimens have been taken, each singly beneath half buried logs, two of them without an ant beneath the logs where they were found. One of them had only one hind leg, yet leaped a foot in height and a distance of 18 inches several times when first uncovered. Dunedin is the most southern station known for *M. pergandei* and it is elsewhere known in Florida only from Crescent City, a single nymph from there being in the Philadelphia collection.

This was the first of these little crickets described from North America, Bruner's types being from the "Atlantic States from Maryland southward." Its known range now extends from Washington, D. C. west to southern Indiana and south and west to Clayton, Ga. and Dunedin, Fla. In Ohio it has been taken by Dury near Cincinnati. The other four species of United States Myrmecophila are separated by Scudder (1899d, 425) only by minor characters of size and color, and it is very probable that two or three of them will prove to be but synonyms or varieties. Bruner in his original description of *pergandei* stated that the characteristic feature of that species is "the two light colored elliptical markings upon the disk of the pronotum," but these are not found in any of the Indiana or Florida specimens at hand.

#### Subfamily IV. MOGOPLISTINÆ.

#### THE WINGLESS BUSH CRICKETS.

Small slender-bodied depressed wingless or subapterous Gryllids, thinly clothed with translucent, easily abraded scales and having the head short, depressed; vertex truncate in front; upper portion of face strongly swollen, protuberant between the antennæ, separated from vertex by a transverse sulcus; ocelli very small or absent; eyes well developed not covered by pronotum; palpi variable in length and form of segments; pronotum of males

usually produced backward into a rounded lobe, its lateral lobes elongate, very narrow; tegmina absent in females, usually abbreviated, membranous and furnished with tympanum in males; hind femora moderately swollen; hind tibiæ serrulate above on both margins, without true spines and with three pairs of subapical spurs; basal joint of hind tarsi with two curved subapical spurs; ovipositor straight, sublanceolate.

This subfamily has been previously placed as a group or tribe of the Myrmecophilinæ, but the differences in structural characters are so great and the habits so different that I here raise it to subfamily rank. The species are mostly tropical or sub-tropical in distribution and occur for the most part on bushes or beneath debris in sandy localities near water. The principal literature treating of the American species of the subfamily is that of Scudder, 1868b, 1897f; Saussure, 1874, 422—427, 1877, 461—477; Bruner, 1891; Redtenbacher, 1892; R. & H., 1905, 1912a.

R. & H. in their revision (1912a) recognized 11 genera of their group Mogoplistii, five of which they state to be represented in the United States or Mexico and three in the territory covered by this work. Anyone who compares their characterizations given on pages 193 and 208 of the two genera *Cryptoptilum* and *Cycloptilum*, will find them word for word exactly the same with the exception that in the proposed new genus *Cryptoptilum* the tegmina are said to be "concealed by pronotum in male," whereas in *Cycloptilum* they are mentioned as "projecting beyond pronotum in male." This and "size small" and "very small" are also the sole characters used in the separation of the two genera in their key, p. 188. As the representatives of the two nominal genera at hand show no other structural differences of generic value whatever, and as wing length in Orthoptera is no longer regarded as of even specific value,<sup>78</sup> I have placed all the species under the older name *Cycloptilum* Scudd. If the projecting tegmina is a character of generic importance in this group, it should also be used in *Atlanticus*, and *A. gibbosus* and *dorsalis* be separated from the other species under a new generic name. Banks (1906) has well said: "If the characters which distinguish genera are of less value or are less constant than the characters that separate the species, such genera are worthless. They mean nothing. They are of no value to science. Why then accept them?"

<sup>78</sup>As proof of this I need only quote R. & H. (1915c, 294) as follows: "The work of Lutz has already demonstrated the error of using length of tegmina, wings and ovipositor as characters of specific importance in the genus *Gryllus*. The mass of evidence upon these features in Lutz's paper is absolutely convincing; from studies of other genera we have found such characters to be of minor importance generally throughout the Orthoptera."

## KEY TO EASTERN GENERA OF MOGOPLISTINÆ.

- a. Facial protuberance between the antennæ very convex and with a distinct but shallow median vertical groove; pronotum of male distinctly widening from apex backward and prolonged behind in the form of a rounded lobe; tegmina present in male but often wholly concealed; fore tibæ with a tympanum on outer face.

## I. CYCLOPTILUM.

- aa. Interantennal protuberance subdepressed, without a vertical groove; pronotum of male not or very feebly widened backward, its hind margin truncate; tegmina and wings absent in both sexes; fore tibæ without a tympanum on outer face. II. OLIGACANTHOPUS.

## I. CYCLOPTILUM Scudder, 1868b, 142. (Gr., "circle" + "wing.")

In addition to the characters above given the members of this genus have the head very small; antennæ very long and slender, widely separated at base, first joint large, the others much smaller, subequal; pronotum about half the length of body, male, shorter and subquadrate, female; tegmina of male either projecting beyond pronotum or wholly hidden, the tips of the dorsal field strongly curved and lateral field well developed; abdomen depressed nearly equally broad throughout, slightly tapering at apex; hind femora much dilated, more than twice as long as broad; hind tibæ with three pairs of apical spurs, the upper inner ones shorter than the lower ones; basal joint of hind tarsi sulcate above, serrate on both margins,<sup>79</sup> ending in an apical spur each side; anal cerci tapering, more than half as long as abdomen. Ovipositor straight, variable in length, its apex not serrulate beneath.

## KEY TO EASTERN SPECIES OF CYCLOPTILUM.

- a. Pronotum of male short and broad, its length about one-fourth more than its greatest breadth, its hind margin almost semicircular; ovipositor short, not over 3.5 mm. in length. 316. SQUAMOSUM.
- aa. Pronotum of male longer, less broad proportionally, its length nearly one-half more than its greatest breadth, its hind margin less broadly rounded and basal third less flattened; ovipositor longer, 4.5 or more mm.

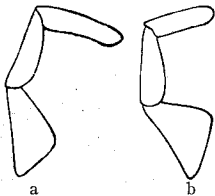


Fig. 218. Maxillary palpi of *Cycloptilum*, a, of *C. antillarum*; b, of *trigonipalpus*, greatly enlarged. (After R. & H.)

- b. Terminal joint of maxillary palpi moderately elongate, widening feebly from base to apex, but slightly obliquely truncate.

## 317. ANTILLARUM.

- bb. Terminal joint of maxillary palpi shorter, strongly widening from base to apex, very obliquely truncate (Fig. 218, b.)

## 318. TRIGONIPALPUM.

<sup>79</sup>Scudder in his key (1897c, 64) says: "First joint of hind tarsi neither sulcate nor serrate," but an examination of the generic type, *C. squamosum*, by Davis showed he was mistaken.

316. *CYCLOPTILUM SQUAMOSUM* Scudder, 1868b, 142. Scaly Bush Cricket.

Size small for the genus. Body elongate-oval, thinly clothed with silvery or yellowish scales; head and pronotum reddish-yellow, often with a postocular stripe of darker scales, extending as a narrow line along the upper edge of lateral lobes; legs, antennæ and mouth parts paler yellow; dorsal surface of abdomen, except at base, fuscous-black, under surface dusky. Terminal joint of maxillary palpi one-third longer than the one preceding, its tip obliquely truncate. Male with disk of pronotum distinctly broadening from apex to base, its apical half rounded into the sides; posterior lobe strongly flattened, longer than the narrow lateral lobes. Tegmina with exposed portion as wide as abdomen, varying in length from .5 to 1.3 mm., its sides embracing those of abdomen. Subgenital plate short, scoop-shaped, its apex entire. Female with pronotum subquadrate, slightly narrower in front; tegmina absent; ovipositor about one-third shorter than hind femora, slightly curved upward at base. Other structural characters as above given. Length of body, ♂, 5.4—7.5, ♀, 6—7.2; of pronotum, ♂, 3—3.4, ♀, 2—2.2; of hind femora, ♂, 3.5—4.1, ♀, 3.7—4.4; of ovipositor, 3—3.6 mm. Greatest width of pronotum, ♂, 2.6—2.9, ♀, 1.9—2.1 mm. (Fig. 219.)

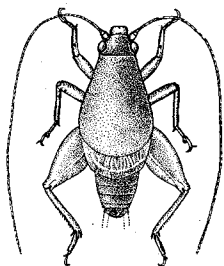


Fig. 219. Male. Dorsal view of type,  $\times 4$ . (After R. & H.)

Dunedin, Fla. (W. S. B.); Carrizo Springs, Texas (Hebard). Only one adult male and several female nymphs have been taken about Dunedin. The former was found December 17 while sifting rubbish for beetles. Elsewhere in the State it has been taken by others at Atlantic Beach, San Pablo, Live Oak, Gainesville and Lakeland, mostly under boards or on grass or weeds.

The unique male type of Scudder was from Texas and the known range of *C. squosum* extends from Long Island, N. Y. southward along the coast to Dunedin, Fla.; westward across Texas and Arizona to the Mojave Desert, Cal., and in the middle west north to northern Colorado, central Nebraska and southern Illinois, three specimens being in the Urbana, Ill. collection taken by Hart and Shiga at Metropolis on the Ohio River in that State. It occurs in both moist and dry situations and ranges from sea level to 3,600 feet in elevation. At Cottonwood, Cal. R. & H. (1912a, 212) found it "common under creosote bushes (*Covillea*), where among the collected refuse the males were heard shrilly stridulating at dusk and later. The sound produced was an incessant and high-pitched zeeee-zeeee-zeeee." Along the Atlantic coast they "have found it under boards and other debris on the ground, usually along the edge of or in forest growth, and almost always in very small numbers. However, at St. Simon's Island, Ga., myriads

were found jumping about among the dead leaves and low plants and grasses growing on the sandy soil under live oaks."

At Lakehurst, N. J. Davis (1909a) found *C. squamosum* in October in the pine woods, and likens its song to a low sounding *chink, chink, chink*. He later (1914a) took well grown nymphs at East Marion, Long Island on Aug. 2.

The *Cycloptilus borealis* Bruner (1891, 37) is a synonym of *C. squamosum* and the latter has also been recorded from Florida by R. & H. (1907, 316) as *Liphoplus krugii* Sauss.

316a. CYCLOPTILUM SQUAMOSUM ZEBRA (Rehn & Hebard), 1905, 49.

Distinguished from *C. squamosum* "by its smaller size, relatively more regularly convex dorsal surface of male pronotum, which is less expanded caudad and much shorter. In the female the pronotum is very small and narrows somewhat more cephalad. Proportionally the limbs are shorter and the caudal femora more flea-like. Scaly covering silvery, usually with limbs barred and body spotted and mottled with dark brown scales (Fig. 220.) Length of body, ♂ and ♀, 4.9—5.5; of pronotum, ♂, 2.4—2.9; ♀, 1.5—1.7; of hind femora, ♂ and ♀, 3.1—3.7; of ovipositor, 2.7—2.9 mm." (R. & H. 1912a, 215.)

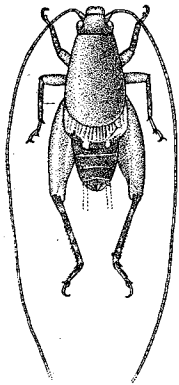


Fig. 220. Male.  
Dorsal view of type,  
× 4.  
(After R. & H.)

Miami, Fla. (Davis); Long Key, Fla., Mch. 13 (Hebard.) The differences between this form and typical *squamosum* are so slight that they cannot be set forth in a key. I regard it as only a depauperate southern race of Scudder's species. Its known distribution is confined to southern Florida, where it has been taken from Lake Worth southward to Key West. R. & H. (loc. cit.) state that "the entire territory over which this species is known has much of its surface composed of rough coquina rock which is very white. The species is wholly terrestrial and its coloration (as given above) so imitates the surface of the coquina that the little insects are practically invisible when at

rest. \* \* \* Nearly all the specimens taken have been found hiding under the coquina boulders on or near the strand. When first exposed they usually remain motionless and closely pressed to the surface of the rock; when disturbed, however, they spring about wildly and are hard to follow with the eye." They state (1914c) that "the song is a faint *krik—krik—krik—krik*, suggesting that of a species of *Nemobius* but much fainter." Davis (1914) mentions the taking of 13 specimens on Sept. 23 from under and in the folds of an old pair of trousers lying on the up-beach at Ocean Beach, Miami.

317. *CYCLOPTILUM ANTILLARUM* (Redtenbacher), 1892, 218. Antillean Bush Cricket.

Size large for the genus; form rather slender. Reddish-brown, thinly clothed with silvery scales; lateral lobes of pronotum, legs and under surface except abdomen paler; outer and upper faces of hind femora often dusky; abdomen in great part dull black. Interantennal space prominent, rounded and with a narrow and shallow but distinct median sulcus. Eyes ovoid-triangular, set obliquely behind the antennæ. Male with pronotum as described in key; tegmina wholly concealed; anal cerci as long as abdomen; apex of subgenital plate broadly rounded, entire. Female with disk of pronotum distinctly longer than broad, its sides nearly parallel; tegmina invisible, apex of subgenital plate narrowly, acutely emarginate; ovipositor but little shorter than hind femora, straight, its apex sublan- ceolate. Length of body, ♂, 6.7—9, ♀, 6.5—9.3; of pronotum, ♂, 3.8—4.2; ♀, 2—2.7; of hind femora, ♂, 4.1—5.5, ♀, 5—6.2; of ovipositor, 4—5.6 mm. (Fig. 221.)

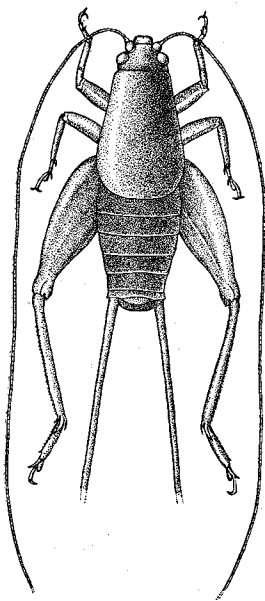


Fig. 221. Dorsal view of male,  $\times 4$ . (After R. & H.)

Lake Okeechobee, La Belle, Cape Sable, Key West and Dunedin, Fla., Jan. 29—Mch. 7 (*W. S. B.*) About Dunedin this bush cricket is in winter much less common than the next, my only adult male having been taken Jan. 29 by beating mangrove on Hog Island. At Cape Sable and Key West it was taken in numbers by beating mangrove and other shrubs. It is, in the main, a subarctic species and has been recorded from numerous stations in Florida between Jacksonville and Key West. On the southern keys it is especially common on the dahoon holly, *Ilex cassine* L.

This species was originally described from St. Vincent's Island and is known from the Bermudas, Bahamas and Cuba. In the United States it inhabits the southern portion of the Lower Austral zone from Beaufort, N. Car. as far west as Brazos County, Texas. Over this range it is said by R. & H. (1912a, 200) to be rather plentiful in bayberry and other heavy bushes, and is sometimes found in numbers on the ground among leaves and low plants under live oaks.

The *Liphoptus krugii* Sauss. (1897, 232) from Cuba, the *Mogoplistus slossoni* Scudder (1897f) from Biscayne Bay, Fla., and the *M. barboursi* Morse (1905, 21) from Nassau are placed by

R. & H. as synonyms of *C. antillarum*. The majority of the records from Florida have been made under the names of the first two synonyms mentioned. The first specimens from that State were taken by Mrs. A. T. Slosson under bark of fallen trees, and she speaks of them (1901) as "silvery iridescent pearly little creatures, very agile and slippery."

318. *CYCLOPTILUM TRIGONIPALPUM* (Rehn & Hebard), 1912a, 204.

"Differs from *C. antillarum* in the average smaller size, more graceful build, more pronounced interantennal sulcus and very different terminal joint of maxillary palpi, the edges of which, when viewed from the side, form an isosceles triangle since this joint expands widely distad and is very obliquely truncate. Pronotum proportionally narrower and smaller in both sexes; caudal femora less strongly inflated. Subgenital plate of male very slightly less produced obtuse-angulate; of female semi-ovate, broadly obtuse-angulate at apex. Color very similar to that of *antillarum*. Maxillary palpi never darkly suffused; dorsal surface of abdomen wholly black (Fig. 222.) Length of body, ♂, 6.8—7.1, ♀, 7.8—8.5; of pronotum, ♂, 3.7—4.1, ♀, 2—2.1; of hind femora, ♂, 4.2—5, ♀, 5—5.5; of ovipositor, 4—6.2 mm." (R. & H.)

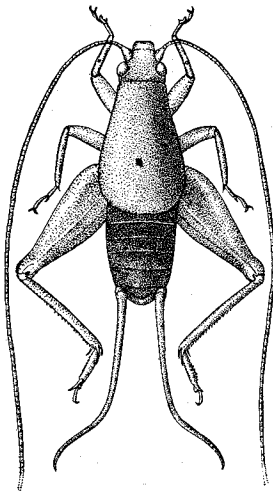


Fig. 222. Dorsal view of male type,  $\times 4$ .  
(After R. & H.)

Dunedin and Cape Sable, Fla., March 2—25 (W. S. B.). About Dunedin the nymphs of this form are frequently taken by sweeping low shrubs during the winter months, and adults by beating oak and bayberry about the middle of March. In two of the males the tegmina are slightly prolonged beyond the pronotum. It is very close to *antillarum*, the only fixed differential character being that of the form of the terminal joint of palpi. The insects are thickly clothed with nearly transparent scales and in the field they frequently appear to have the black abdomen ringed above with whitish scales at the intersection of the segments.

The known range of *C. trigonipalpus* extends from Petersburg, Va. to Key West, Fla., Agricultural College, Miss. and the Bahama Islands. It has been taken by R. & H. and Davis at numerous stations in both Georgia and Florida, having been found mainly on the shrubby undergrowth of open pine woods, sometimes beneath the loose bark of trees in hammocks.

II. OLIGACANTHOPUS Rehn & Hebard, 1912a, 218. (Gr., "small"  
+ "thorn" + "feet.")

Very small scaly wingless crickets having the head small, horizontal, wider than long, the interantennal protuberance subdepressed, broadly rounded, without a dividing sulcus; antennæ very slender, tapering, twice or more as long as body; eyes triangular-ovoid, rather prominent; disk of pronotum depressed, subquadrate, female, slightly longer than wide, male, its sides nearly parallel, front and hind margins truncate; legs all short; femora unarmed, hind ones feebly dilated; hind tibiæ heavy, short, the upper margins minutely serrulate, and apical fourth with three pairs of very short spurs; first hind tarsal joint more than half the length of tibiæ, minutely serrulate above. Males with subgenital plate transverse, its apex broadly curved; anal cerci slender, tapering, very bristly, as long as hind femora. Ovipositor about two-thirds the length of hind femora, rather stout, its apical third sublanceolate with lower margins very finely serrulate. But one species is known.

319. OLIGACANTHOPUS PROGRAPTUS Rehn & Hebard, 1912a, 219.

Size small; form depressed. General color pale brown but hidden everywhere except on front of face with a thick coating of silvery and fuscous scales; face between the antennæ with four vertical dark brown stripes; antennæ and palpi yellowish, their basal portions annulated with fuscous; legs all barred or ringed with fuscous scales; abdomen thickly clothed with similar scales interrupted with many silvery ones. Structural characters as given above. Length of body, ♂ and ♀, 6—6.7; of pronotum, 1.5—1.7; of hind femora, 3.7—4.2; of ovipositor, 2.5—3 mm. Width of pronotum, 1.4—1.6 mm. (Fig. 223.)

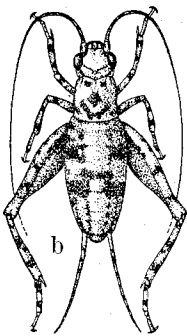
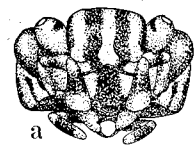


Fig. 223. a, Front view of head; b, adult male.  $\times 4$ . (After Hebard.)

Miami, Fla., March (Hebard). Known only from Brickell's Hammock, Miami, on the Atlantic Coast and by a single nymph taken by Hebard on Captiva Island, Charlotte Harbor on the Gulf Coast of Florida. Of its habits at Miami Hebard (1915b, 461) says: "A series of 57 specimens was taken March 4—15 by peeling off loose bark on two typical trees of the hammock jungle, the inkwood, *Erothea paniculata* Juss. and the pigeon plum, *Coccolobis laurifolia* Jacq. and on live oaks, *Quercus virginiana* Mill. Often several trees would be thoroughly examined without success, but usually two or three specimens would be found and rarely six or seven, on the same tree. When revealed, the tiny insects either fell with the bark or re-



mained usually motionless when they could easily be made to jump into the beating net, which was held below the spot under investigation to catch the bark and any specimens which might fall with it. Without such use of a net the species would prove very difficult to capture. The insect is apparently wholly nocturnal and individuals probably seldom leave the tree trunks. This latter is indicated by the peculiar silvery general coloration of the insects, mottled and speckled with dark brown, which blends perfectly with the bark of the trees upon which they are found, but which would cause them to be conspicuous under many other environmental conditions."

### Subfamily V. GRYLLINÆ.

#### THE GROUND AND FIELD CRICKETS.

This subfamily comprises our most numerous and best known crickets. They are of small or medium size, usually robust and stubby in form and have the head large, vertical or nearly so, vertex broad, rounded into the face; antennæ long, setaceous; ocelli three, usually arranged in a very obtuse triangle; pronotum short, subquadrate, its front and hind margins truncate or nearly so; tegmina and wings variable in length; stridulating organ of male furnished with a speculum; fore tibiæ with a tympanum on one or both faces; femora unarmed, hind ones very stout; hind tibiæ armed above with two rows of spines, without serrations between them, and with six subapical spurs; joints of all the tarsi compressed; anal cerci long, tapering, bristly. Ovipositor variable in length, straight, slender, cylindrical, feebly lanceolate at apex.

About 20 genera of the subfamily are known, six of which are represented in the eastern United States. The principal literature treating of these is as follows: Saussure, 1874, 379, 1877, 226; Blatchley, 1892, 1900, 1903; Scudder, 1896a, 1896b, 1896c, 1901b, 1902a; Walker, E. M. 1904; Morse, 1905; Lutz, 1908; Hebard, 1913, 1913a, 1915, 1915c; R. & H., 1915c, 1916.

#### KEY TO EASTERN GENERA OF GRYLLINÆ.

- a. Spines of hind tibiæ long, movable, pilose; last joint of maxillary palpi at least twice the length of the one preceding; basal joint of hind tarsi (in our species) unarmed above; smaller, length of body less than 12 mm.
  - b. Lower front angle of lateral lobes of pronotum rounded; tegmina of male with a tympanum; hind tibiæ armed above with four spines on each margin and with three subapical spurs on each side.
 

I. NEMOBIUS, p. 671.
  - bb. Lower front angle of lateral lobes rectangular or acute; tegmina of male without a tympanum; hind tibiæ armed above with