

- d. Body subspherical, wingless; pronotum covering the occiput and eyes, the latter very small; hind femora ovate, very strongly swollen; hind tibiæ armed above with only a few movable spines. (Ant-loving crickets).

III. MYRMECOPHILINÆ, p. 659.

- dd. Body more elongate, usually winged; occiput and eyes not covered by pronotum, the eyes well developed; hind femora more elongate, not exceptionally swollen.

- e. Hind tibiæ armed above on both margins with minute teeth, but no spines; body covered with translucent scales; pronotum of males usually prolonged backward; species wingless or males usually with very short membranous tegmina. (Wingless bush crickets.)

IV. MOGOLISTINÆ, p. 662.

- ee. Hind tibiæ armed above with two rows of spines; body not covered with scales; pronotum not prolonged backward in either sex; tegmina always present, sometimes much abbreviated.

- f. Head short, vertical or nearly so; hind tibiæ rather stout, armed with stout spines without teeth between them; ocelli present; color black or brown. (Ground and field crickets.)

V. GRYLLINÆ, p. 670.

- ff. Head elongate, horizontal; hind tibiæ slender, armed with delicate spines (except in the genus *Neoxabea*) with minute teeth between them; ocelli absent; color white or pale green. (White tree crickets.)

VI. OECANTHINÆ, p. 709.

- aa. Second tarsal joint distinct, depressed, heart-shaped.

- g. Hind tibiæ armed above with two rows of spines without teeth between them and with only two apical spurs on inner side; ovipositor in our species compressed and distinctly upcurved. (Small brown or black bush crickets.)

VII. TRIGONIDIINÆ, p. 728.

- gg. Hind tibiæ armed above with two rows of spines with small teeth between them, the apical spurs three on both outer and inner sides; ovipositor in our species subcylindrical, but little upcurved. (Larger brown bush crickets.)

VIII. ENEOPTERINÆ, p. 737.

Subfamily I. GRYLLOTALPINÆ.

THE MOLE CRICKETS.

Crickets of large size, having, in addition to characters given in key, the antennæ much shorter than body; eyes very small; pronotum subcylindrical, arched, prolonged more or less backward, its hind margin rounded; lateral lobes with lower margin straight or concave, oblique; tegmina somewhat triangular, usually abbreviated; wings often fully developed; fore femora dilated and compressed; fore tibiæ with a tympanum on outer face, strongly dilated, coarsely toothed; middle and hind legs slender, compressed; hind femora slender, scarcely saltatorial, divergent from the body; abdomen cylindrical, its apex obtuse, 9-jointed,

male, 7- or 8-jointed, female; subgenital plate of male large, transverse; ovipositor not visible. Both the two known North American genera are represented in our territory. The principal literature treating of them is as follows: Saussure, 1874, 1877; Scudder, 1869a; Blatchley, 1892, 1903; R. & H., 1916.

KEY TO EASTERN GENERA OF GRYLLOTALPINÆ.

- a. Front tibiæ with four dactyls; hind femora shorter than pronotum. I. GRYLLOTALPA.
 aa. Front tibiæ with two dactyls; hind femora usually longer than pronotum. II. SCAPTERISCUS.
 I. GRYLLOTALPA Latreille, 1802, 275. (L., "cricket" + "mole.")

The principal characters of this genus have been given above under the subfamily heading and generic key. Among all our Gryllidæ these mole crickets rank first in size and singularity of structure. When full grown they measure from an inch and a fourth to an inch and a half in length, are pale brown in color and have the body covered with very short hairs, giving it a soft, velvety appearance. The females have no visible ovipositor, and, externally, may be separated from the males only by the difference in the veining of the uppermost of the tegmina. By their habit of burrowing beneath the soil in search of such food as the tender roots of plants, earthworms and the larvæ of various insects, the anterior tibiæ of these crickets have, in the course of ages, become so modified in structure as to closely resemble the front feet of the common mole, whence the generic name. The dactyls or claws of these tibiæ are four in number, the upper two, the larger, being movable; the others immovable. The compound eyes have, on account of the underground life, become much aborted, being not more than one-fourth the size of those of the common field crickets of the genus *Gryllus*. As the mole crickets crawl rather than leap, the hind femora are but little enlarged, and are always shorter than the pronotum. The hind tarsi are short, seldom exceeding half the width of the pronotum. The genus is widely distributed over the earth, three species occurring in the eastern United States.

KEY TO EASTERN SPECIES OF GRYLLOTALPA.

- a. Hind tibiæ not spined above except at apex.
 b. Apex of hind tibiæ armed with eight spines, four long ones on inner face and four shorter ones on outer; front trochanters short, nearly semicircular, armed with spinous hairs.

307. HEXADACTYLA.⁷⁸

⁷⁸Kirby considers the characters given under (b) of generic importance and has founded (1906, 2) for *hexadactyla* and allied forms the genus *Neocurtilla*. I prefer to retain all of our species under the old name *Gryllotalpa*.

bb. Apex of hind tibiæ armed with seven spines, four on inner and three on outer side; processes of front trochanters knife-shaped, curved, acute. 308. MAJOR.

aa. Apical half of hind tibiæ armed above on inner margin with three or four long spines; processes of front trochanters curved, acute.

309. GRYLLOTALPA.

307. GRYLLOTALPA HEXADACTYLA Perty, 1832, 119. Common Mole Cricket.

Size medium for the genus; form robust. Cinnamon-brown or darker, covered with short fine hairs of the same hue; claws and veins of tegmina darker; occiput and abdomen more or less blotched with fuscous. Ocelli small, ovate, located between the upper inner margins of the eyes. Dactyls (fingers) of the fore tibiæ stout, curving outward, the outer movable ones the longer. Tegmina covering one-half to three-fourths of abdomen; wings slightly exceeding tegmina in short-winged form, extending beyond tip of abdomen in long-winged form (*columbia* Scudder). Anal cerci nearly one-half longer than pronotum. Length of body, ♂ and ♀, 21—30; of pronotum, 7.5—10.5; of tegmina, 6.5—12; of hind femora, 6—8.2; of cerci, 9.5—13 mm. (Fig. 212.)



Fig. 212. Long-winged male.

This, the *G. borealis* of my former work (1903, 411) and of most American authors, is a common insect in suitable localities throughout Indiana, though unknown to most of the inhabitants of the State. About one-third of those taken have the wings elongate, extending beyond the abdomen as shown in Fig. 212. On one occasion a log deeply buried in the sand on the southern shore of Lake Maxinkuckee was overturned and nine specimens were secured. Of these six were long-winged and three short-winged.

In the moist mud and sand along the margins of the smaller streams and ponds the runs or burrows of this cricket, exactly like those of a mole though much smaller, can in late summer and early autumn be seen by those interested enough to search for them. The burrows are, in the main, very superficial, lying just beneath the surface and running in very irregular directions. They frequently fork, and often end beneath a stone or small stick. The insects themselves are seldom seen, as they are nocturnal, forming their burrows by night, and scarcely ever emerging from beneath the ground. Moreover, like a mole, they move backward as readily as forward, and so easily escape their enemies. Apparently one insect, or a single pair occupy these burrows; the males, though several are often heard at the same time, being usually at quite a distance apart.

The burrows occasionally enlarge into side cavities large enough for the insect to turn around, and in such lateral chambers

the eggs are sometimes found in masses of 60 to 100, adhering to the rootlets of various plants. These eggs are spherical, white or almost colorless, and have a diameter of 0.7 mm. The young are active leapers, and are said to be about three years in reaching maturity. On July 19, 1894, a hundred or more of the half-grown young were captured in a small meshed seine while collecting fishes in a small stream in Montgomery County. They were evidently burrowing in the soft mud close to shore or perhaps in the mud beneath the shallow water. Just a year later a number of young were also taken in a seine from the waters of the outlet of Lake Wawasee, Kosciusko County. Since they feed, during their lives, mainly upon the tender roots of various plants, they are necessarily very injurious and it is fortunate that with us they are not more common than they are.

The known range of this mole cricket is a very wide one extending from British America to the southern part of South America, Perty's types having been from Minas Geraes, Brazil. R. & H. (1916, 277) first placed the *G. borealis* of Burmeister as a synonym of *hexadactyla* and as Scudder and Saussure in their keys separated the two only by the length of the inner wings and the form of the projection at the base of the second lateral dactyl of the fore tibiæ, the two names are doubtless synonymous. The long-winged form, *columbia* Scudder (1869a, 26) was first placed as a synonym of *borealis* by me in 1903. Other synonyms of *hexadactyla* are *brevipennis* Serv. (1839, 368) and *longipennis* Scudder (1862, 426).

In Florida *G. hexadactyla* has been taken by me only at St. Augustine (at light), Ormond, Lake Okeechobee and Dunedin, though its runways have been noted at almost all collecting stations. Elsewhere in the State it has been recorded only from Leon County, where Hebard found one in a cherry tree, Enterprise and Lake City. About Dunedin its runways occur in numbers around the numerous small lakes and ponds, and on March 11, 1918, I took nine males and three females by digging in the muck on the margin of one of these. The specimens thus taken were all brachypterous and were much more sluggish in their actions than when uncovered in a runway. They were smaller and darker than those from Indiana and the terminal joints of the palpi were also distinctly paler. When first uncovered the smooth silken-like luster of their surface was notable. To it not a particle of mud, muck or water adhered. There is little doubt but that this mole cricket occurs in numbers in all parts of the mainland of Florida

but has to be especially sought for in its mucky abiding places and the records for the State are therefore few.

Morse (1919a, 31) says that *hexadactyla* "probably occurs throughout New England but is very local and difficult to capture." I can find but one record from Ontario, that of Fletcher (1892) who had received it from Leamington and wrote an excellent account of its habits. There is no definite locality recorded from Michigan, though Hubbell has it from Washtenaw County. Bruner mentions it as not rare in the eastern half of Nebraska and McNeill as found about Moline, Ill. in August. The latter states (1891, 4) that it "can be made to eject from its cerci a grayish viscid substance which can be thrown several inches. The ejected mass does not have any noticeably bad odor, and if used to repel the attacks of enemies it is probably efficient by entangling the feet and covering the eyes of attacking insects." Of this habit Baumgartner (1910 316) says: "If one seizes a mole cricket of either sex it squirts from its anus a brown liquid of nauseating fetidity. This liquid is formed in part by excrement from the rectum and is in part the secretion of a special gland. It is protective in function, operating both as a repellent by its fetidity and as a restardant by its great viscosity or stickiness."

The note of the male mole cricket is a sharp di-syllabic chirp, continuously repeated and loud enough to be heard several rods away. It is usually attributed, by those who have given little attention to insect sounds, to the field cricket or to some of the smaller frogs. The cricket is very difficult to locate by this note, and I have on several occasions approached cautiously, on hands and knees, a certain spot, and remained silent for several minutes while the chirping went on apparently beneath my very eyes; yet, when the supposed exact position of the chirper was determined and a quick movement was made to unearth him, he could not be found. Indeed, it is only by chance, as by the sudden turning over of a log in a soft mucky place, that a person can happen upon one of them unawares. Even then quick motion is usually necessary to capture him before he scrambles into the open mouth of one of the burrows which he has ever in readiness. I have heard their note in the forenoon of cloudy days, but it is much more common in the afternoon. Scudder who has set the note to scale says of it (1893 63):

"Our common mole cricket usually begins its daily chirp at about four o'clock in the afternoon, but stridulates most actively at about dusk. On a cloudy day, however, it may be heard as early as two or three o'clock;

this recognition of the weather is rather remarkable in a burrowing insect, and the more so as it does not appear to come to the surface to stridulate, but remains in its burrow, usually an inch below the surface of the ground. Its chirp is a guttural sort of sound, like *grii* or *greeu*, repeated in a trill indefinitely, but seldom for more than two or three minutes, and often for less time. It is pitched at two octaves above middle C, and the notes are usually repeated at the rate of about 130 or 135 per minute; sometimes, when many are singing, as rapidly as 150 per minute. Often, when it first begins to chirp, it gives a single prolonged trill of more slowly repeated notes, when the composite character of the chirp is much more readily detected, and afterward is quiet for a long time. When most actively chirping, however, the beginning of a strain is less vigorous than its full swell, and the notes are then repeated at the rate of about 120 per minute; it steadily gains its normal velocity. It sounds not unlike a feeble distant croaking of toads at spawning season."

McNeill (*loc. cit.*) says he has "been struck with the resemblance of the note to that of the tree cricket, *Oecanthus niveus*. To my ear the only discernible difference is that of pitch. The song is a simple chirp, very low in pitch for an Orthopteron, repeated at intervals of about a second."

Baumgartner (*loc. cit.*) says that the female mole cricket has a partly developed chirping organ on its tegmina. With this it produces a single note used as a means of recognition in the dark tunnels which it inhabits; both this organ of sound and the protective secretion above mentioned being adaptations to an underground life.

308. GRYLLOTALPA MAJOR SAUSSURE, 1874, 343. Giant Mole Cricket.

Size very large, form robust. Brownish-yellow; pronotum velvety brown, with a faint narrow median groove or oval space smooth, shining and prolonged backward in several lines. Tegmina abbreviated, reaching only the fourth abdominal segment; wings fully developed, surpassing the abdomen. Front legs stout, the trochanter large and of the same shape as in *G. gryllotalpa*. Hind femora more slender than in that species; hind tibiæ feebly enlarged at middle, armed as described in key. Claws of hind tarsi equal. Length of body, ♂, 41; of pronotum 13, of tegmina, 19 mm. Width of pronotum, 10 mm.

The above are the salient points of the original description, the type of which was from Illinois. The only published record of its occurrence elsewhere, which can be found, is that of Bruner (1885, 126) who mentions and briefly describes a specimen from Labette County, Kansas under the name of *Gryllotalpa ponderosa* n. sp.? Caudell (Ms.) reports that he has received specimens from Carthage, Mo., Louisville, Miss. and Oklahoma, and specimens in the Philadelphia collections are from Riley County and Manhattan, Kansas, and Stillwater, Okla. All stud-

ents of Orthoptera in the states mentioned should look for this giant mole cricket about the boggy places of ponds, lakes and streams.

309. *GRYLLOTALPA GRYLLOTALPA* (Linnæus), 1758, 428. European Mole Cricket.

Size large, form robust. Reddish- or brownish-yellow, tinged with fuscous above, pale brownish-yellow beneath. Ocelli very small, subrotund. Antennæ scarcely longer than pronotum. Tegmina short, pointed, covering about half the abdomen; wings fully developed, caudate very rarely abbreviated. Front trochanters produced to a point. Hind tibiæ armed as in key. Anal cerci longer than pronotum. Length of body, 35—40; of pronotum, 13; of tegmina, 13—19; of hind femora, 9—11; of anal cerci, 14.5—16 mm. (Fig. 213.)

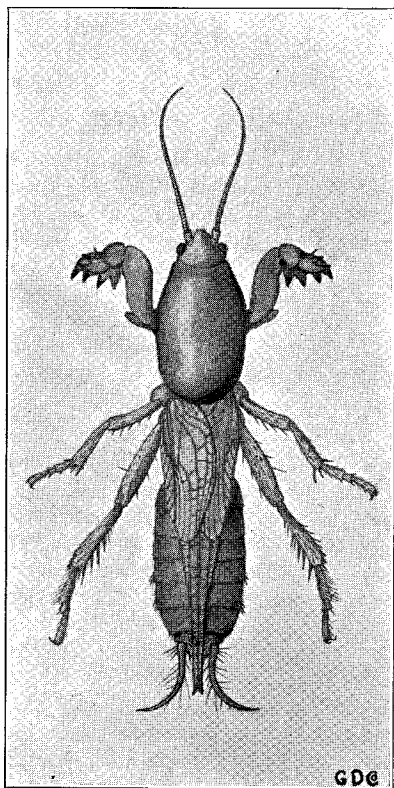


Fig. 213. European Mole Cricket. Male
× 1.5. (After Weiss.)

This large mole cricket has been introduced and become established at a few points in the eastern States. Single adventive specimens have been mentioned by several authors, Scudder (1869, 19) recording one as received in a collection from Vermont, but doubted its having been obtained there. Weiss (1915) first recorded its establishment in this country in a nursery at Rutherford, N. Jer., stating that the firm on whose premises they were found claimed to have destroyed at least 20,000, including eggs. Later he and Dickerson (1918) gave an extended account of its occurrence at Rutherford, stating that: "This infestation, which is undoubtedly of several years' duration, extends over several acres planted to herbaceous and ornamental stock, a large number

of plants being yearly imported from Europe. The soil is rather light and porous and contains a variety of shrubs, shade-trees, etc., such as one would naturally find in a nursery. No

preference is shown by the cricket for any particular plant, its zig-zag burrows being found in different parts of the area irrespective of the kinds of plants growing there. The insects have been numerous enough for the nursery to detail several men at certain periods to hunt them out and destroy as many as possible every few days."

Morse (1919, 18) records three specimens as found in a local collection at Nantucket, Mass., where it was doubtless introduced by importations of European plants. Burr (1897, 67) states that in England: "It lives in holes in damp places, potato fields, and also in sandy places. The burrow is a long winding passage at the end of which is a chamber in which the female lays about one hundred dirty yellow eggs. It feeds on roots, etc., and animal food if it can get it. The stridulation of this mole cricket has been likened (by Gilbert White) to the churr of the nightjar, but 'more inward' as the insect churrs in its burrow. It is to be heard about dusk on warm spring evenings. In France they are very numerous, and do damage by eating the roots of grass, etc., but may be killed by pouring boiling water mixed with a little oil into their holes; they then come up to die. They may be kept in cages and fed on potatoes, turnips, meat, etc., but individuals should be kept separately or they will fight and mutilate each other. It takes about two years for this mole cricket to pass through its transformations; the larvæ, and perhaps the adult insects, hibernate."

Gilbert White says of this mole cricket: "When it flies it moves *curso undoso*, rising and falling in waves or curves like woodpeckers. In different parts of England people call them fern-crickets, churr-worms and eve-churrs, all very apposite names. Anatomists who have examined the intestines of these insects, astonish me with their accounts for they say, that from the structure, position and number of their stomachs or maws, there seems to be good reason to suppose that they ruminate or chew the cud like many quadrupeds."

The majority of the European records of this insect have been made under the name of *Gryllotalpa vulgaris* Latr., a synonym; Burr (1897, 67) first restoring the older name of Linnæus.

II. SCAPTERISCUS Scudder, 1868c, 385. (Gr., "a little digger.")

Medium sized burrowing crickets resembling closely the species of *Gryllotalpa* in general appearance but easily distinguished by having only two dactyls on each of the expanded fore tibiæ.

They differ also in having the fore trochanters much longer, the free portion equalling the tibial dactyls in length; hind tibiæ always armed above on inner margin as well as at apex; basal joint of hind tarsi ending on each side with a sharp spine, the inner one the longer; apical third only of the hind tarsal claws naked; anal cerci shorter than pronotum.

The habits of these smaller mole crickets are much the same as those of the larger ones, but in tropical countries, where they are much more numerous, they often do extensive damage to crops. Barrett (1902) prepared a special bulletin on the damage done by *S. didactylus* (*vicinus* Scudd.) in Porto Rico, estimating the annual damage on that island at more than \$100,000. All the species feed on the roots, stems and leaves of living plants, especially those of cane, tobacco, rice and vegetables, growing in moist places. The species are all tropical or subtropical in range, three being recognized as occurring in our southern states.

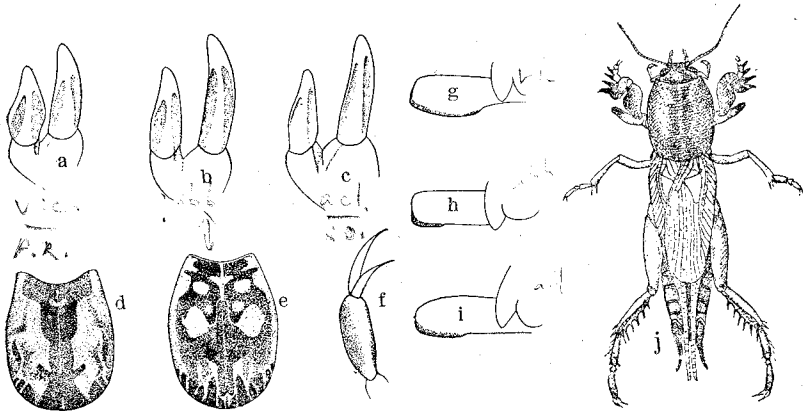


Fig. 214. Structures of *Scapteriscus*. *a*, Lateral outlines of dactyls of front tibiæ of female, $\times 4$; *d*, dorsal view of pronotum, $\times 2$; *g*, lateral outline of fore trochanter or spatula, $\times 4$, all of *S. vicinus*; *b*, *e*, *h*, same of *S. abbreviatus*; *c*, *i*, dactyls and fore trochanter of *S. acletus*; *f*, lateral outline of terminal joint of hind tarsi and claws of *abbreviatus*, $\times 3.5$; *j*, dorsal view of *S. vicinus*. (After R. & H. and Barrett.)

KEY TO EASTERN SPECIES OF SCAPTERISCUS.

- a*. Dactyls of front tibiæ almost or quite touching at base; pronotum without definite spots or figure of a distinct pattern (Fig. 214, *a*, *d*); ocelli obovate. 310. VICINUS.
- aa*. Dactyls of front tibiæ separated by a distance at least equal to one-half their basal width; pronotum either with distinct spots or figure of a definite pattern (Fig. 214, *b*, *e*); ocelli rounded or elongate-oval.
- b*. Tegmina covering only one-third of abdomen; pronotum and abdomen mottled with numerous large rounded pale spots; ocelli very small, subrotund. 311. ABBREVIATUS.
- bb*. Tegmina covering three-fourths of abdomen; pronotum and abdo-

men not strongly mottled; ocelli larger, twice as long as broad.

312. ACLETUS.

310. SCAPTERISCUS VICINUS Scudder, 1869a, 12. "Changa."

Size medium for the genus; form robust. Above pale brownish-yellow or fawn, an irregular blotch on disk of pronotum and veins of tegmina fuscous; beneath pale brown. Pronotum oval, one-third longer than wide, front margin concave, hind one broadly rounded. Tegmina usually covering three-fourths of abdomen, slightly surpassing the hind femora; wings fully developed, usually surpassing the anal cerci. Fore trochanter oblong or subspatulate, concave beneath, its tip rounded. Dactyls of fore tibiæ broad at base, subparallel, narrowly separated, their apical halves tapering, feebly decurved, the lower one the shorter and stouter (Fig. 214, a.) Dactyls of fore tarsi elongate-triangular, subacute, the inner one much the larger. Hind femora about one-fourth longer than pronotum. Hind tibiæ armed above on inner margin with four long sharp spines and at apex with two long and one short one on inner side and three short ones on outer side. Third hind tarsal joint strongly compressed, its inner terminal claw nearly as long as the segment, the outer one one-fourth shorter. Anal cerci two-thirds the length of pronotum. Length of body, ♂ and ♀, 26—29; of pronotum, 8—10.5; of tegmina, 15—20; of hind femora, 9.5—11.5; of cerci, 6.5—8 mm. Width of pronotum, 6.5—8.5 mm. (Fig. 214, j.)

St. Simon's Island, Ga. (Hebard); Brunswick, Ga., Feb. 5—Apr. 7 (Goodyear); Culebra and Guayama, Porto Rico (Pearson). This species is said by R. & H. (1916, 278) to occur abundantly in the southeastern United States, the West Indies and portions of South America. It has been usually recorded as *S. didactylus* Latr. but they state that our species is somewhat heavier with width of pronotum distinctly greater in proportion to its length and with the basal width between the tibial dactyls averaging less than in *didactylus*, which was described from Surinam and does not occur north of Costa Rica.

No definite record of the occurrence of *S. vicinus* in Florida can be found. Scudder (1869a, 11) mentions nymphs doubtfully belonging to *S. didactylus*, as having been received from Fort Jefferson, Fla. Hebard (Ent. News, XX, 179) first recorded *vicinus* from the United States, his specimens coming from Darien, Ga., where they were reported to have destroyed a great portion of the grass on the golf grounds. It has since been found at a number of places in southern Georgia, and is said by R. & H. to be a serious pest in portions of that State. In Porto Rico, on account of its face having a fancied resemblance to that of a pet monkey which there goes by the name of "Chango," it is the species known as the "Changa." It is said by Barrett (1902) to be "by far the most serious insect pest" of that island. He states that:

"The young changa very seldom leaves the ground unless driven out by water, but the adults are frequently to be seen hurrying over the surface even in the daytime. The adult males frequently fly at night and are attracted to light. Though their flight is laborious, like that of a large beetle, and not long sustained, they sometimes rise to a light 20 feet or more above the ground. They seem to prefer dark, cloudy nights in which to make their aerial excursions. Whenever the soil is moist and not too hot, be it night or day, its work of destruction is carried on, though, of course much the greater amount of damage is done at night. Its habit of burrowing just beneath the surface in a great measure saves it from the attacks of lizards, but not entirely from fowls and blackbirds, that are quick to notice the slightest movement of the earth on top of the burrow and to recognize the cause thereof. These burrows, ramifying through the soil in the vicinity of food plants, are kept open and utilized for a considerable length of time by all the mole crickets frequenting that soil area. Thus it will be seen a changa can readily pass from the roots of one food plant to those several feet, or perhaps even yards, distant without emerging from the ground or making any new gallery.

"When removed from the ground, or sometimes when surprised on the surface, the adult changa has the habit of feigning death. This 'possum' act may be prolonged several minutes. After a few minutes of intense activity directly after coming to a light, the changa usually strikes an attitude of meditation, as it were, and remains absolutely motionless for a considerable length of time.

"The changa's food consists almost wholly of living plants; the stomach, however, is always found to contain more or less mud and sand, which is probably unavoidably eaten along with the roots. Portions of decaying plants and leaves and stems of living plants are sometimes eaten. In captivity, even with plenty of its normal food, the changa will eat the dead and dying individuals of its own kind; and we suspect that it varies its normal diet with an occasional earthworm, as we have kept specimens in cages on an unmixed diet of earthworms for a week or more."

311. *SCAPTERISCUS ABBREVIATUS* Scudder, 1869a, 14. Lesser Short-winged Mole Cricket.

Size medium; form robust. Brownish-fuscous blotched with pale yellow on thorax and abdomen; head blackish, maculate with yellow; veins of the tegmina fuscous. Ocelli minute, rounded, nearly flat. Pronotum elongate-oval, one-third longer than wide. Tegmina scarcely reaching middle of hind femora, wings rudimentary. Fore trochanters long, straight, slightly twisted at base, the sides parallel, tip broadly rounded; lower margin, except near apex, armed with numerous slender spines (Fig. 214, *h.*) Dactyls of fore tibiæ well separated at base, narrower than in *vicinus*, feebly curved, the lower one the shorter. Upper dactyl of fore tarsi distinctly longer, stouter and more curved than the lower. Hind femora shorter than pronotum, strongly compressed. Hind tibiæ with four spines on upper inner margin, these gradually increasing in length, the basal one the shorter; lower inner apical spine distinctly longer than any of the others. Inner hind tarsal claw as long as its supporting segment. Length of body, ♂ and ♀, 21—24; of pronotum, 10—11; of tegmina, ♂, 4.5—5.2, ♀, 6; of hind femora, ♂, 8, ♀, 10 mm. Width of pronotum, 7 mm.

Port Tampa Fla., Feb. 7. Ybor City, Fla., Nov. 7. This is the only species of these lesser mole crickets definitely recorded from Florida. In addition to the above localities it has been taken at Lemon City, Miami, Key West and Ft. Myers by R. & H. or Davis. At Key West it was found on the sea beach in burrows in the damp sand and at Miami Hebard (1915b) "dug it out of sandy soil in a grape fruit grove. Individuals were found to burrow but a few inches beneath the surface, coming to feed beneath decaying grape fruit. Everywhere about Miami in sandy soil this insect, which is locally called 'cricket mole,' is said to do decided damage, particularly to farm truck. It is reported to have been introduced in this region in manure from Key West. The soft fat abdomen is in life whitish and distinctly paler than the hard portions of the insect." Specimens in the Gainesville collection are dark fuscous in general hue, the legs and scattered spots alone paler. This short-winged species was described from Pernambuco, Brazil, and is recorded only from that country, the West Indies, Southern Florida and White Oak, Ga.

312. *SCAPTERISCUS ACLETUS* Rehn & Hebard, 1916, 279. Unwelcome Mole Cricket.

"Size medium, form rather slender. Pinkish-buff; head with occiput blackish-brown; dorsum of pronotum with an oval of blackish-brown, this interrupted cephalad and mesad by rounded incursions from each side of pinkish-buff; tegmina and wings buffy with veins darker; caudal femora except the proximal fourth of dorso-external portion suffused with darker; abdomen dark above, pale below. Lateral ocelli over twice as long as broad. Tegmina similar to *vicinus*, the veins not as heavy and cross veinlets fewer; wings slightly surpassing apex of abdomen. Dactyls of cephalic tibiæ separated by a space equal to basal width of one of the dactyls. Spatula with distal half of ventral margin chitinous, straight, the disto-ventral angle nearly rectangulate, sharply rounded (Fig. 214, c, i.) Median tibiæ armed interno-distad with four heavy spurs. Caudal tibiæ with ventro-internal margins each bearing four long spines, the last situated slightly proximad of the three long distal spurs; disto-external margin with three short spurs, the dorsal one widely separated from the other two. Distal joint of caudal tarsus slender, no wider than metatarsus (Fig. 215.) Length of body, ♂, 26.4—34.4, ♀, 26.5—35.5; of pronotum, ♂, 8.8—11.3, ♀, 8.5—10.3; of tegmina, ♂, 14.6—17.8, ♀, 15—19.2; of caudal femora, ♂, 10—11.7, ♀, 10.2—12 mm. Width of pronotum, 6.4—8.9 mm." (R. & H.)

This species is known only from Jesup, Hebardville and White Oak, Ga. At Hebardville, "the type locality, it was found in great numbers in sandy soil. Tunnels recently made were everywhere apparent. Digging into these and the flooding of such areas revealed few examples, but a row of lettuce in a dying condition was investigated, and beneath the wilted leaves, resting on

the ground at the base of these plants, many specimens were found. The roots of the lettuce, tomatoes and beets were found

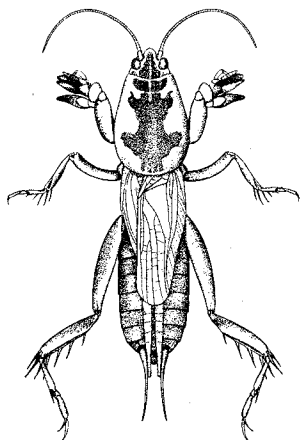


Fig. 215. Dorsal view of male type, $\times 1.5$. (After R. & H.)

to be extensively damaged by this insect, in many cases all but the main root having been completely devoured. When disturbed individuals always sought to escape under the ground, disappearing in the sandy soil with astonishing rapidity; on the surface they could run very nimbly, occasionally giving a short hop, but not attempting to fly. There is no doubt, however, but that both this species and *vicinus* can fly vigorously and during migrations, which undoubtedly occur, probably resort almost wholly to this method of locomotion. At night the rich

guttural "grrrr" of the cricket could be heard on all sides, but no individuals were found on the exposed surface of the ground." (R. & H.)

Subfamily II. TRIDACTYLINÆ.

THE SAND OR PYGMY MOLE CRICKETS.

Burrowing crickets of very small size, having the body smooth, shining; ocelli three, very small; antennæ 11-jointed,⁷⁶ widely separated at base, differing from those of all our other Gryllidæ in being submoniliform, the segments distinct and similar to those of many Coleoptera; pronotum short, covering but little of the head, not prolonged backward; tegmina of male without a tympanum; front tibiæ without a hearing organ; hind femora much swollen, strongly saltatorial; tarsi of front and middle legs in our genera two-jointed, of hind ones one-jointed or wanting; abdomen ending in four slender, tapering, bristly appendages, the lower pair styliform.

The above characterization shows clearly the important differences between these pygmy mole crickets and their larger cousins the Gryllotalpinæ. In any other group of insects such a combination of different characters would be deemed sufficient for family ranking and I have no hesitancy, therefore, in raising them to subfamily standing. Two of the three known genera occur in our eastern states. The principal literature pertaining to

⁷⁶Saussure (1877, 210) says there are only ten joints but in both our American genera there are eleven.