

The Great Lakes Entomologist

Volume 1
Number 9 – An Annotated List of the
Dermaptera, Dictyoptera, Phasmatoptera, and
Orthoptera of Michigan *Number 9 – An
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Article 1

December 1968

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**AN ANNOTATED LIST OF THE DERMAPTERA, DICTYOPTERA,
PHASMATOPTERA, AND ORTHOPTERA OF MICHIGAN***

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The only publication to date dealing exclusively with the Orthoptera and Dermaptera of Michigan is that of Pettit and McDaniel (1918). In the fifty years since their paper, several factors have combined to increase by nearly one-third the number of orthopterous and dermapterous taxa known for the state. These have been better understanding of the taxonomy of some groups, more extensive collecting, the establishment over the past several years of five advents, and the unquestioned northerly extension during the past two or three decades of the ranges of several species previously known to occur to the south in Ohio and Indiana. As might be expected, some of these taxa have undergone changes in name during this period. A most interesting observation is that of the 142 forms occurring in Michigan, all except eight were described prior to 1918. Of the names which have been assigned since that time only one has involved a population completely new to science. The remaining names have resulted from changes made necessary by examination of types, or by the application of new or more sophisticated methods of analyzing populations and population segments.

Although grasshoppers and their allies have been taken in all parts of the state, relatively few areas have been intensively collected by orthopterists. The studies of Hubbell (1922) and of Cantrall (1943) involved Berrien and Livingston Counties respectively. Other areas scattered over the state have been sufficiently sampled so that the list below may be considered as essentially complete. Some shuffling of names may be anticipated, and a few species will more than likely move northward into Michigan. Continued collecting will serve to fill out more completely and make more meaningful the distributional patterns of these orders in Michigan.

The papers cited above pertain either to the total fauna of specific areas, or to the entire state. General information on life-histories, ecology, and the recognition of forms can be found in the broad works of Blatchley (1920) and Hebard (1934). In recent years, several groups have been treated in more detail than in the above references. Citation to pertinent literature for these groups is given in the appropriate place.

The present list was based originally on material collected and made available by the late Dr. Robert R. Dreisbach. To the records from that collection have been added those taken from many thousands of additional specimens in The University of Michigan Museum of Zoology (UMMZ), and in the Entomological Museum of Michigan State University (MSU). Distributions (Figs. 2-142) are based upon county records, and have been plotted only for those taxa which are native, which are established advents, or which are known to occur as

*Dedicated to the memory of Robert R. Dreisbach whose boundless energy and fervent zeal did so much to further the study of Michigan Arthropods.

vagrants within the state. Literature records have been used only when they have been involved in the revisionary studies cited below. Dates, unless otherwise indicated, are those of the earliest and latest collections of adults taken in Michigan. Owing to the need for brevity in this list, it is not possible to outline in detail the range of habitat occupancy of many of the species. In numerous instances a summary of environments has been given to indicate, in a general way, where the insects should be sought in Michigan.

Although all of the native species of Orthoptera which are known to occur in Michigan are believed to have an annual lifecycle, there is reason to suspect



Figure 1. The counties of the State of Michigan.

that in the Upper Peninsula some or all of the eggs of one or more species may require two seasons for development. This delay is not a matter of a prolonged period of nymphal growth, but rather a delay in embryonic development and eclosion. In most species there is a clear indication of the lifecycle, the stages following one another sequentially. In the genus *Ceuthophilus* the stages of the lifecycle occur concomitantly. The appearance, development, and decline of adult populations follow several patterns. A late spring fauna is made up of those species which overwinter as juveniles or adults. The adults are most common in May and early June. A second cluster of forms hatch in the early spring, mature more rapidly and appear as adults in June and early July. Members of a third fauna, also overwintering as eggs, hatch later and develop more slowly, so that most of the components mature in late July and early August.

Generally the adult populations develop explosively; peak numbers are usually reached within a week or ten days after the appearance of the first adult. Males appear a few days before the females and die sooner than the latter. Decline in the populations is slower and more drawn out. The species of the late summer fauna have varying degrees of susceptibility to cold. Some die away rapidly with the coming of cool nights in early September, others are able to tolerate the effects of light frosts, and yet still others hang on until heavy, killing frosts and dying vegetation make their environment untenable. Much remains to be learned regarding early and late captures, because these involve times of the year when collectors have been busy with other activities.

Order DERMAPTERA

The Earwigs

Family LABIIDAE

Subfamily LABIINAE

Genus LABIA Leach

minor (Linnaeus) 1758. (Little Earwig). (Fig. 2). May 21 to September 26. An established European species which has probably been overlooked owing to its small size and similarity to a rove beetle. Most specimens have been taken at light. Nocturnal.

Family FORFICULIDAE

Subfamily FORFICULINAE

Genus DORU Burr

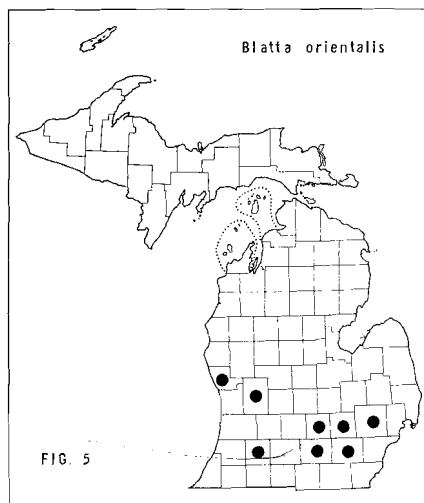
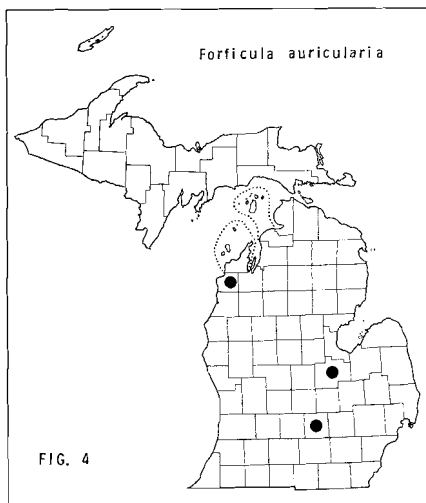
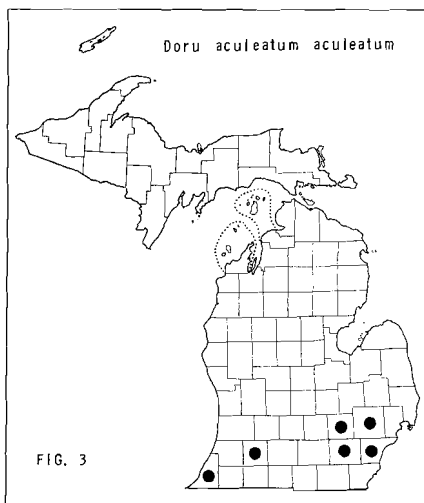
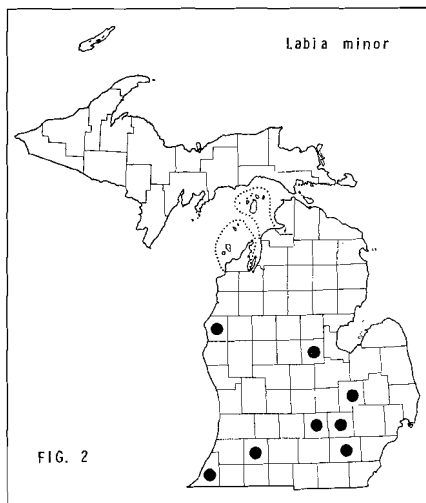
aculeatum aculeatum (Scudder) 1876. (Spine-tailed Earwig). (Fig. 3). May 27 to September 30. Described from "Southern Michigan." Nocturnal. Found during the day in the axils of the sedge, *Carex riparia* var. *lacustris*, growing in marshes which are adjacent to woodland. Hibernates as the adult. Except for mid-summer, adults can be collected through the year.

Genus FORFICULA Linnaeus

auricularia Linnaeus 1758. (European Earwig). (Fig. 4). An established advent in recent years. A pest in Saginaw in July 1967, this species has been found common on milkweed in Benzie County. Hibernates as an adult. Nocturnal.

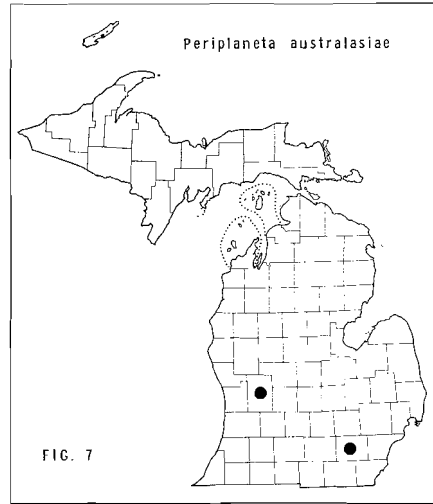
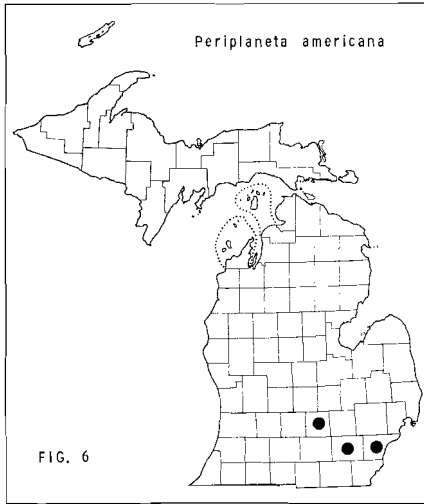
Order DICTYOPTERA
Family BLATTIDAE
The Cockroaches
Subfamily BLATTINAE
Genus BLATTA Linnaeus

orientalis Linnaeus 1758. (Oriental Cockroach). (Fig. 5). Adult the year around. An established advent, this cockroach is a very common inhabitant of restaurants and institutions. It is probably widespread in Michigan.



Genus PERIPLANETA Burmeister
americana (Linnaeus) 1758. (American Cockroach). (Fig. 6). Adult the year around. An established advent in stores, restaurants, and institutions. Undoubtedly widely distributed in the southern part of the Lower Peninsula.

australasiae (Fabricius) 1775. (Australian Cockroach). (Fig. 7). Adult the year around. In Michigan the Australian Cockroach is established in institutions, stores and restaurants. The records almost certainly fail to reflect its abundance and distribution.



Subfamily POLYZOSTERIINAE

Genus EURYCOTIS Stal

floridana (F. Walker) 1868. (Florida Cockroach). Adventive, probably not established. Taken in Berrien County in the "Spring of 1918"

Family BLATTELLIDAE

Subfamily PLECTOPTERINAE

Genus SUPELLA Shelford

longipalpa (Fabricius) 1798. (Brown-banded Cockroach). (Fig. 8). Adult the year around. This recently established advent is believed to be widespread in the southern Lower Peninsula. It is domiciliary and is found more generally throughout an infested building than is the case with the German Cockroach.

Genus NEOBLATTELLA Shelford

sp. Adventive; probably not established. Specimens have been taken in Washtenaw (August 28, 1932; UMMZ) and Wayne (May 20, 1914; UMMZ) Counties.

Subfamily BLATTELLINAE

Genus BLATTELLA Caudell

germanica (Linnaeus) 1767. (German Cockroach). (Fig. 9). Adult the year around. In Michigan the German Cockroach is domiciliary, very common, and widespread. It undoubtedly occurs in, or will occur in every county in the state. In infested buildings, it tends to be located close to kitchens and other sources of food and water.

Genus PARCOBLATTA Hebard

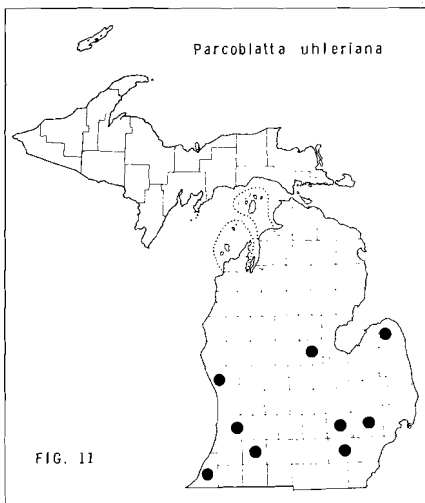
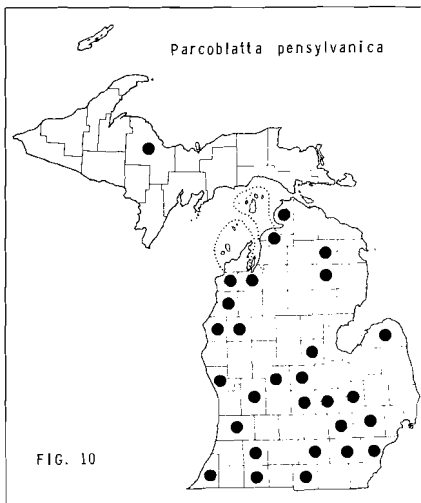
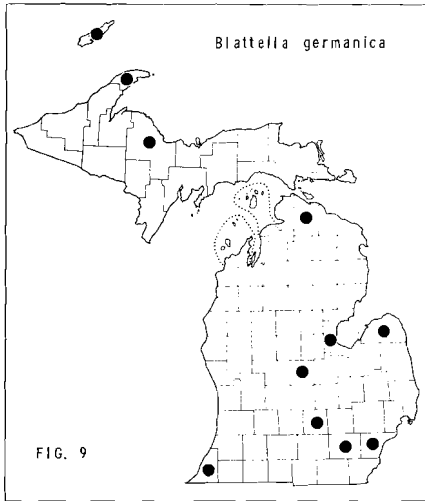
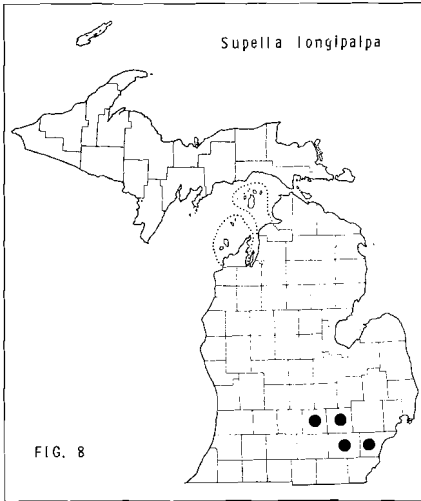
The Wood Roaches

The members of this genus are the only native cockroaches found in Michigan. The species hibernate as nymphs, and are mature only during early- and mid-summer. The wings of the female wood roaches are much reduced. The long-winged males are readily attracted to lights. Individuals are often introduced into houses by way of fireplace wood, but are not known to have ever become established in domiciliary environments.

pensylvanica (DeGeer) 1773. (Pennsylvania Wood Roach). (Fig. 10). Adult from early June until late August. Common throughout upland forests.

uhleriana (Saussure) 1862. (Uhler's Wood Roach). (Fig. 11). Adult from early June until late August. Found in mesic woodlands.

virginica (Brunner) 1865. (Virginia Wood Roach). (Fig. 12). Adult June 10 to August 18. A denizen of mesic woodlands.



Subfamily ECTOBIINAE

Genus **ECTOBIUS** Stephens

pallidus (Olivier) 1789. (Spotted Mediterranean Cockroach). (Fig. 13). An established advent, first noticed in 1967 when it was taken near Bloomfield Hills, Oakland County on September 1 and 8, and on October 26 and 30. Gurney (1953) notes that this cockroach was observed for the first time in the United States in 1948 at Falmouth, Massachusetts where it is now well established and spreading. He has kindly identified Michigan specimens. He indicates (*op. cit.*) that *livens* (= *pallidus*) is only casually domiciliary and that it will likely become no more than a nuisance pest in the vicinity of gardens and dwellings.

Subfamily NYCTIBORINAE

Genus **NYCTIBORA** Burmeister

noctivaga Rehn 1902. (Great Brown Cockroach). A casual advent on tropical produce. Specimens have been taken in Clare, Genesee, and Wayne Counties.

Family BLABERIDAE

Subfamily PANCHLORINAE

Genus **PANCHLORA** Burmeister

nivea (Linnaeus) 1785. (Cuban Cockroach). May 18 and September 9. *P. nivea* has been taken in Washtenaw and Wayne Counties as a casual advent on tropical produce.

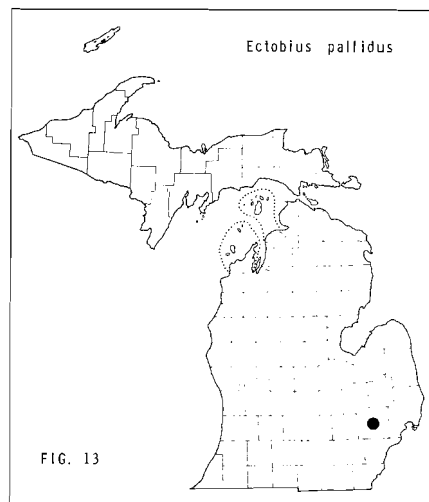
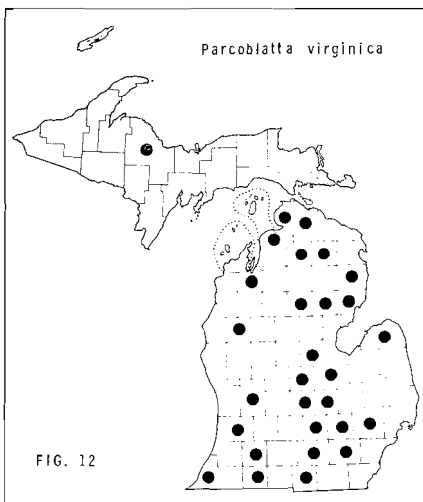
Family MANTEIDAE

The Praying Mantids

Subfamily MANTEINAE

Genus **MANTIS** Linnaeus

religiosa religiosa (Linnaeus) 1785. (European Mantid). (Fig. 14). Adult mid-summer to early frosts. An established advent, probably by way of southern Ontario. The first specimen seen by me was taken August 22, 1957 in St. Clair County.



Genus **TENODERA** Burmeister

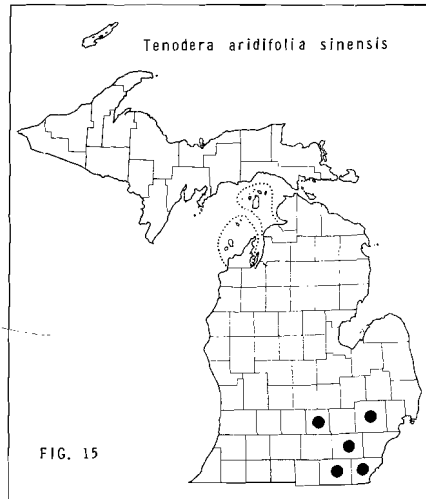
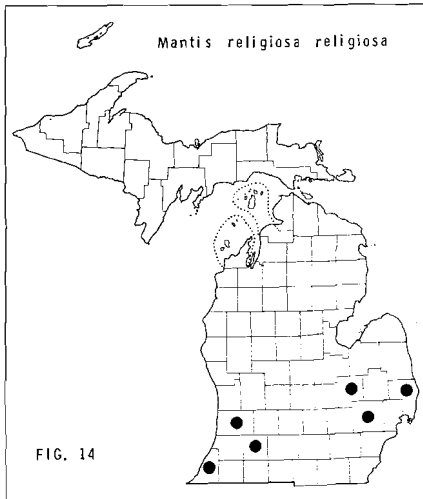
aridifolia sinensis Saussure 1871. (Chinese Mantid). (Fig. 15). Adult late summer (September) to October 13. This mantid has apparently become established in southeastern Michigan sometime during the last two decades. It is commonly reared in biology laboratories, and is often released out-of-doors.

Order **PHASMATOPTERA**

The Walking Sticks

Family **PHASMATIDAE**Subfamily **HETERONEMIINAE**Genus **DIAPHEROMERA** Gray

femorata (Say) 1824. (Common Walking Stick). (Fig. 16). A characteristic insect of the arboreal stratum of oak forests. Adults may be found from early August until the leaves drop in the fall. Graham (1937) notes that *D. femorata* is partial to black oaks. He describes instances of defoliation and gives information on the life-cycle.

Order **ORTHOPTERA**Suborder **CAELIFERA**

The Locusts

Family **TETRIGIDAE**

The Grouse Locusts

Rehn and Grant (1961), in the first volume of their projected *Monograph of the Orthoptera of North America*, summarized and referred to a series of their papers in which they discussed in considerable detail all of the grouse locusts known to occur in Michigan. All UMMZ and MSU material of this group formed part of their studies. For this reason Michigan distributional records are based largely on these works.

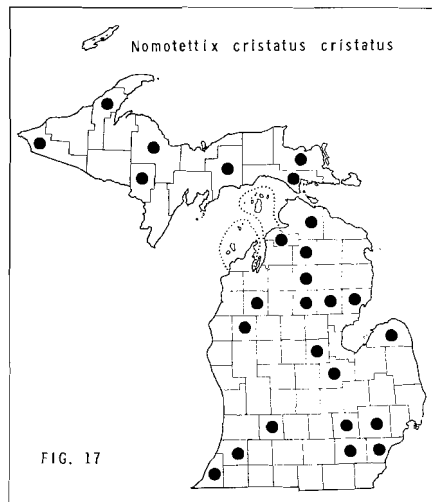
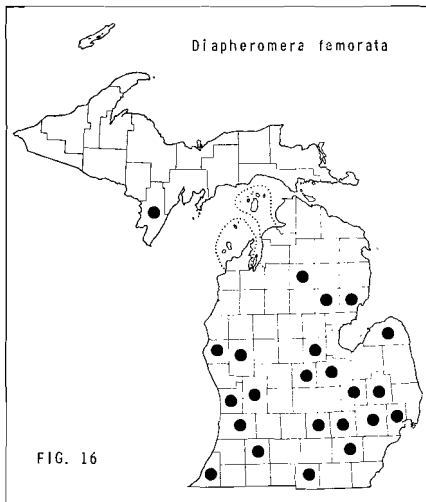
All grouse locusts found in the State are believed to have no more than one brood each year in Michigan. Adults, and occasionally a late instar nymph, pass

the winter in hibernation, becoming active from time to time in response to the warmer winter days. The warm days of spring result in increased activity and the formation of breeding aggregations. Following egg laying in the late spring and early summer, adults die and their numbers diminish as the young appear and develop. However, adults can be found throughout the summer months, because spent individuals are not subjected to the deleterious effects of fall frosts as is the case with the true locusts. Maturity is reached by late summer at which time the adults of several species tend to disperse. For this reason they may be found in environments considerably different from those where the eggs were laid.

Subfamily TETRIGINAE
Genus **NOMOTETRIX** Morse

cristatus cristatus (Scudder) 1862. (Northern Crested Grouse Locust). (Fig. 17).

June 20 to September 23. *N. cristatus cristatus* is an inhabitant of much drier environments than is usual for the other Michigan tetrigids. It has been found in a variety of habitats, most often among scant grassy or bushy vegetation along dry woodland borders. The presence of moss seems to be a good indicator.



Genus **TETRIX** Latreille

arenosa angusta (Hancock) 1896. (Obscure Grouse Locust). (Fig. 18). Adult the year around. Common on moist or wet areas about woodland pools, sand and mud shores, pond margins, flood-plain forests, and swamps.

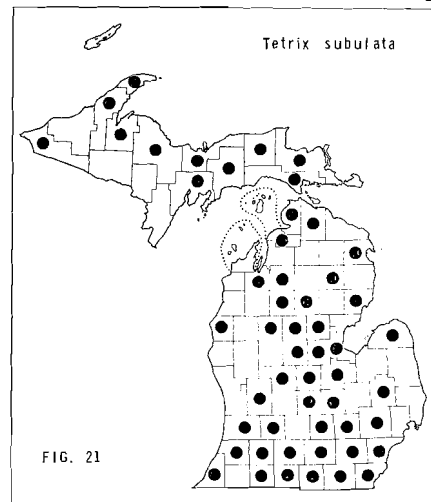
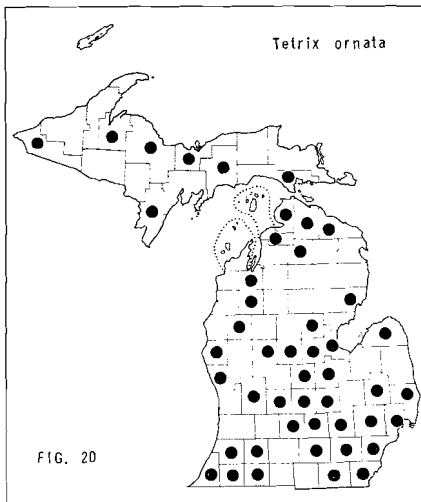
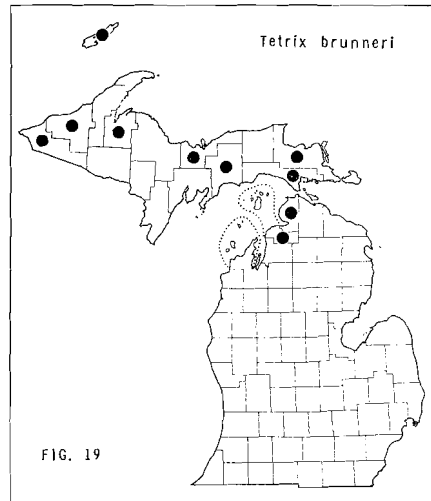
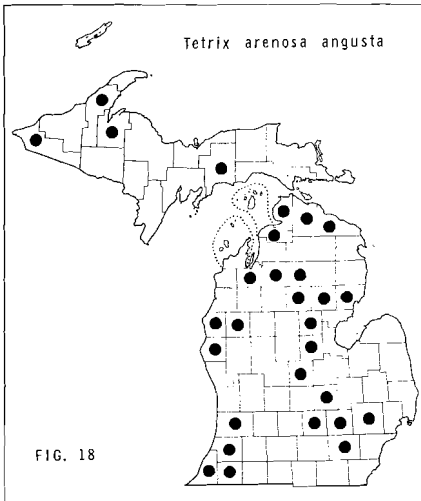
brunneri (I. Bolivar) 1887. (Brunner's Grouse Locust). (Fig. 19). July 21 to September 1. A northern tetrigid barely reaching the southern peninsula in its southward distribution. It favors moist areas of meadowy or boggy character.

ornata (Say) 1824. (Ornate Grouse Locust). (Fig. 20). Rehn and Grant (1956) recognize four subspecies of *ornata*. Two of these, *ornata ornata* (Say) 1824, and *ornata hancocki* (Morse) 1899, have a common distribution over large areas of the United States and southern Canada. Both occur over much of

Michigan, often together at the same locality. To date, no recognizable differences in ecological requirements, or in details of the life-cycle have been determined. I believe that Rehn and Grant's interpretation of the populations of *ornata* is open to question, if not untenable. For this reason I have assigned all Michigan records to *ornata*.

Individuals of *ornata* are partial to moist, bare, or sparsely vegetated soil bordering upon a body of water. Adults have been taken in all of the warmer months of the year. March 20 to November 11.

subulata (Linnaeus) 1761. (Slender Grouse Locust) (Fig. 21). Adult the year around. One of the commonest grouse locusts in the state. It characteristically occupies the wet margins of swamps, marshes, streams, and lakes.

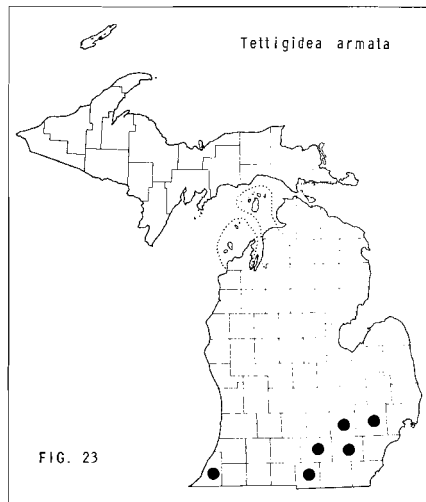
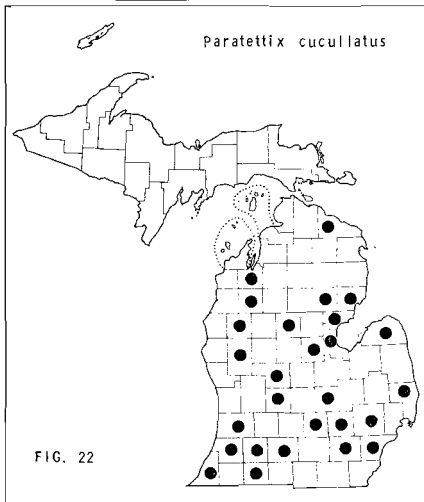


Genus **PARATETTIX** I. Bolivar

cucullatus (Burmeister) 1838. (Hooded Grouse Locust). (Fig. 22). Adult the year around. The preferred habitat of this grouse locust is the margin of marshes, lakes, or streams where there is sufficient water to produce muck and enable the growth of algae.

Subfamily **BATRACHIDEINAE**Genus **TETTIGIDEA** Scudder

armata Morse 1895. (Spined Grouse Locust). (Fig. 23). Adult the year around. *T. armata* reaches the northern limit of its range in southern Michigan. It shows a preference for wet muck in swamps, forests, and areas adjacent to wood-margined ponds.



lateralis lateralis (Say) 1824. (Sedge Grouse Locust). (Fig. 24). Adults have been taken in all except the coldest months of the year. A common and generally distributed tetrigid which should be sought in almost any moist or wet environment in the state. *T. lateralis lateralis*, as a characteristic subspecies, is found to the south and east of Michigan. Specimens of *lateralis* taken in the state are representative of populations intermediate between the nominal form and *lateralis cazieri* (Rehn and Grant, 1958), found in western Nebraska, eastern Colorado, and in parts of New Mexico and Arizona. As Michigan is traversed from south to north there is an increased tendency toward *cazieri*.

Family **TRIDACTYLIDAE**

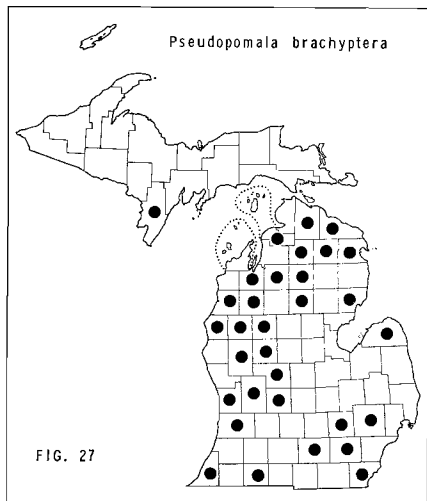
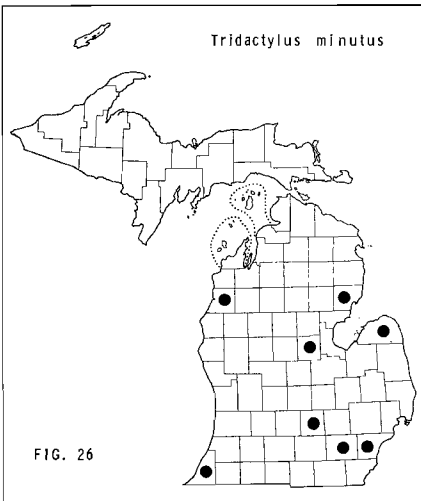
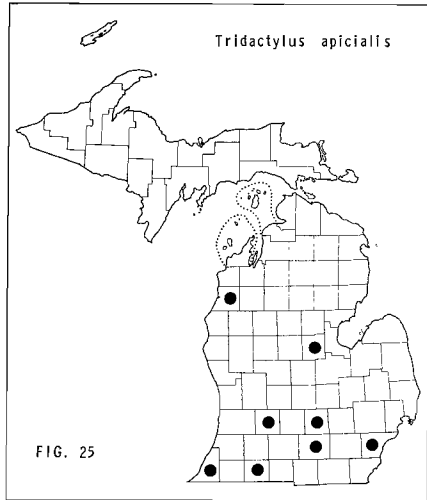
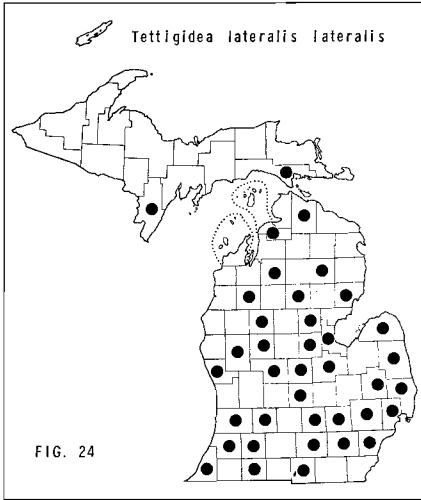
The Pygmy Locusts

Subfamily **TRIDACTYLINAE**Genus **TRIDACTYLUS** Olivier

These small insects create minute "mole-burrows" in very sparsely vegetated, damp, sandy areas which are usually adjacent to a stream, roadside ditch, pond, or lake.

apicalis Say 1825. (Larger Pygmy Locust). (Fig. 25). May 9 to October 3.

minutus Scudder 1862. (Minute Pygmy Locust). (Fig. 26). May 8 to September 8.



Family ACRIDIDAE

The True Locusts

Subfamily GOMPHOCERINAE

The Slant-Faced Locusts

Genus PSEUDOPOMALA Morse

brachyptera (Scudder) 1862. (Bunch Grass Locust): (Fig. 27). June 29 to September 7. In many parts of the Lower Peninsula *P. brachyptera* is common in dry grasslands and rank prairie-like growths of grass and herbage. In marginal environments it has been found among tall, lush marsh vegetation.

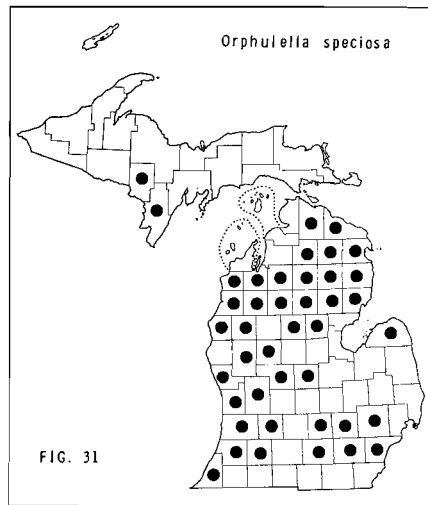
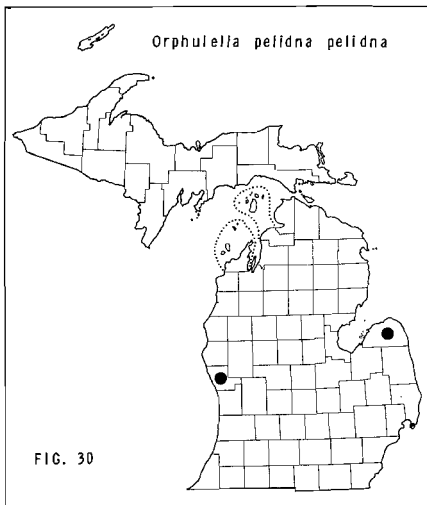
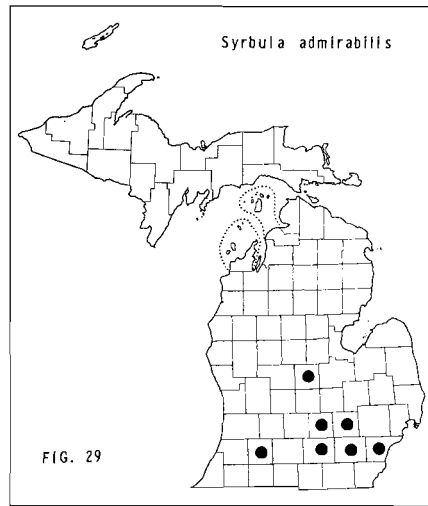
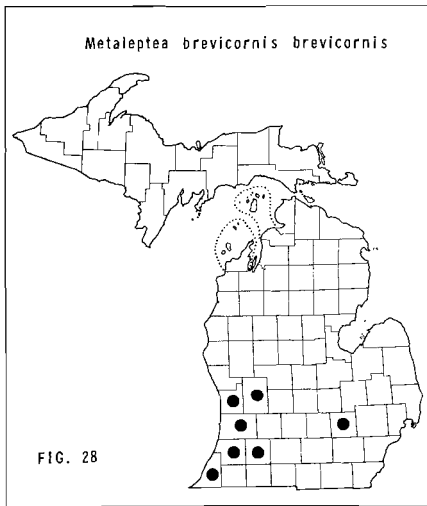
Genus METALEPTEA Brunner

brevicornis brevicornis (Johannson) 1764. (Short-horned Locust). (Fig. 28).

August 9 to September 15. Common among tall grasses, sedges, and lizard's tail in marshes and swales, and along the margins of lakes, ponds, and streams.

Genus **SYRBULA** Stal

admirabilis (Uhler) 1864. (Handsome Locust). (Fig. 29). August 16 to September 15. *S. admirabilis* has moved into southern Michigan sometime during the past twenty years. It is now fairly common in old, fallow fields where the soil is poor and the vegetation sparse.



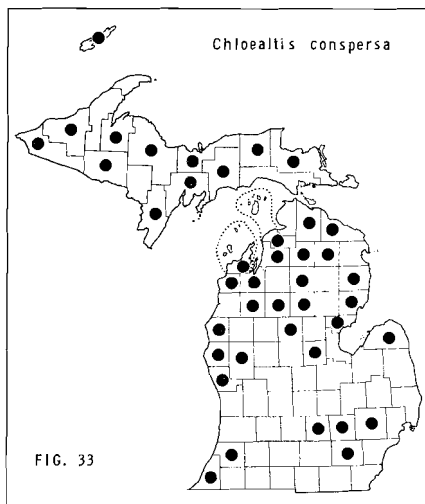
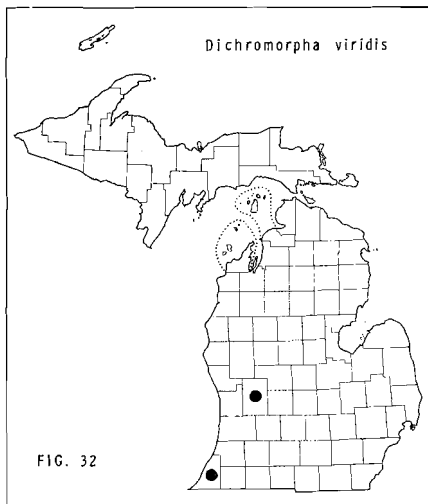
Genus **ORPHULELLA** Giglio-Tos

pelidna pelidna (Burmeister) 1838. (Spotted-winged Locust). (Fig. 30). July 14 to September 2. Specimens from Huron County were taken on bare sand in

sparsely grass-covered open black oak and jack-pine woods.
speciosa (Scudder) 1862. (Pasture Locust). (Fig. 31). July 9 to September 25.
 Usually found among the grasses and herbaceous growth of dry upland fields.

Genus *DICHROMORPHA* Morse

viridis (Scudder) 1862. (Short-winged Locust). (Fig. 32). "June," September 2, and September 9. A common southern species reaching the northern limits of its distribution in Michigan. It is rather plastic in its ecological requirements and is found in ruderal environments, especially among the course vegetation growing along the margins of ponds, lakes and other wet places.



Genus *CHLOEALIS* Harris

conspersa Harris 1841. (Sprinkled Locust). (Fig. 33). June 20 to October 11.
 This grasshopper lays its eggs in soft and decaying wood of stumps, logs, and down timber. It is to be found in or near woodlands where it inhabits the shrub-terrestrial stratum.

Genus *NEOPODISMOPSIS* Bei-Bienko

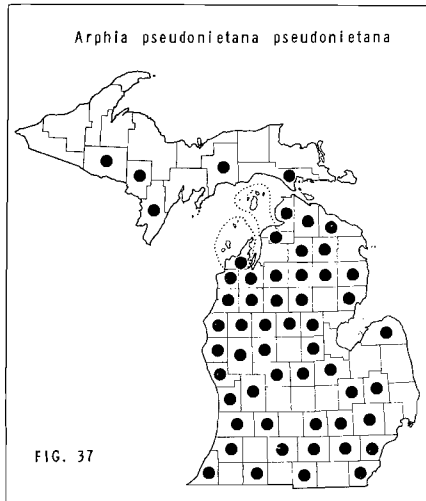
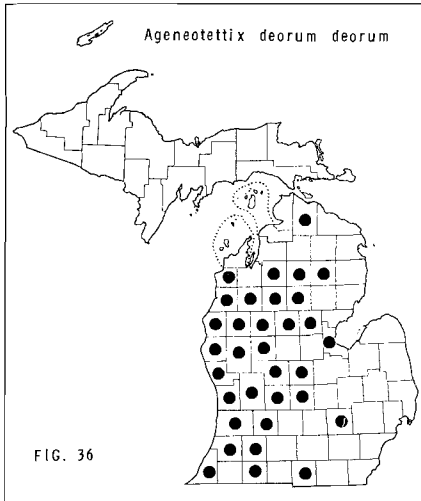
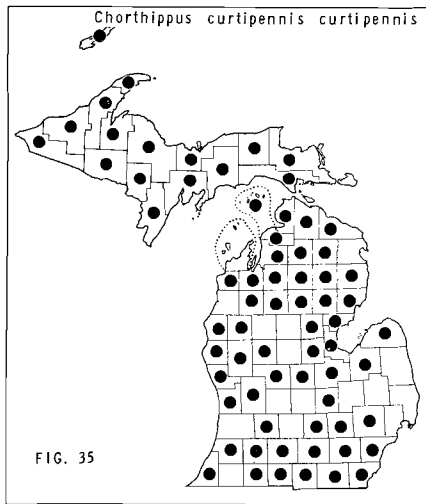
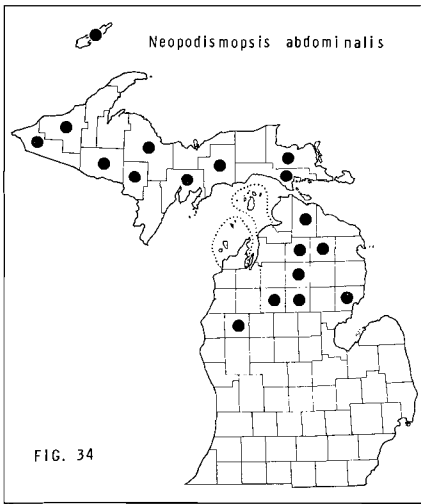
abdominalis (Thomas) 1873. (Rocky Mountain Sprinkled Locust). (Fig. 34).
 July 9 to October 18. Common in northern Michigan among the low shrubby vegetation along the margins of woods and forest trails; in and around openings in both pine and hardwood forests.

Genus *CHORTHIPPUS* Fieber

curtipennis curtipennis (Harris) 1841. (Meadow Locust). (Fig. 35). June 20 to October 18. A very common marsh or low ground inhabitant.

Genus *AGENEOTETTIX* McNeill

deorum deorum (Scudder) 1876. (Sand Locust). (Fig. 36). July 12 to September 10. This prairie species was unknown in Michigan until Hubbell (1922) reported a single specimen taken in Berrien County in 1920. Since that time it has spread east and north over a major portion of the lower peninsula. It is to be found in areas of open, poorly vegetated sandy soils.



Subfamily OEDIPODINAE
The Band-Winged Locusts
Genus ARPHIA Stal

- pseudonietana pseudonietana** (Thomas) 1870. (Red-winged Locust). (Fig. 37). July 10 to September 28. Common in open upland fields and grassland. Yellow-winged demes of this grasshopper occur in the Upper Peninsula as far east as Schoolcraft County.
- sulphurea** (Fabricius) 1781. (Spring Yellow-winged Locust) (Fig. 38). May 9 to August 5. This is the common yellow-winged grasshopper seen in spring and early summer among mixed grass-herbaceous growths in upland fields.
- xanthoptera** (Burmeister) 1838. (Autumn Yellow-winged Locust). (Fig. 39). August 31 to September 23. A common grasshopper to the south and west of

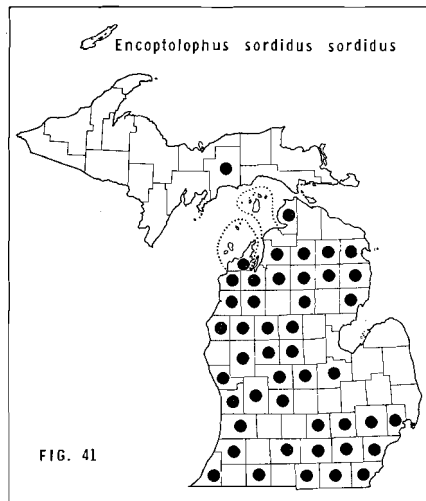
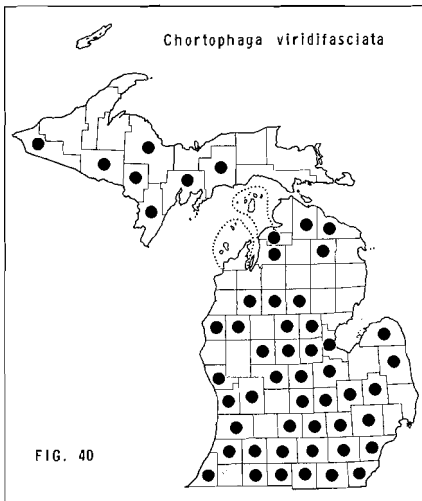
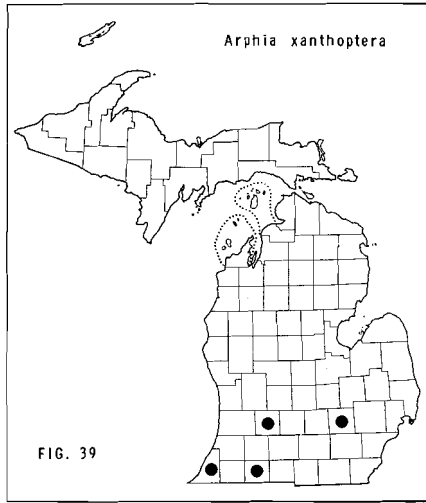
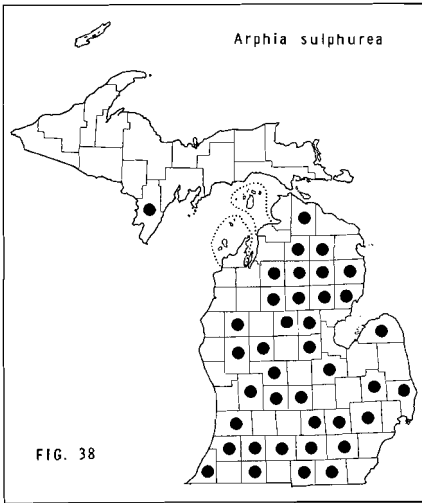
Michigan, this species seems to be extending its range northward in the state. It is a denizen of upland fields and grassland.

Genus **CHORTOPHAGA** Saussure

viridifasciata (DeGeer) 1773. (Green-striped Locust). (Fig. 40). April 20 to August 16. This species is one of the earliest locusts to appear in the spring. It is to be found in grassy-herbaceous fields, and is often taken in moister swales and grassland.

Genus **ENCOPTOLOPHUS** Scudder

sordidus sordidus (Burmeister) 1838. (Dusty Locust). (Fig. 41). July 8 to November 10. A common fall inhabitant of upland fields, pastures, roadsides, and ruderal environments.



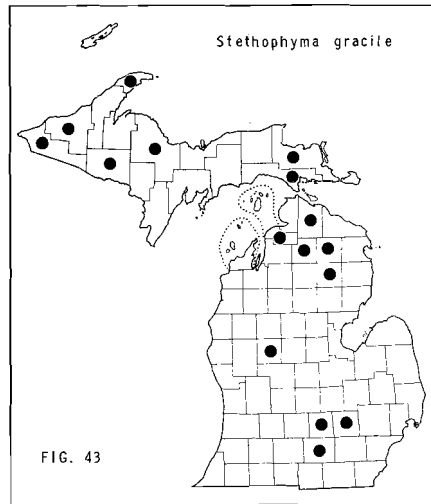
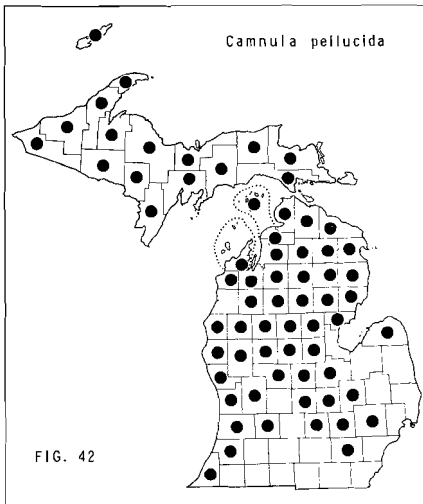
Genus **CAMNULA** Stal

pellucida (Scudder) 1862. (Clear-winged Locust). (Fig. 42). July 17 to September 25. An abundant, and sometimes destructive, grasshopper in the fields and pastures of northern Michigan, this species is rather local in distribution and much less frequent in numbers in the southern part of the state.

Genus **STETHOPHYMA** Fischer

gracile (Scudder) 1862. (Northern Sedge Locust). (Fig. 43). July 18 to October 12. An inhabitant of semi-permanent marshes among the thick growths of grasses, sedges, and herbs.

lineatum (Scudder) 1862. (Striped Sedge Locust). (Fig. 44). June 30 to October 1. Found among the grasses and sedges of marshes or the low, wet margins of swamps and lakes.

Genus **PARDALOPHORA** Saussure

apiculata (Harris) 1835. (Coral-winged Locust). (Fig. 45). May 12 to July 16.

This species has been taken over much of Michigan among the mixed grasses and herbs of upland fields.

haldemanii (Scudder) 1872. (Haldeman's Locust). (Fig. 46). May 27 to August 30. The species is a native of the prairies of mid-United States. It is probably extending its range to the east and north in the southern part of the Lower Peninsula. It is found in grassy herbaceous uplands.

Genus **DISSOSTEIRA** Scudder

carolina (Linnaeus) 1758. (Carolina Locust). (Fig. 47). June 24 to September 11. The Carolina Locust is one of the commonest of the band-winged grasshoppers in the state. Its penchant for dusty paths, trails, roadways, and open areas, and the black disks of its hind wings make it one of the most conspicuous and easily recognized grasshoppers in the state of Michigan.

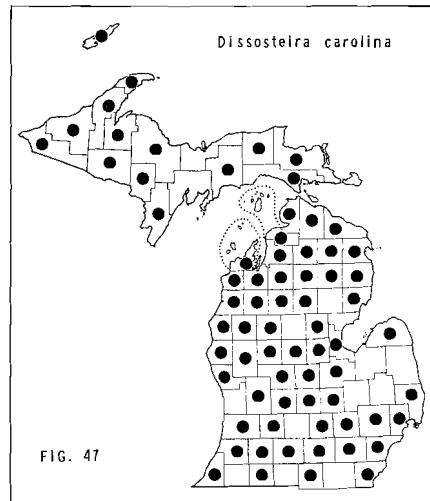
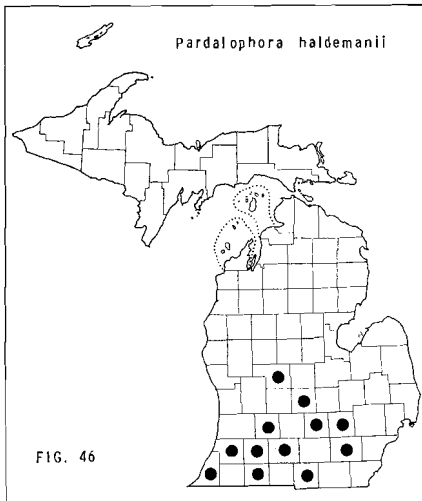
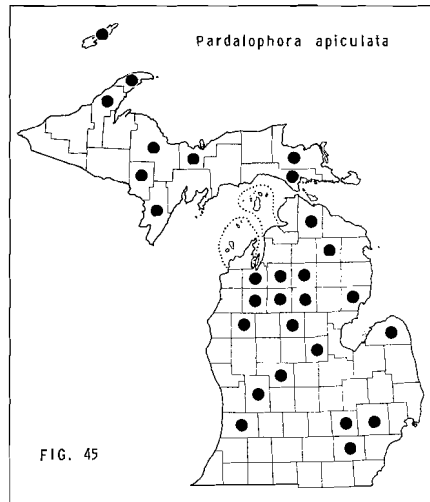
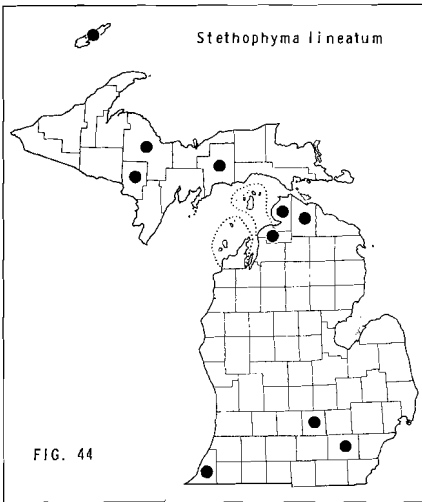
Genus **SPHARAGEMON** Scudder

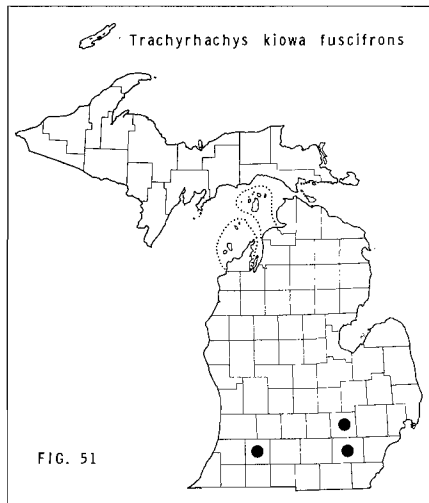
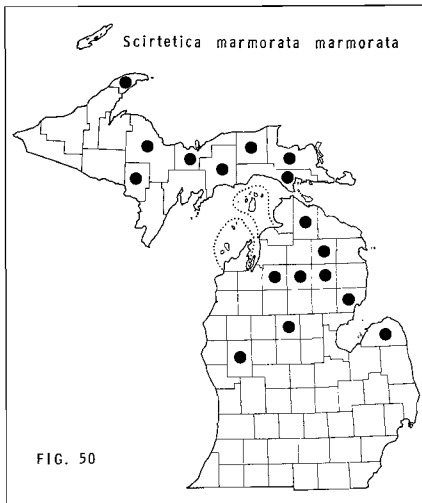
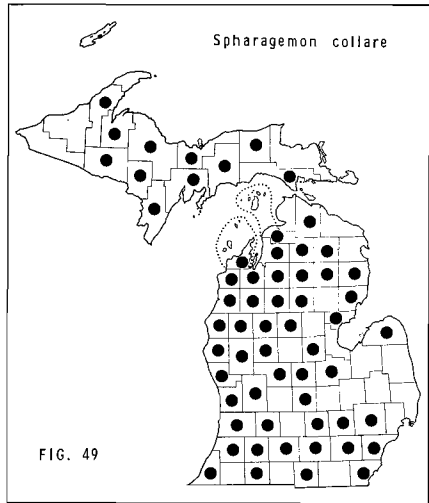
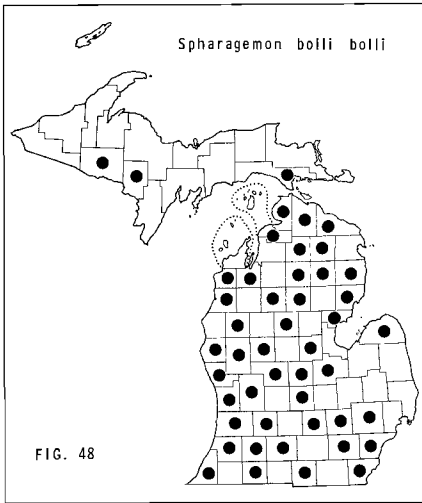
bolli bolli Scudder 1875. (Boll's Locust). (Fig. 48). July 1 to October 18. This

Spharagemon frequents forest borders or open woodland, where it can be found along the grassy margins, and in the low shrub-terrestrial stratum. *collare* (Scudder) 1871. (Mottled Sand Locust). (Fig. 49). June 10 to November 1. From mid-June until heavy, killing frosts, this species is one of the more abundant grasshoppers of thinly vegetated, sandy upland fields and pastures.

Genus **SCIRTETICA** Saussure

marmorata marmorata (Harris) 1841. (Northern Marbled Locust). (Fig. 50). July 12 to September 12. In Michigan the Marbled Locust is associated with lichens and mosses of the open, sparsely vegetated, sandy soils of the Upper Peninsula and of the northern half of the Lower Peninsula.





Genus TRACHYRHACHYS Scudder

kiowa fuscifrons (Stal) 1873. (Ash-brown Locust). (Fig. 51). July 21 to September 26. This species was taken in Michigan for the first time in 1957 at the Edwin S. George Reserve, Livingston County, where it was found in a sparsely vegetated, open, sandy upland area. It has since been taken at the University of Michigan Botanical Gardens in Washtenaw County, and, in 1964, at the Gull Lake Biological Station in Kalamazoo County.

Genus PSINIDIA Stal

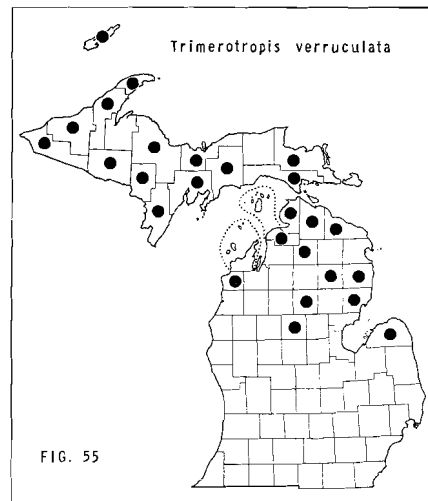
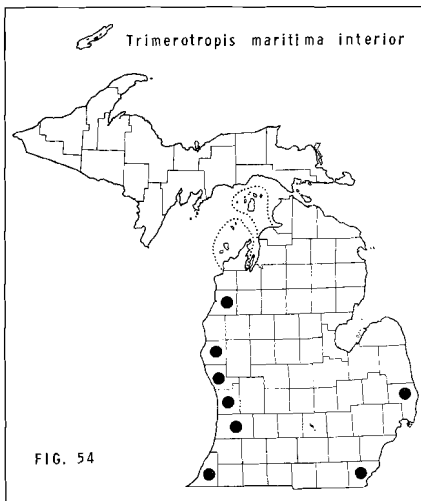
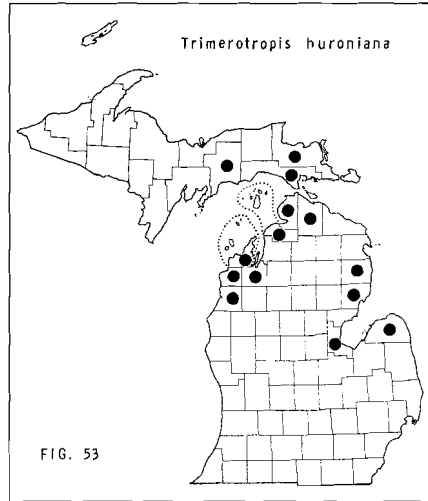
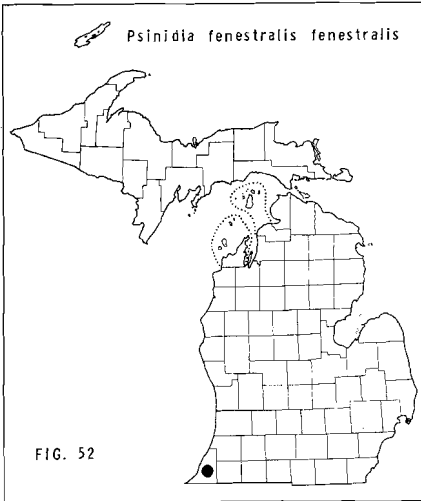
fenestralis fenestralis (Serville) 1839. (Long-horned Locust). (Fig. 52). August 31 to September 9. This species is known in Michigan only from Berrien County where Hubbell found it common among bunch grass growing on low dunes and upon an abandoned, sand-drifted railroad grade.

Genus **TRIMEROTROPIS** Stal

huroniana E. M. Walker 1902. (Lake Huron Locust). (Fig. 53). July 6 to September 11. In Michigan this beach locust is limited in distribution to the eastern portion of the Upper Peninsula and the northern part of the Lower Peninsula, where it is to be found in greatest numbers on dry sand among the scattered grasses and herbage of the upper beaches of Lakes Michigan, Superior, and Huron. Southwardly, *huroniana* is replaced in Manistee County on the west and in St. Clair County on the east by *T. maritima interior*.

maritima interior E. M. Walker 1898. (Seaside Locust). (Fig. 54) July 9 to September 11. *T. maritima interior* supplants *T. huroniana* on the beaches of Lakes St. Clair, Erie, and Michigan in the southern part of the Lower Peninsula.

verruculata (Wm. Kirby) 1837. (Cracker Locust). (Fig. 55). July 8 to September



ber 22. A common grasshopper in the northern part of the state. The Cracker Locust favors rocky exposures, or dry, open areas of bare soil along roads, trails, and in upland fields.

Subfamily CYRTACANTHACRIDINAE

The Bird-Locusts

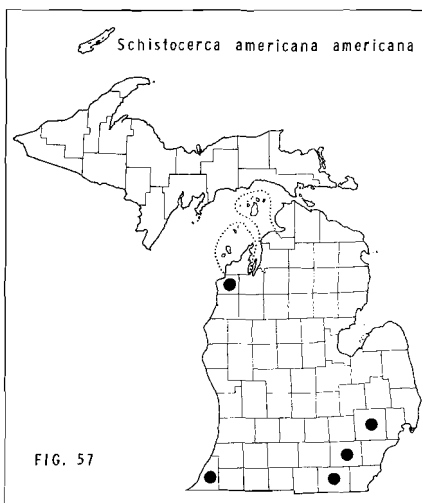
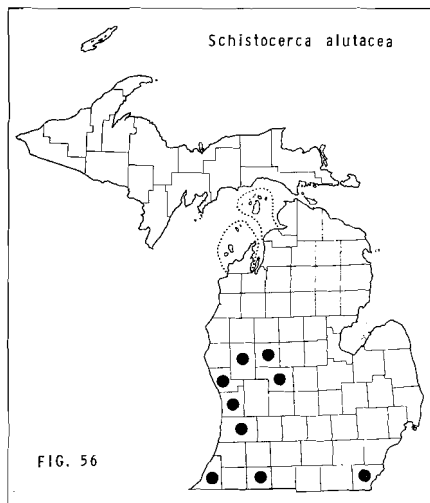
Genus SCHISTOCERCA Stall

The members of this genus are all strong fliers and are often carried considerable distances by strong winds. Hubbell (1960) has presented a lengthy study on *alutacea* and *emarginata*.

alutacea (Harris) 1841. (Leather-colored Bird-Locust). (Fig. 56). June 30 to October 7, with peak adult abundance in August. Lives in rank weed and shrubby growths on moist sandy soils.

americana americana (Drury) 1773. (American Bird-Locust) (Fig. 57). Dates of capture are July 14, October 27, and November 3. This locust is not known to breed in Michigan. Records are for individual specimens and are apparently based on migrants.

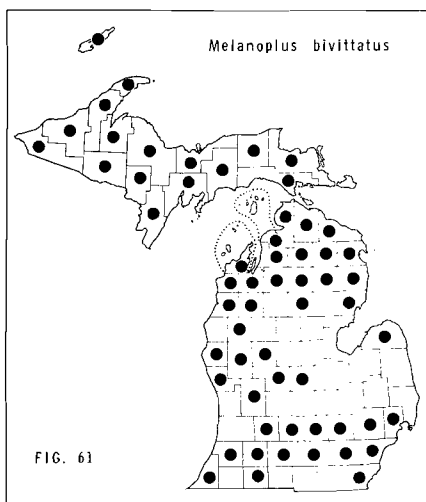
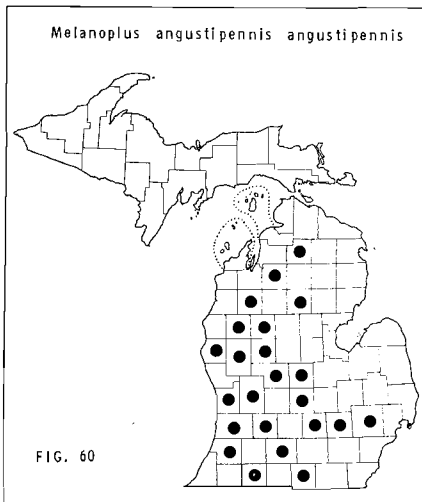
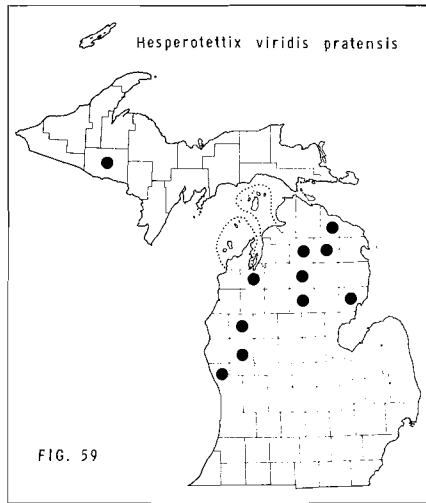
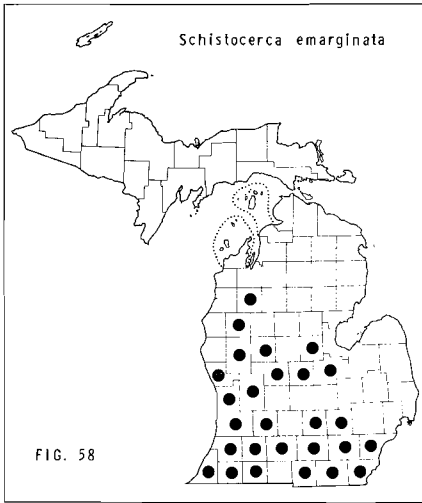
emarginata (Scudder) 1872. (*lineata* of authors)* (Prairie Bird-Locust). (Fig. 58). July 13 to October 15. Peak of abundance occurs in mid-August. Xeric to xeromesic environments on sandy upland soils.



Subfamily MELANOPLINAE

Genus HESPEROTETTIX Scudder

viridis pratensis Scudder 1897. (Purple-striped Locust). (Fig. 59). July 11 to September 16. This handsome little grasshopper has undoubtedly reached Michigan from the west and southwest. It should be looked for in grassland along the Wisconsin border, on the poorer soils along Lake Michigan, and in the Sand Plains of the northern part of the Lower Peninsula.



Genus **MELANOPLUS** Stal

angustipennis angustipennis (Dodge) 1877. (Narrow-winged Locust). (Fig. 60).

June 13 to September 28. This species of *Melanoplus* is partial to sparsely vegetated upland fields which are sandy and open.

bivittatus (Say) 1825. (Two-striped Locust). (Fig. 61). June 23 to September 17.

The Two-Striped Locust is widely distributed, distinctive in appearance, and a very common inhabitant of environments ranging from upland fields, woodland margins, and roadsides to semi-permanent marshes.

borealis borealis (Fieber) 1853. (Northern Locust). (Fig. 62). June 18 to September 27. *Melanoplus b. borealis* has a wide distribution in northern America. In

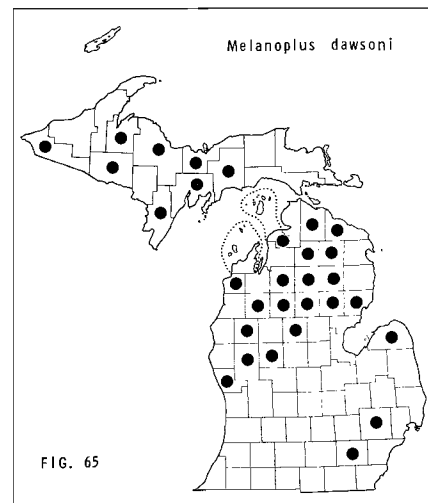
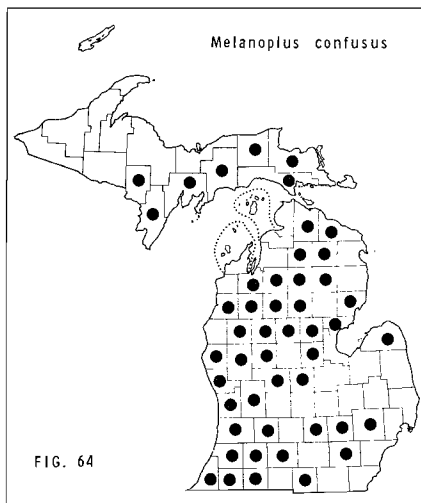
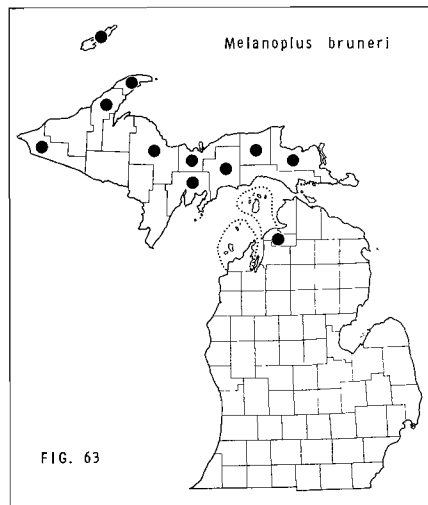
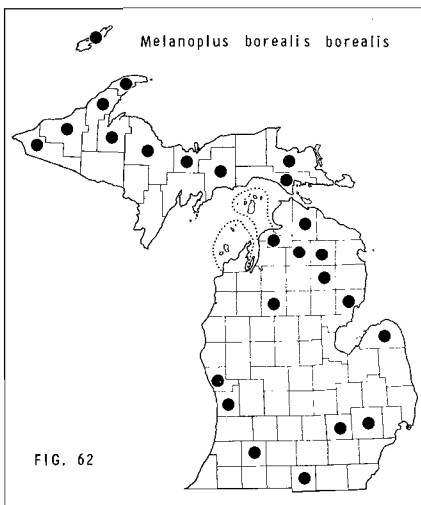
the northern reaches of its range it is found in several types of hydric environments varying from tall rank grasses and sedges to leatherleaf-tamarack bogs

and swamps. The species approaches the southern part of its range in southern Michigan. Here it is relict, local, and favors peat bogs and cool marshes.

bruneri Scudder 1897. (Bruner's Locust). (Fig. 63). July 5 to October 3. Bruner's Locust reaches its easternmost distribution in the Upper Peninsula of Michigan where it may be very common in clearings, along trails, and, in general, in areas covered with low bushes and shrubs, and tall herbaceous growths.

confusus Scudder 1897. (Little Locust). (Fig. 64). May 30 to September 6. Common throughout much of Michigan in mixed grass-herbaceous upland habitats.

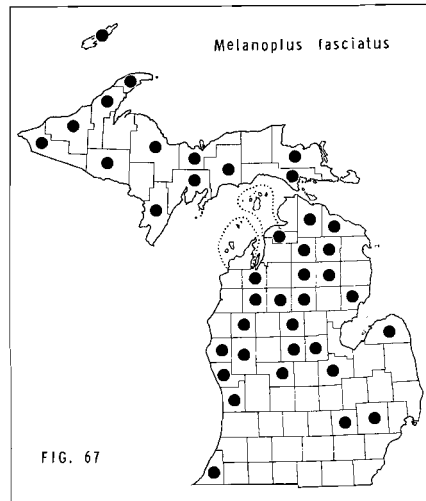
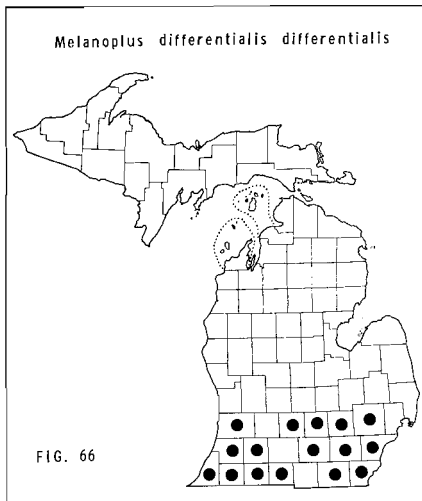
dawsoni (Scudder) 1875. (Dawson's Locust). (Fig. 65). July 10 to October 18. The main range of *Melanoplus dawsoni* lies to the north and west of Michigan. In the state it is found most commonly in areas of low bushes and shrubs in clearings and along the margins of woodland.



differentialis differentialis (Thomas) 1865. (Differential Locust). (Fig. 66).

July 25 to September 25. Although this large, distinctive, and potentially destructive grasshopper has been taken in Michigan in a number of environments, it is most common in low, moist areas. There is evidence that this locust is increasing in numbers and is extending its range northwardly in the Lower Peninsula.

fasciatus (F. Walker) 1870. (Huckleberry Locust). (Fig. 67). June 19 to October 18. Usually encountered on or near low shrubby growths in sunlit areas of open woodland. *Melanoplus fasciatus*, form *volticus* Scudder 1879, a synonym of *Melanoplus fasciatus* (F. Walker), was described from "Michigan." The only locality cited by Scudder was Charlevoix (Charlevoix County).



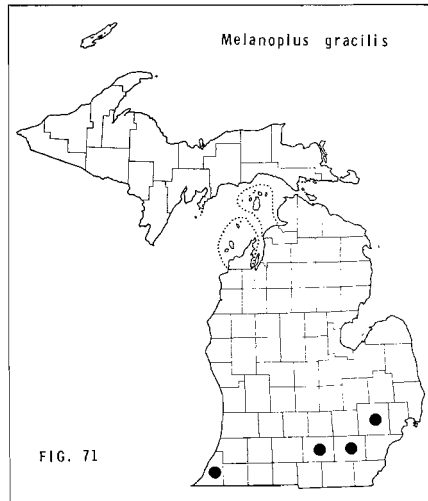
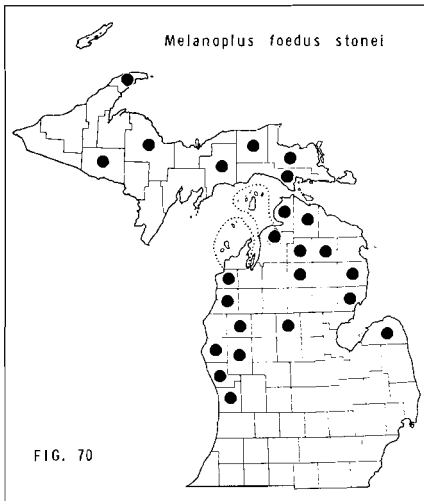
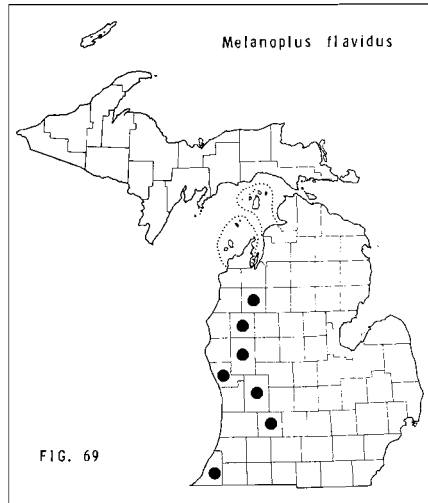
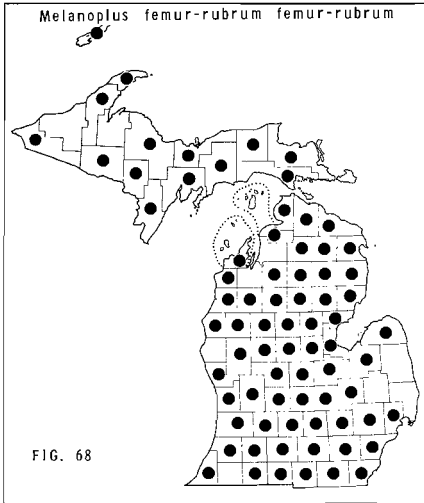
femur-rubrum femur-rubrum (DeGeer) 1773. (Red-legged Locust). (Fig. 68).

July 12 to November 18. The Red-Legged Locust is one of the most abundant, most widely distributed, and, ecologically speaking, more plastic grasshoppers in the state. Although moist environments are optimal, the species fares well in most upland field habitats. It has been, and can be a destructive insect.

flavidus Scudder 1879. (Blue-legged Locust). (Fig. 69). July 25 to September 13. This *Melanoplus* is another of the Great Plains fauna which favors the open, sparsely vegetated sandy areas in the western portions of the Lower Peninsula.

foedus stonei Rehn 1904. (Stone's Locust). (Fig. 70). June 20 to September 13. Stone's Locust is associated with the Jack-pine Barrens in the northern part of the state. The species is often very common in the more open portions which support a scanty to thin ground cover of herbs, low bushes, xerophilous grasses, and often a covering of reindeer moss.

gracilis (Bruner) 1876. (Graceful Locust). (Fig. 71). July 13 to September 9. Often taken in the rank herbage found in low, moist ground around the margins of marshes and small lakes, *gracilis* has been noted in numbers among rather heavy growths of grasses, herbs, and low shrubs in fallow upland fields.



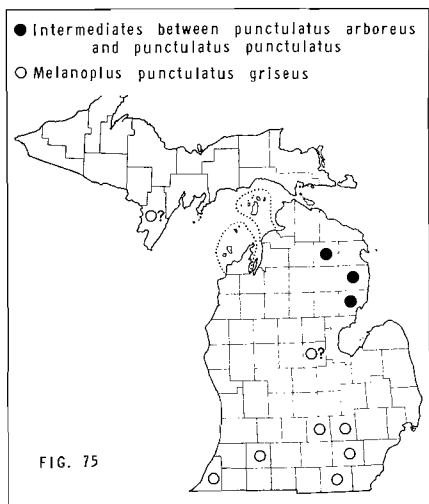
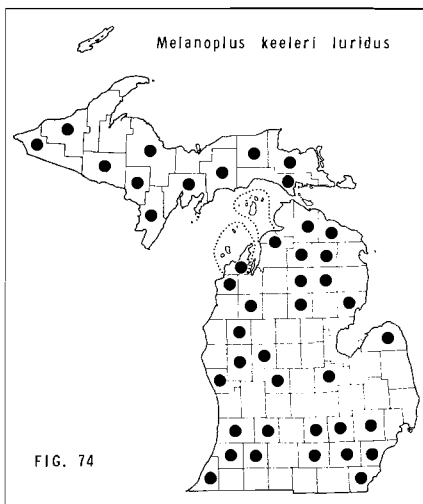
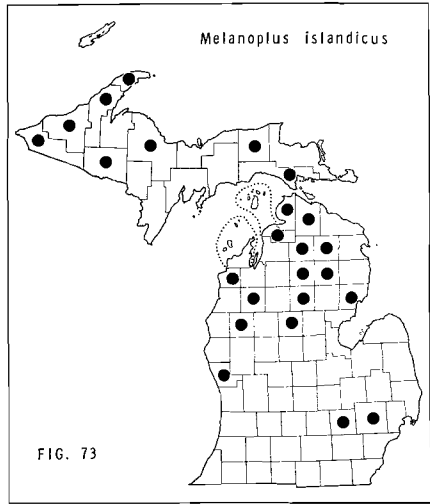
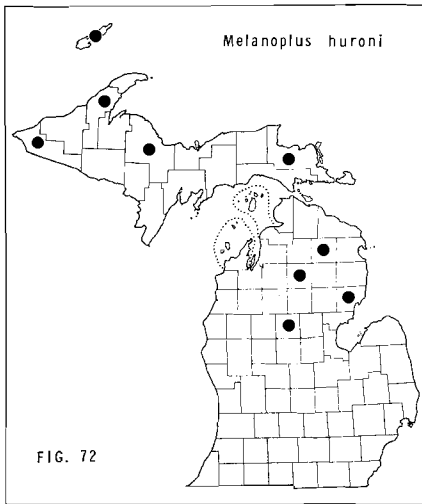
huroni Blatchley 1898. (Huron Short-winged Locust). (Fig. 72). July 14 to August 27. This species was described from specimens taken on La Salle Island, Les Cheneaux Islands, Mackinac County. *M. huroni* is to be found among the herbage, fern growth, and lower shrubs of openings and clearings of coniferous, deciduous, or mixed woodland.

islandicus Blatchley 1898. (Forest Locust). (Fig. 73). July 8 to September 8. The specimens upon which Blatchley based this species were taken on La Salle Island, of the Les Cheneaux Islands, Mackinac County. The species favors sunlit areas of open woodland or openings and clearings within denser stands of timber. Northern in distribution, it is relict, local, and rare in the southern part of the Lower Peninsula.

keeleri luridus (Dodge) 1876. (Broad-necked Locust). (Fig. 74). July 10 to

November 7. *Melanoplus keeleri luridus* has a broad range of tolerance in habitat requirements. It is most commonly found in mixed grass-herbaceous communities, but has often been taken associated with shrubby undergrowth along the margins of woodland.

punctulatus griseus (Thomas) 1872. (Grizzly Locust). (Fig. 75). July 19 to September 14. In the southern part of the Lower Peninsula this most interesting arboreal grasshopper favors the limbs and branches of tamarack where its coloration blends remarkably well with the bark. However, it has been taken on or near hardwood trees. I suspect that a single female taken in Menominee County and another from Midland County will eventually prove to be representatives of populations of *punctulatus griseus*.

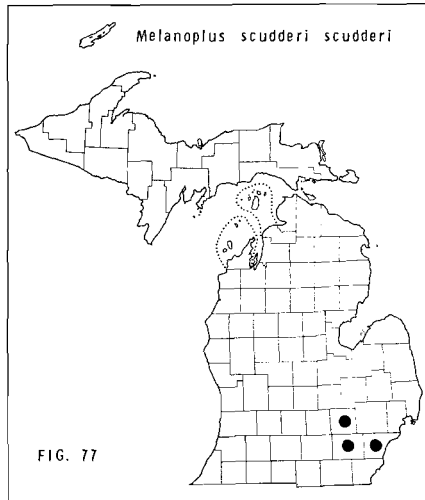
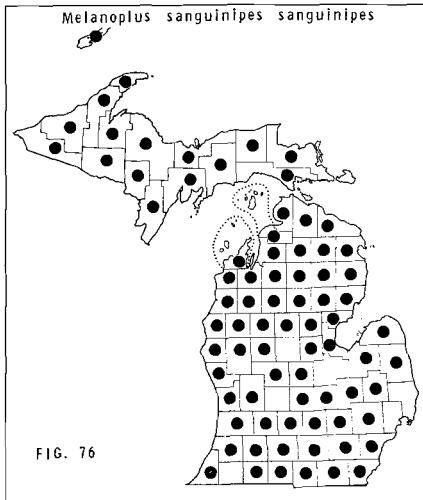


punctulatus griseus (Thomas) 1872 X **punctulatus punctulatus** (Scudder) 1862.

(Fig. 75). August 21 to September 18. *M. punctulatus* populations in the northern portions of Michigan represent intergrades between *griseus* and the nominate form. In this part of the state the grasshopper is, more often than not, associated with jack- or white pine.

sanguinipes sanguinipes (Fabricius) 1798. (Lesser Migratory Locust). (*mexicanus mexicanus* and *bilituratus bilituratus* of recent authors) (Fig. 76). June 1 to October 24. Often exceedingly abundant, sometimes destructive, prone to wander and hence seemingly ubiquitous, this species is partial to mixed grass-herbaceous environments.

scudderi scudderi (Uhler) 1864. (Scudder's Short-winged Locust). (Fig. 77). August 22 to November 6. *M. s. scudderi* is a small, brown, short-winged, thamnophilous grasshopper found most commonly in and around small shrubs, berry canes, and rank herbaceous growth in upland environments. The species is at the northern limits of its range in Michigan where it is local and where it appears to be slowly spreading northwardly.



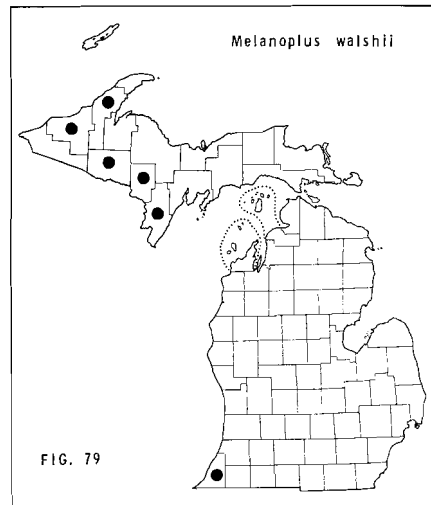
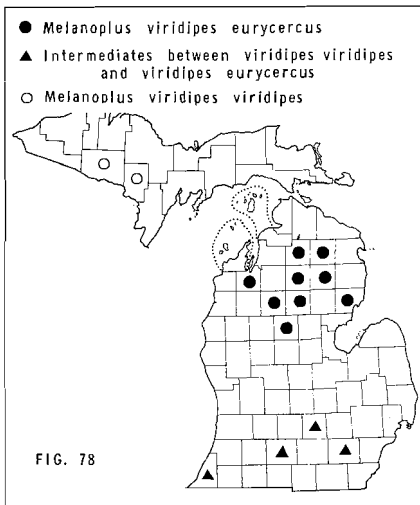
viridipes eurycerus Hebard 1920. (Hebard's Green-Legged Locust). (Fig. 78). June 5 to August 28. In Michigan, the outlying northern populations of this eastern subspecies of *viridipes* are remnants of a once more widely ranging distribution. Limited to a few counties centered on the sand plains of the northern part of the Lower Peninsula, this thamnophilous grasshopper should be sought among the shrubby, rank growths of vegetation in fallow fields and adjacent to woodlands.

viridipes eurycerus Hebard 1920 X **viridipes viridipes** Scudder 1897. (Fig. 78). May 23 to September 9. These intergrading populations appear to represent an intrusion into Michigan from the southwestern corner of the state. Intergradation between the two forms is to be found southwardly along the Indiana-Illinois boundary. As is the case with *eurycerus*, the grasshopper is associated with open woods and forest margin environments.

viridipes viridipes Scudder 1897. (Green-legged Locust). (Fig. 78). July 22 and

July 10. These populations represent an intrusion of the nominate subspecies moving in from the southwest where the form is common in shrubby growths along forest margins.

walshii Scudder 1897. (Walsh's Locust). (Fig. 79). July 16 to September 4. *M. walshii*, spotty in distribution and never very common, is found over a large area to the east, south, and west of Michigan. It should be looked for among the thickets of herbs, low shrubs, tree seedlings, vines, and brambles in or near deciduous woodland.



Genus **PHOETALIOTES** Scudder

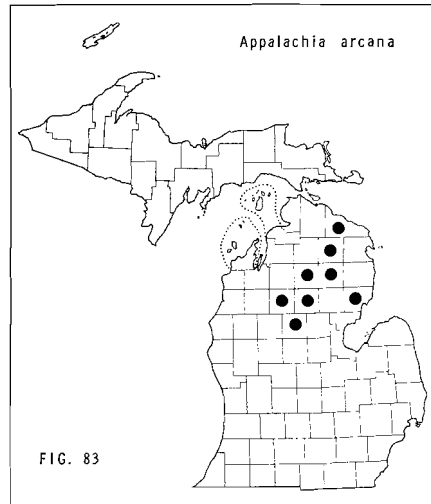
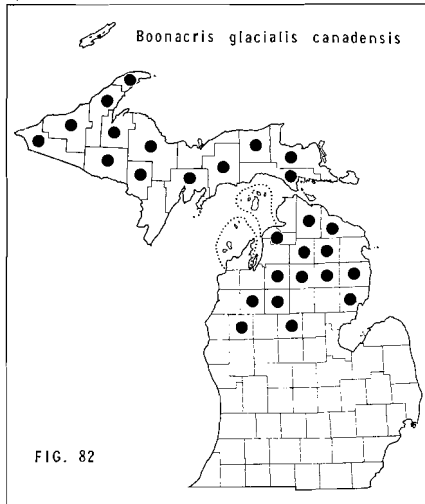
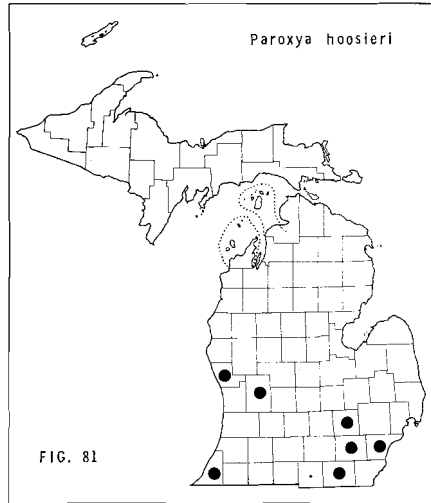
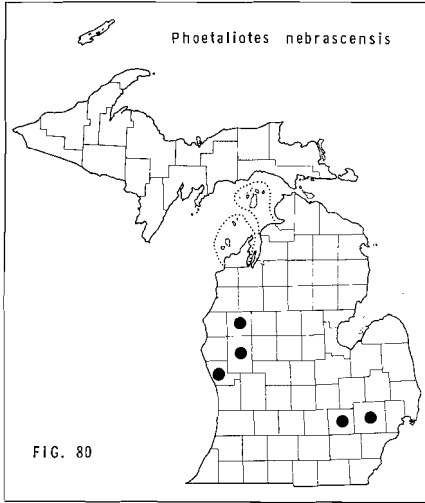
nebrascensis (Thomas) 1872. (Large-headed Locust). (Fig. 80). August 4 to October 9. This prairie species has been taken in Michigan on low ground growths in marshes and swales where it lives among the sedges and blue-joint grass. Very local, but common where found.

Genus **PAROXYA** Scudder

hoosieri (Blatchley) 1892. (Hoosier Locust). (Fig. 81). June 30 to October 17. In Michigan, the Hoosier Locust is local in distribution. It should be sought for among the growths of grasses and sedges which are to be found bordering ponds, small lakes and associated with the heavier soils of the more moist marshes and swales.

Genus **BOONACRIS** Rehn and Randell

glacialis canadensis (E. M. Walker) 1903. (Northern Wingless Locust). (Fig. 82). July 9 to September 18. The Northern Wingless Locust is one of the most colorful grasshoppers to be found in Michigan. It is a common insect in the Upper Peninsula and in the northern part of the Lower Peninsula. It is thamnophilous and partial to the shrubby, bushy, and brambly thickets along roadsides, the margins of woodland, and of leatherleaf bogs. Mrs. Mary D. Ries (*in litt.*) informs me that in northern Wisconsin she has seen it abundant on wild blackberry, which it eats with avidity.

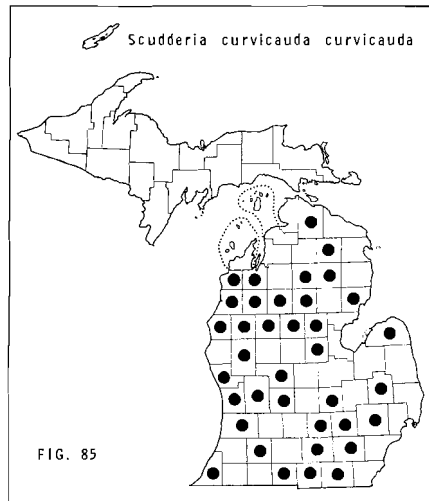
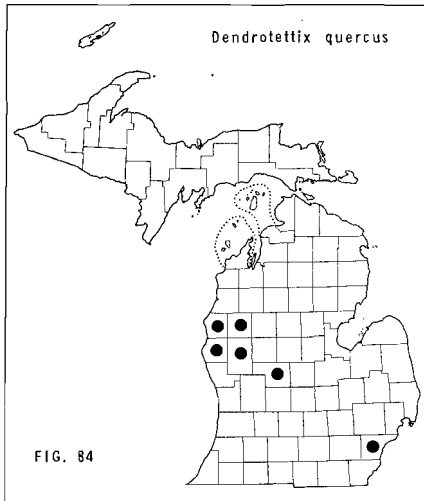


Genus APPALACHIA Rehn and Rehn

arcana Hubbell and Cantrall 1938. (Secretive Locust). (Cover) (Fig. 83). July 1 to September 18. This beautiful little short-winged grasshopper is the only orthopteroid insect endemic to the State of Michigan. It was described from specimens taken near Oscoda, Iosco County. The type locality is now buried beneath the concrete runways of Wurtsmith Air Force Base. The entire range of this insect is limited to an area centering on the sand plains of the northern part of the Lower Peninsula. There it has been found in a variety of habitats, all having in common the presence of shrubby growths upon which individuals climb and sun themselves. The cryptic coloration of the female closely matches the color of jack-pine bark, and the species is often found on that tree particularly when the tree is growing adjacent to, or within the limits of a leatherleaf-sphagnum bog.

Genus **DENDROTETTIX** Riley

quercus Packard 1890. (Post-oak Locust). (Fig. 84). July 10 to September 8. In Michigan, this arboreal grasshopper seems to be partial to *Quercus ellipsoidalis*, the northern pin oak. It is known to feed upon other oaks, and sometimes occurs in large enough numbers to cause defoliation.



Suborder **ENSIFERA**
 Superfamily **TETTIGONIOIDEA**
 The Katyids
 Family **PHANEROPTERIDAE**
 Subfamily **PHANEROPTERINAE**
 Genus **SCUDDERIA** Stal
 The Bush Katyids

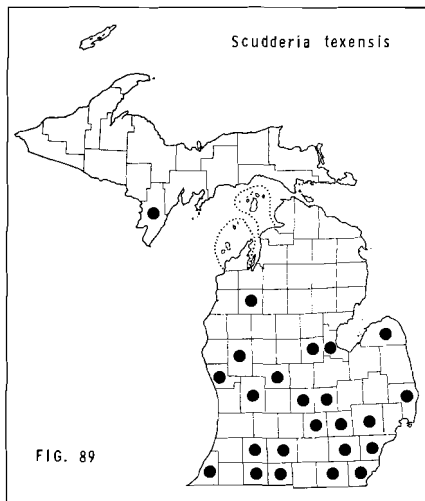
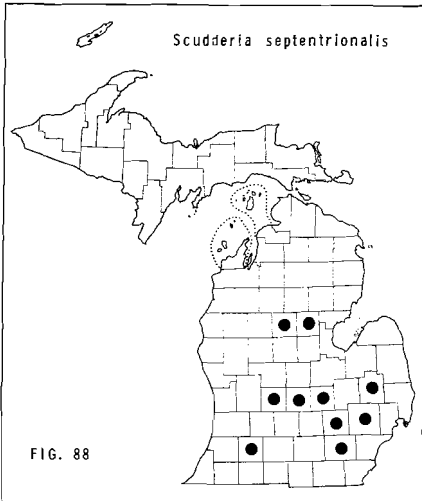
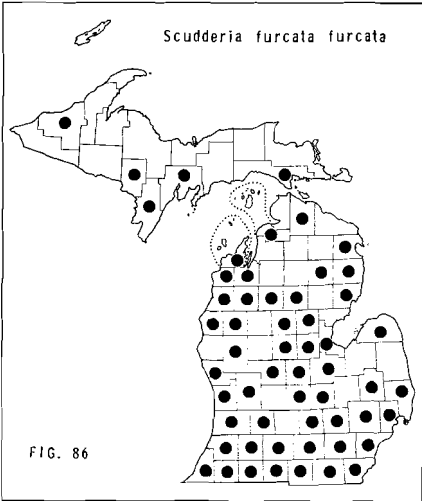
curvicauda curvicauda (DeGeer) 1773. (Curved-tailed Bush Katydid). (Fig. 85). The taxonomic status of Michigan populations of the Curved-tailed Bush Katydid is not clear. Demes north of the middle of the Lower Peninsula are composed of individuals which are smaller, but otherwise similar in many respects to *curvicauda* (DeGeer). It seems best to assign all demes in the state to *curvicauda* until the problem can be solved. July 10 to September 21. A very common bush katydid, particularly in cooler, more hydric low ground environments. As is the case with *pistillata*, the species becomes more ubiquitous in the northern part of the Lower Peninsula.

furcata furcata Brunner 1878. (Fork-tailed Bush Katydid) (Fig. 86). July 9 to October 11. The Fork-tailed Bush Katydid is very common over a major portion of the state. It has been found in thickets and among rank growths of vegetation on both upland and marshy ground.

pistillata Brunner 1878. (Broad-winged Bush Katydid) (Fig. 87). June 27 to October 25. This bush katydid is a species of northern range, but should occur over the whole of Michigan. It is particularly common on bushes and the taller herbage of nearly every kind of upland habitat. To the south it tends to favor the cooler marshes and meadows.

septentrionalis (Serville) 1839. (Northern Bush Katydid). (Fig. 88). July 13 to September 28. I believe *septentrionalis* to be more widely distributed in the Lower Peninsula of Michigan than the records indicate. It is a secretive species, the adults living in the crowns of deciduous trees. Males are attracted to light of the correct intensity. Females do not so respond and, as a result, are rare in collections.

texensis Saussure and Pictet 1897. (Texas Bush Katydid). (Fig. 89). July 24 to October 12. This species is one of the more abundant bush katydids in the southern part of the Lower Peninsula. It occurs commonly on bushes and the taller herbaceous plants in nearly all upland environments as well as similar situations in marshes, meadows, and lake margins.



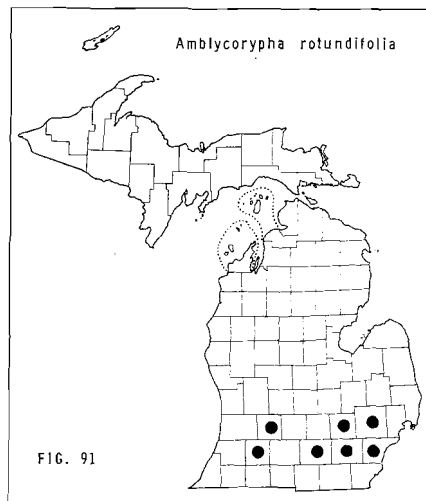
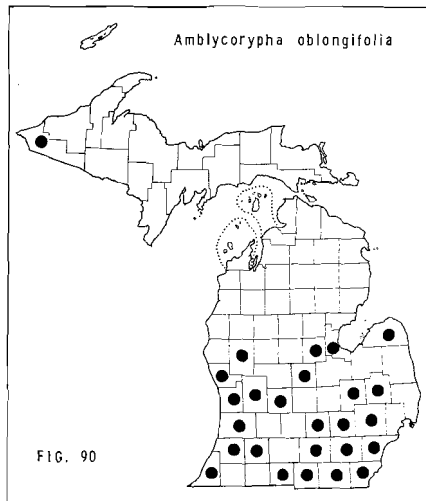
Genus **AMBLYCORYPHA** Stal

oblongifolia (DeGeer) 1773. (Oblong-winged Katydid). (Fig. 90). August 3 to October 11. This species is a common inhabitant of environments ranging from wet marshes to the thickets of shrubs and tall, rank weeds which occur along the margins of woods and in old, fallow upland fields.

rotundifolia (Scudder) 1862. (Round-winged Katydid). (Fig. 91). July 18 to October 1. *A. rotundifolia* favors somewhat drier habitats than does *A. oblongifolia*. It is found closer to the ground and among the low shrubs, grasses, and weeds which occur as ground vegetation within and along the edges of the more open deciduous woodlands.

Genus **MICROCENTRUM** Scudder

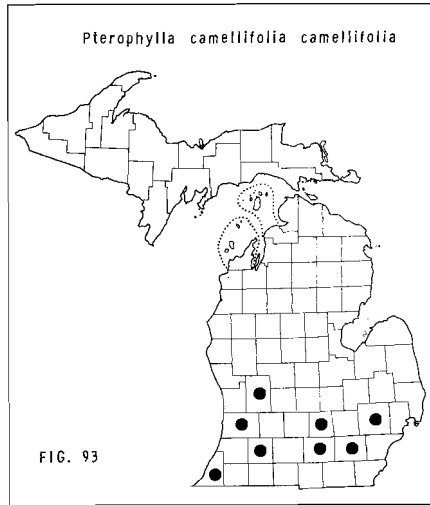
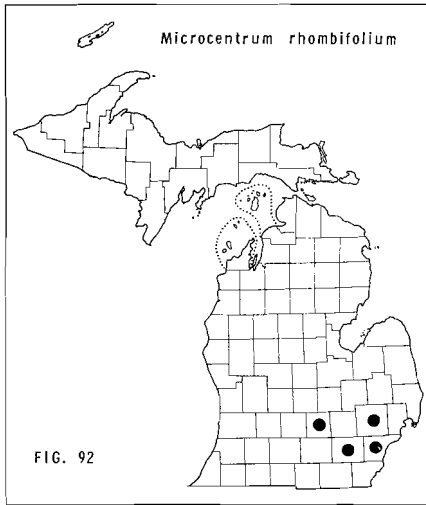
rhombifolium (Saussure) 1859. (Angle-winged Katydid). (Fig. 92). September 20 to November 2. The Angle-winged Katydid frequents bushes, shrubbery, and, often, the crowns of deciduous trees. This species has moved into southern Michigan sometime during the last fifteen years and seems to be slowly continuing the extension of its range. It is now rather common in and around Ann Arbor. It occasionally comes to light.

Family **PSEUDOPHYLLIDAE**Subfamily **COCCONOTINAE**Genus **NESOECIA** Scudder

nigrispina (Stal) 1873. October. A native of Mexico. Taken in 1935 in Ann Arbor, Washtenaw County from bananas.

Subfamily **PTEROPHYLLINAE**Genus **PTEROPHYLLA** Kirby

camellifolia camellifolia (Fabricius) 1775. (Northern True Katydid) (Fig. 93). July 30 to October 10. A noisy inhabitant of the crowns of deciduous trees, this large katydid is probably much more widely distributed in southern Michigan than the records indicate.



Family CONOCEPHALIDAE
Subfamily COIPHORINAE
The Coneheaded Katydids

Genus NEOCONOCEPHALUS Karny

crepitans (Scudder) 1862. (Crepitating Conehead) (Fig. 94). August 18 to September 30. During the last twenty years the Crepitating Conehead has been rapidly expanding its range in southern Michigan. The species occupies the mixed grass-herbaceous growths of old fallow upland fields.

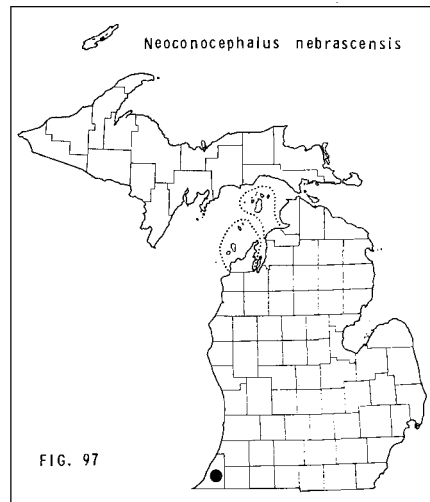
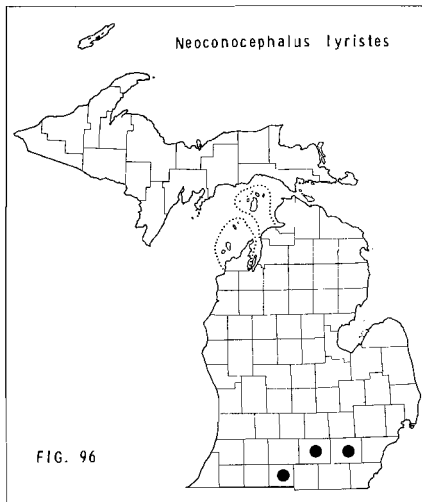
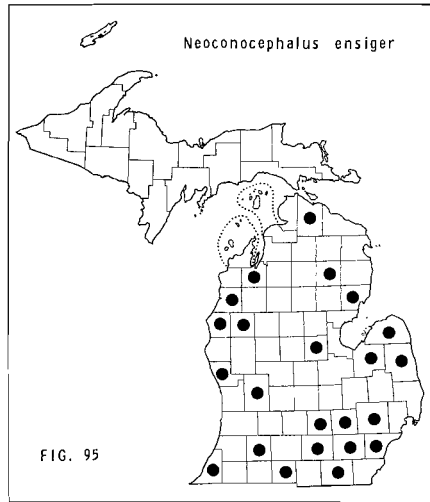
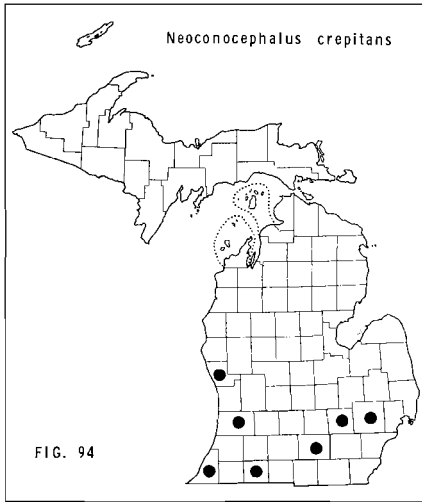
ensiger (Harris) 1841. (Sword-bearing Conehead) (Fig. 95). July 18 to October 19. This species is the common conehead to be heard in late summer in open, upland environments ranging from damp swales and marshes to more xeric habitats.

lyristes (Rehn and Hebard) 1905. (Slender Conehead) (Fig. 96). August 14 to September 15. I have taken the Slender Conehead in three places in extreme southern Michigan. This katydid prefers to live among the tall grasses, sedges, and rushes which cover broad areas of low semi-boggy ground. The soil at the west end of Ackerson Lake in Jackson County, where the species was taken, was quite marly.

nebrascensis (Bruner) 1891. (Nebraska Conehead) (Fig. 97). August 30. In Michigan the Nebraska Conehead is known only from the four specimens taken by Hubbell (1922) in Berrien County. He found them among the shrubbery of a second growth woods, and in a grassy field of second growth scrub on a cleared portion of a flood plain, in the vicinity of bushes and shrubs.

Subfamily CONOCEPHALINAE
The Meadow Katydids
Genus ORCHELIMUM Serville

The systematics and behavior of three of the seven species of *Orchelimum* known to occur in Michigan have been treated in detail by Thomas and Alexander (1962). These are *campestris*, *concinnum*, and *delicatum*.

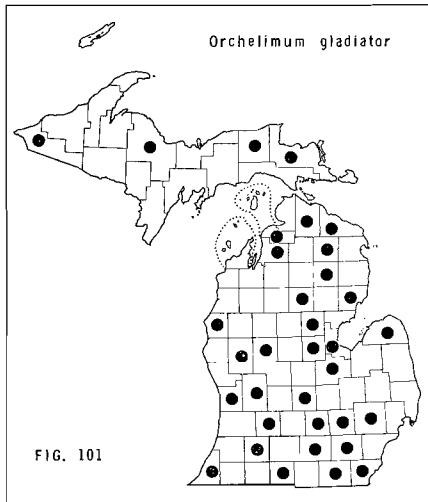
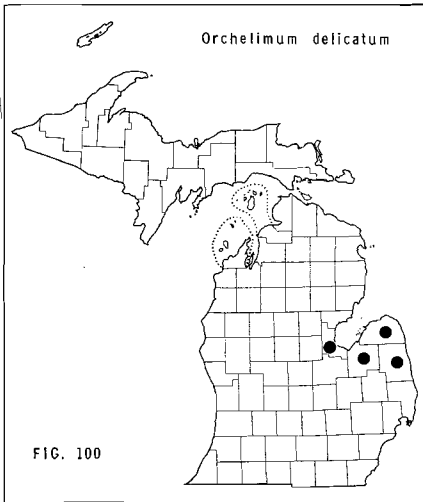
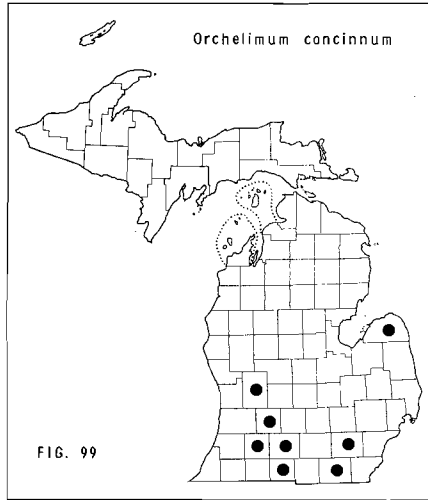
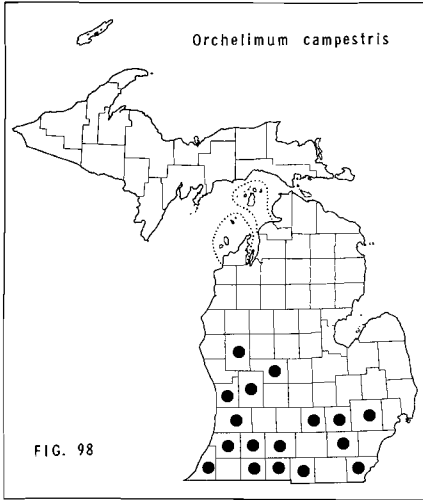


campestris Blatchley 1893. (Dusky-faced Meadow Katydid) (Fig. 98). July 25 to October 4. This species is associated with more permanently wet marshes where vegetation grows in standing water.

concinnum Scudder 1862. (Stripe-faced Meadow Katydid) (Fig. 99). August 14 to September 28. *O. concinnum* is characteristic of alkaline situations such as northern relict marl bogs.

delicatum Bruner 1892. (Delicate Meadow Katydid) (Fig. 100). July 23 to September 14. Thomas and Alexander (1962) state that . . . "*O. delicatum* is largely restricted to swales adjacent to sand dunes or sand beaches, where it is often associated with Blue-joint Grass, *Calamagrostis canadensis*."

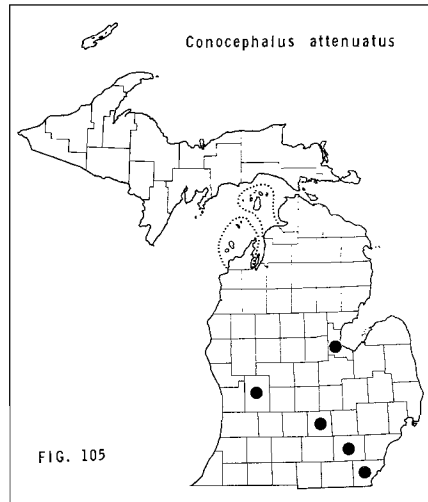
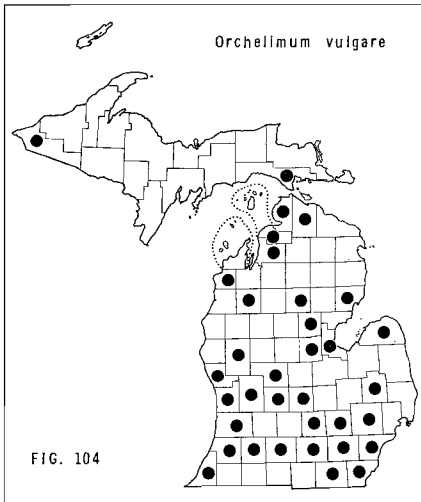
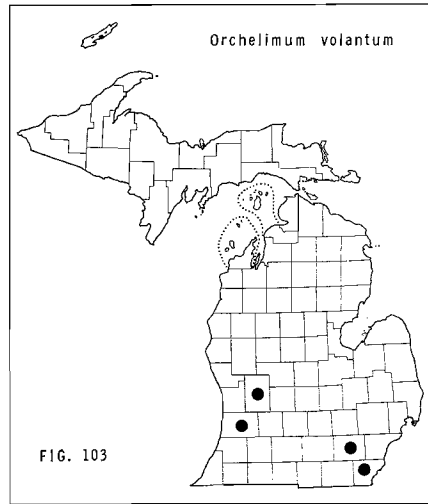
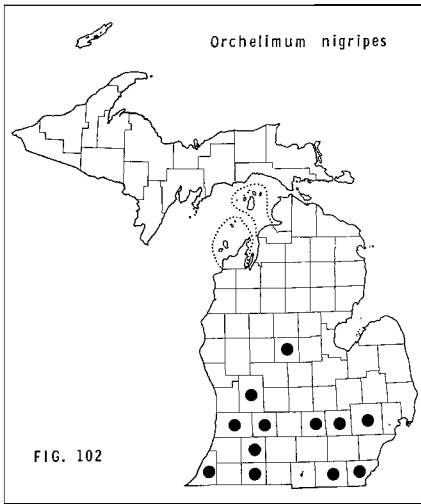
gladiator (Bruner) 1891. (Gladiator Meadow Katydid) (Fig. 101). June 29 to September 15. *O. gladiator* is one of the two most common of the species of



Orchelimum in Michigan. It prefers more moist, semipermanently and permanently wet marsh and meadow habitats.

nigripes Scudder 1875. (Black-legged Meadow Katydid) (Fig. 102). July 26 to September 21. The black-legged meadow katydid is more thamnophilous than the other members of *Orchelimum* in Michigan. It is characteristically found in tall shrubby adjacent to or margining lakes, ponds, and streams. It is sometimes common among the vegetation growing in the shallow waters of such hydric environments.

volantum McNeill 1891. (Nimble Meadow Katydid) (Fig. 103). August 22 to October 13. In Michigan *volantum* lives among the grasses, sedges, and weeds which grow luxuriantly in the shallow waters of streams, rivers, lakes, larger ponds, and permanently wet marshes.

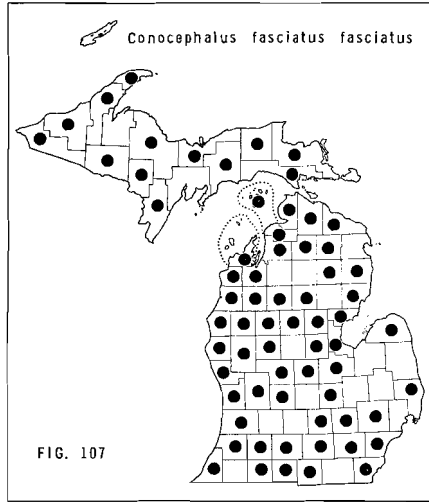
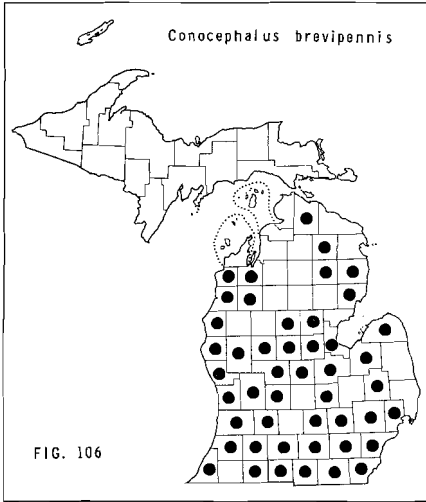


vulgare Harris 1841. (Common Meadow Katydid). (Fig. 104). July 23 to September 25. *O. vulgare* is very common in Michigan. In late summer it replaces *O. gladiator* in the drier marshes and meadows, and is often found in mixed grass-herbaceous upland habitats.

Genus CONOCEPHALUS Thunberg

attenuatus (Scudder) 1869. (Long-tailed Meadow Katydid). (Fig. 105). July 28 to September 26. In Michigan, *attenuatus* lives among rank grasses, sedges, and rushes growing in the shallow waters of marshes, and river and lake margins.

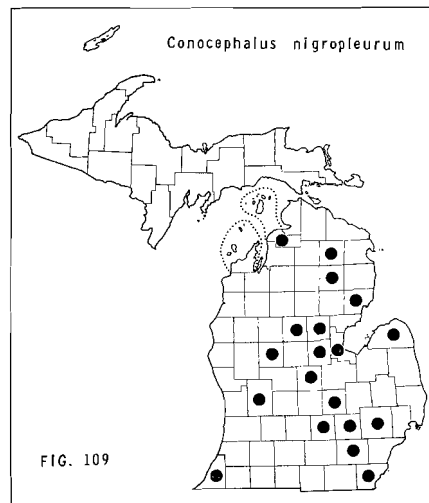
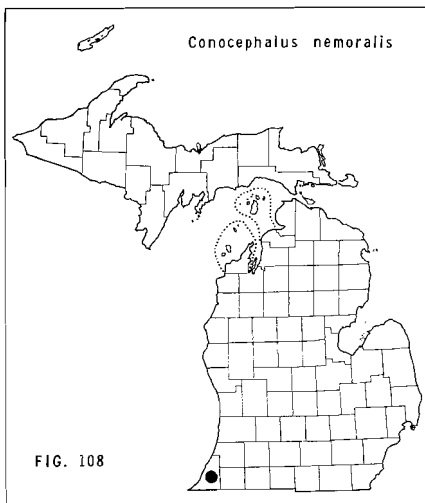
brevipennis (Scudder) 1862. (Short-winged Meadow Katydid). (Fig. 106). July 24 to October 28. This widely distributed and common to abundant meadow katydid lives among the rank stands of grasses, sedges, and herbaceous growths of hydric environments.



fasciatus fasciatus (DeGeer) 1773. (Slender Meadow Katydid). (Fig. 107). July 8 to October 17. The Slender Meadow Katydid occurs in much the same environment as does *C. brevipennis*. In Michigan, it rivals that species in ecological plasticity, in distribution, and in numbers.

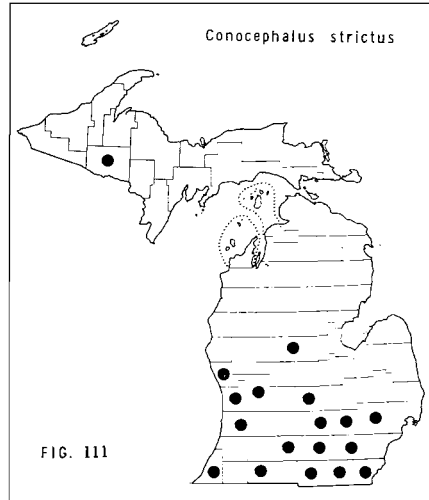
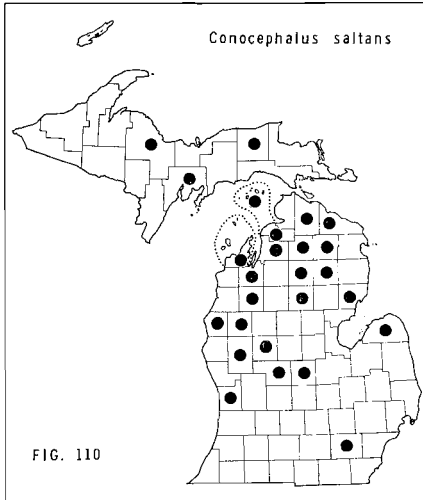
nemoralis (Scudder) 1875. (Woodland Meadow Katydid). (Fig. 108). September 9. This little brown katydid favors low shrubs, bushes, weeds, and brambles found along the margins of woodlands, in fence rows, and in old, fallow upland fields. The species occurs commonly in northwestern Ohio and should be found more extensively in extreme southern Michigan.

nigropleurum (Bruner) 1891. (Black-sided Meadow Katydid). (Fig. 109). July 9 to September 26. The Black-sided Meadow Katydid is semi-thamnophilous. It favors tall rank grasses and sedges, as well as shrubby growths found in marshes, swamps, bogs, and along the edges of streams, ponds, and lakes.



saltans (Scudder) 1871. (Prairie Meadow Katydid). (Fig. 110). July 20 to September 14. *C. saltans* is a xerophilous species living mainly among the scattered grasses and low herbs of upland fields and sandy barrens.

strictus (Scudder) 1875. (Straight-lanced Meadow Katydid). (Fig. 111). July 29 to October 9. The favorite haunt of the Straight-lanced Meadow Katydid is the mixed grass-herbaceous growths of upland fields.



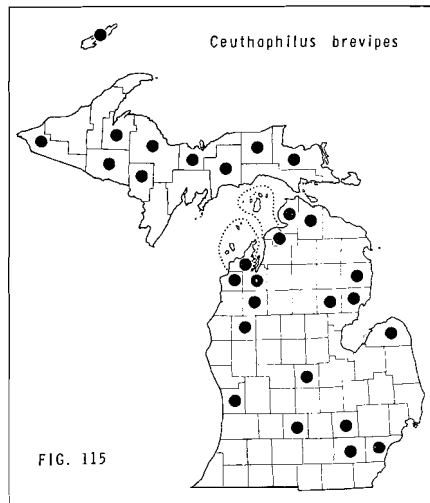
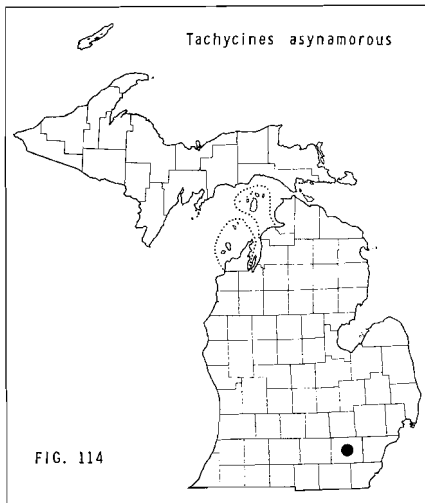
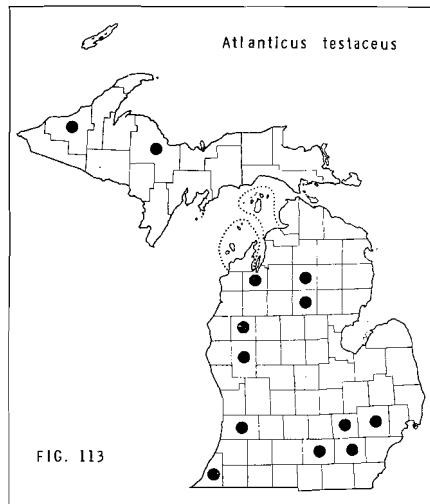
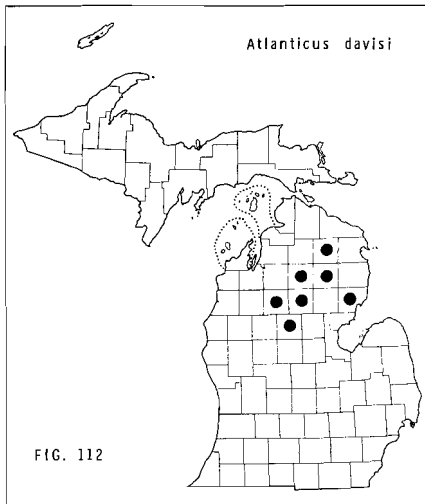
Family TETTIGONIIDAE
Subfamily DECTICINAE
The Shield-bearing Katydid
Genus ATLANTICUS Scudder

davisi Rehn and Hebard 1916. (Davis' Shield-bearer). (Fig. 112). July 13 to September 11. As is the case with *Melanoplus viridipes eurycercus*, *Atlanticus davisi* appears to be limited in distribution in Michigan to the Jack-pine Barrens of the northern part of the Lower Peninsula. There it occurs in the low shrubby and herbaceous undergrowths of a number of environments ranging from coniferous and deciduous woodland to leatherleaf bogs.

testaceus (Scudder) 1900. (Short-legged Shield-bearer). (Fig. 113). June 11 to September 13. Local and sometimes common among the low shrubs, herbaceous growths and vine tangles of woodland, forest margin, and fallow upland field.

Family GRYLLACRIDIDAE
Subfamily RHAPHIDOPHORINAE
The Camel Crickets
Genus TACHYCINES Adelung

asynamorus Adelung 1902. (Greenhouse Camel Cricket). (Fig. 114). Adult the year around. This Old-World species was an established advent in the greenhouses of the old University of Michigan Botanical Gardens. These buildings have now been destroyed, but the cricket may have been able to maintain itself in other buildings of the Ann Arbor area.



Genus CEUTHOPHILUS Scudder

Michigan members of this genus are associated with the surface of the soil in or near woodland where they move about at night and conceal themselves during the daylight hours beneath logs, stones, piles of leaves or within the burrows of small mammals. Some occasionally make their way into and live within humid basements of houses adjacent to woodland. Although adults occur most commonly during the summer months, various instars are to be anticipated at all times of the year. All species are omnivorous. Reference is made to Hubbell's (1936) scholarly monograph of the genus.

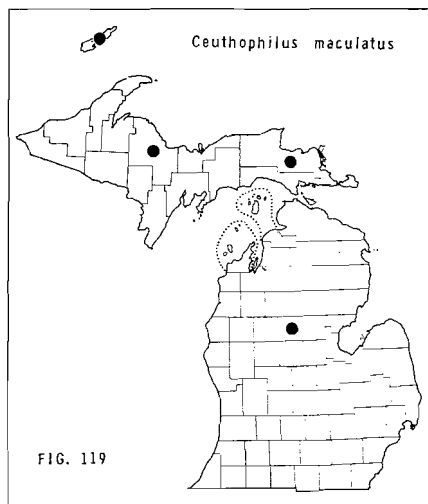
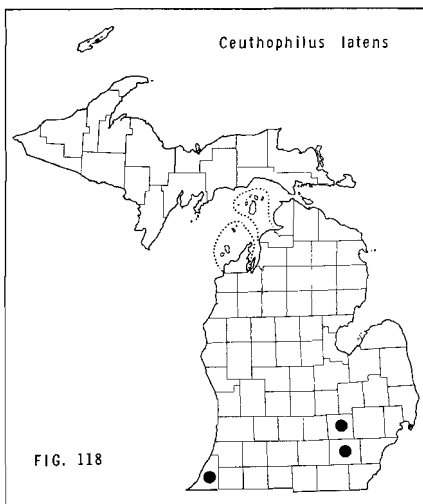
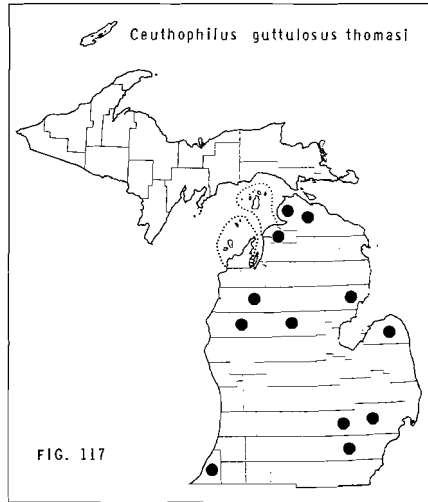
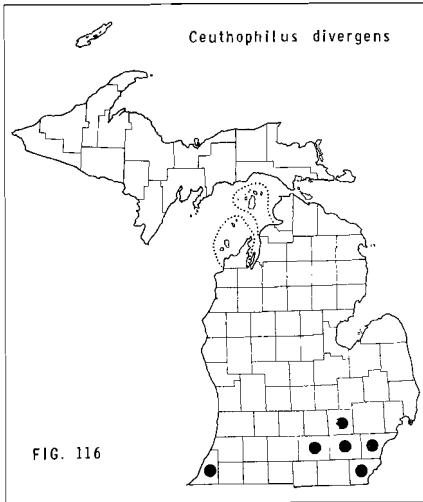
brevipes Scudder 1862. (Short-legged Camel Cricket). (Fig. 115). June 20 to September 10. A common and ubiquitous species found in or near mesic to hydric forests.

divergens Scudder 1862. (Divergent Camel Cricket). (Fig. 116). June 10 to mid-September. *C. divergens* reaches the northern limits of its range in the southern part of the Lower Peninsula. It should be sought for in xeric to mesic woodland.

guttulosus thomasi Hubbell 1936. (Thomas' Camel Cricket). (Fig. 117). May 19 to August 27. Thomas' Camel Cricket is uncommon to rare in Michigan. The species prefers mesic to meso-hydric forests ranging from the more moist portions of oak-hickory to flood-plain woodland.

latens Scudder 1862. (Black-sided Camel Cricket). (Fig. 118). June 29 to September 7. An occupant of a rather wide range of sylvan environments, this species tends to be more common in the more xeric of these habitats.

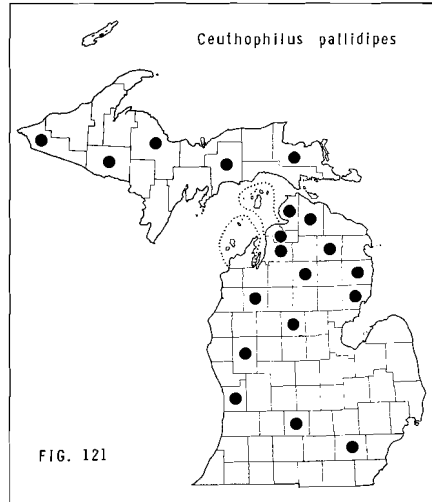
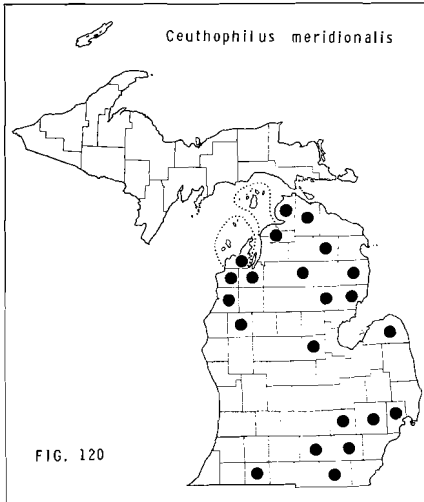
maculatus Harris 1841. (Spotted Camel Cricket). (Fig. 119). July 7 to October



10. Local in distribution and rare in Michigan, *C. maculatus* prefers the more xeric types of woodland.

meridionalis Scudder 1894. (Striped Camel Cricket). (Fig. 120). June 11 to September 17. This species is one of the more common camel crickets in the Lower Peninsula. It is found in or near the low, moist portions of woodlands.

pallidipes E. M. Walker 1905. (Pale-legged Camel Cricket). (Fig. 121). July 21 to October 10. The optimum habitat of *C. pallidipes* is considered to be beech-maple-hemlock forest. However, it has been found in other woodland environments ranging from flood-plain forest to bogs and swamps and upland pine woods.



silvestris Bruner 1885. (Woodland Camel Cricket). (Fig. 122). Adults have been taken in June, September, and October, and they probably are to be found throughout the year. A seemingly rare species, *silvestris* is rather numerous in its proper habitat. East of the Mississippi River, it has been taken from the deeper, moister burrows and runways of the common mole, *Scalopus aquaticus*. This tiny camel cricket appears to be an obligate inhabitant of the subterranean environments created by the burrows of small mammals.

uhleri Scudder 1862. (Uhler's Camel Cricket). (Fig. 123). August and September 4. Recently found in Michigan, this species is known to occur only in St. Joseph County where it reaches the northernmost limits of its distribution. Little is known of its habits or ecology.

Family GRYLLIDAE

The Crickets

Subfamily GRYLLINAE

The House and Field Crickets

Genus ACHETA Linnaeus

domesticus (Linnaeus) 1758. (House Cricket). (Fig. 124). Adult the year around. An established domiciliary advent. Reared and used for fish bait.

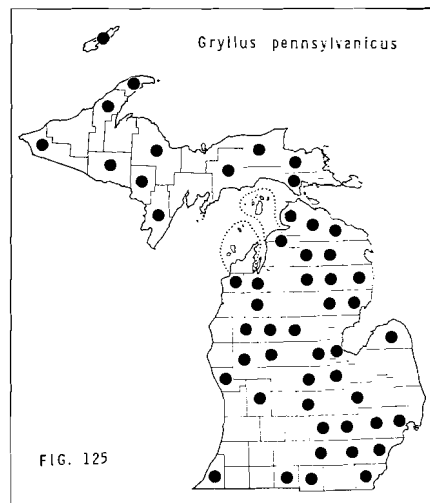
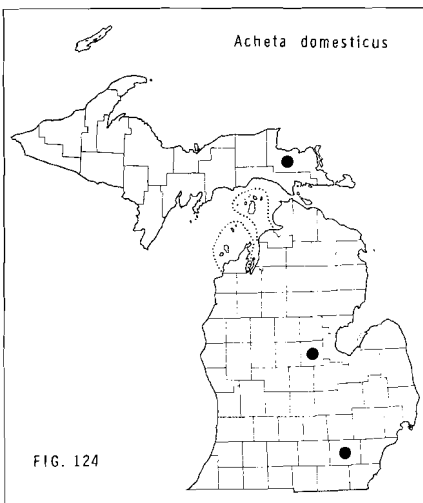
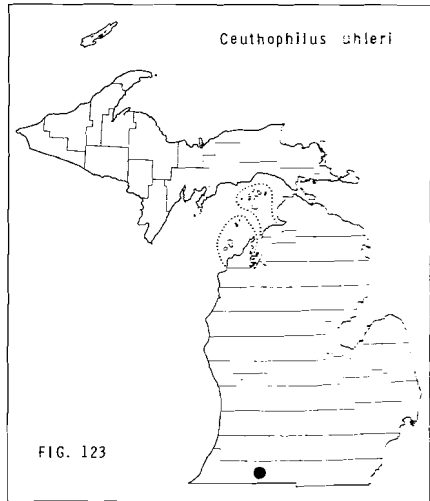
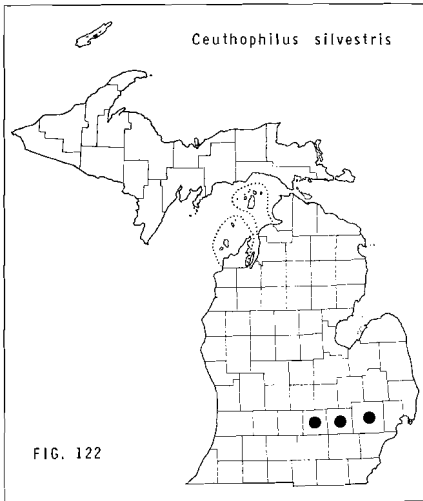
Genus **GRYLLUS** Linnaeus

The Field Crickets

Michigan species of the genus *Gryllus* have been treated recently by Alexander and Bigelow (1960).

pennsylvanicus Burmeister 1838. (Fall Field Cricket). (Fig. 125). July 15 to November 11. This is the common large black cricket which is almost ubiquitous in open upland environments.

veletis (R. D. Alexander and Bigelow) 1960. (Spring Field Cricket). (Fig. 126). May 20 to July 6. The black field cricket encountered in the spring and early summer, *veletis* is partial to upland fields.



Subfamily NEMOBIINAE

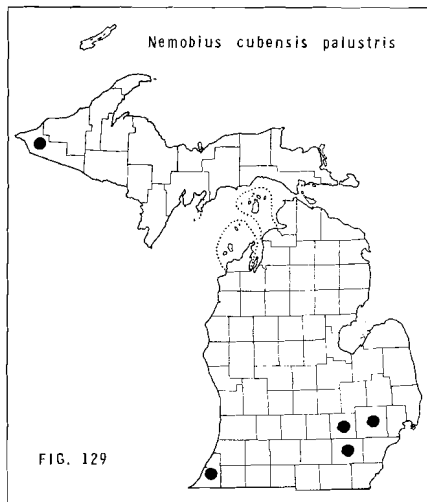
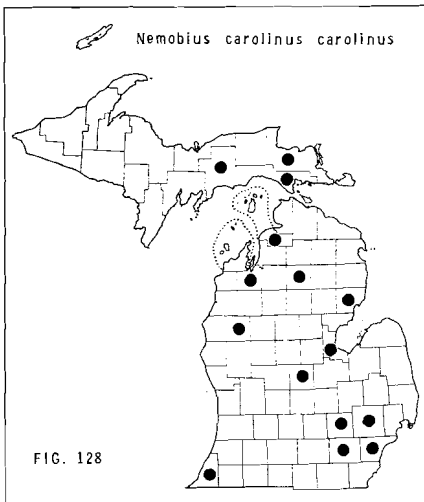
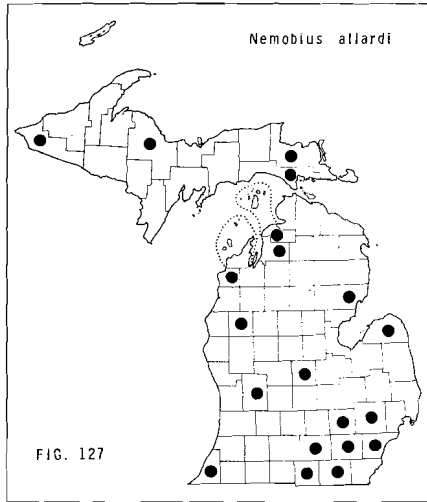
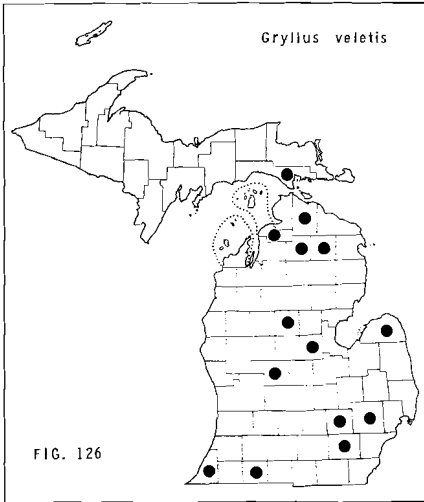
The Ground Crickets

Genus NEMOBIUS Serville

Alexander (1957) and Alexander and Thomas (1959) have presented considerable information on the status and biology of five of the species of Michigan *Nemobius*.

allardi R. D. Alexander and E. S. Thomas 1959. (*fasciatus* of recent authors) (Allard's Ground Cricket). (Fig. 127). July 28 to October 25. An abundant inhabitant of xeric upland fields.

carolinus carolinus Scudder 1877. (Carolina Ground Cricket). (Fig. 128). July 19 to November 6. The Carolina Ground Cricket is partial to hydric environ-



ments. It is often found in numbers on the moist soils of swales, marshes, swamps, and the margins of ponds and streams.

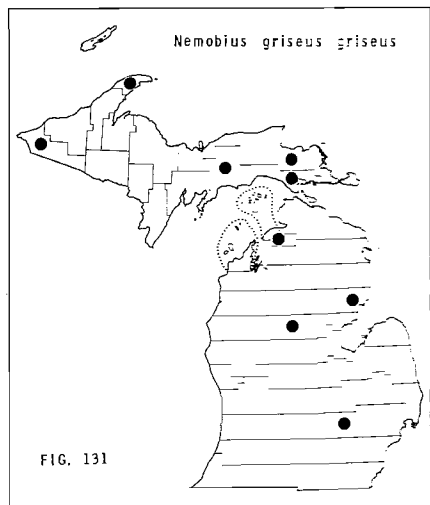
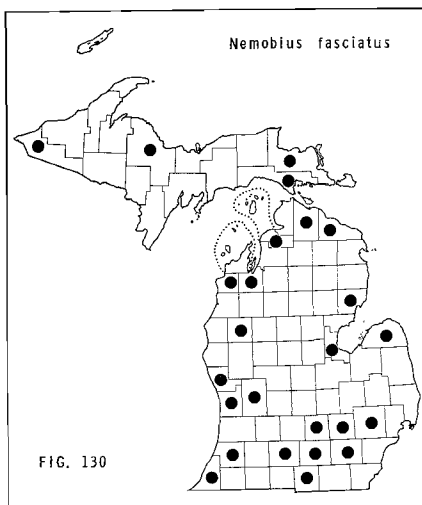
cubensis palustris Blatchley 1900. (Sphagnum Cricket). (Fig. 129). July 12 to October 4. As the common name implies, this ground cricket is usually found associated with the sphagnum found in bogs and swamps.

fasciatus (DeGeer) 1773. (*socius* of authors). (Striped Ground Cricket). (Fig. 130). July 20 to October 14. This species occurs on almost every type of wet soil except the acid soils of bogs. Thus, it is to be found in or near marshes, swales, ponds, small lakes, and streams.

griseus griseus E. M. Walker 1904. (Gray Ground Cricket). (Fig. 131). July 26 to October 7. This ground cricket inhabits the terrestrial strata of the more xerophytic upland environments where the soil is sandy and the vegetation sparse.

maculatus Blatchley 1900. (Spotted Ground Cricket). (Fig. 132). August 18 to November 6. This *Nemobius* has been recorded as frequenting dry open woods and borders of thickets.

tinnulus Fulton 1931. (Tinkling Ground Cricket). (Fig. 133). August 9 to September 23. An inhabitant of open, sunny, deciduous woodland.



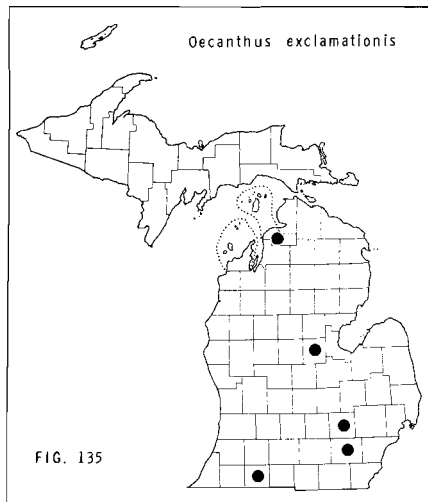
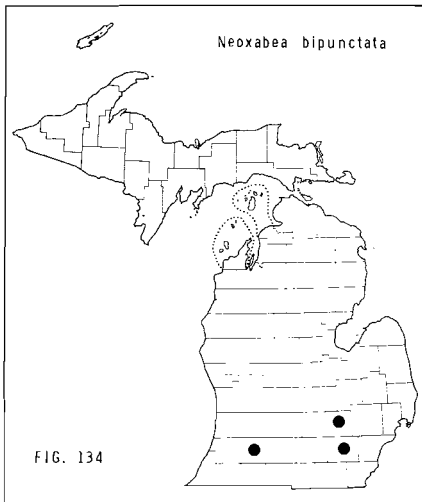
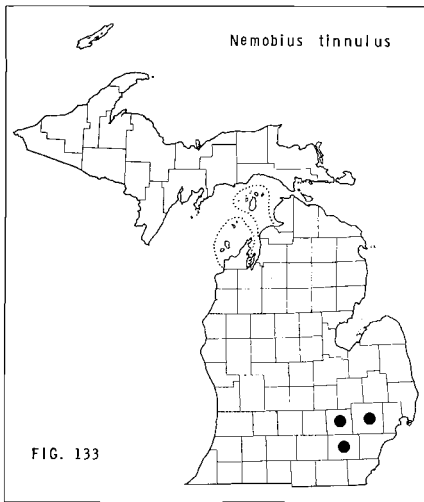
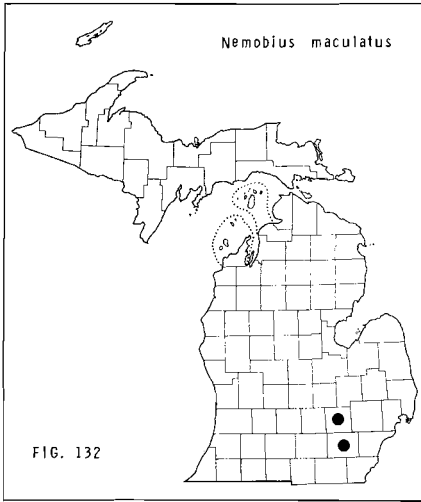
Subfamily OECANTHINAE

The Tree Crickets

T. J. Walker (1962, 1963) has presented a rather complete summary of the taxonomy, behavior, and ecology of all the tree crickets which are known to occur in Michigan.

Genus NEOXABEA Kirby

bipunctata (DeGeer) 1773. (Two-spotted Tree Cricket). (Fig. 134). August 4 to October 1. This tree cricket, first taken in Michigan in 1951, lives in deciduous trees, but occasionally can be found in tangles of shrubs and vines.



Genus **OECANTHUS** Serville

exclamatoris Davis 1907. (Davis' Tree Cricket). (Fig. 135). August 2 to September 17. An inhabitant of tangled undergrowth, woody understory, and the crowns of deciduous trees.

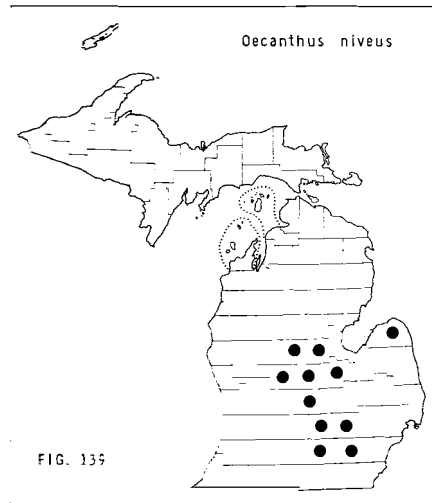
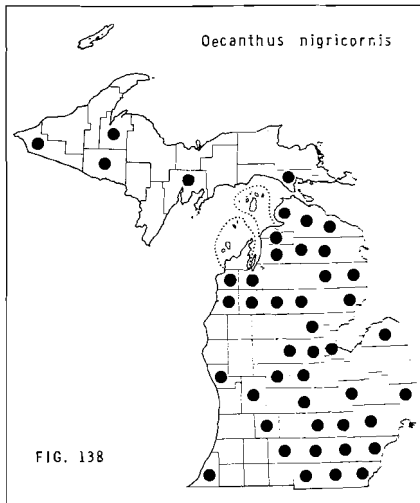
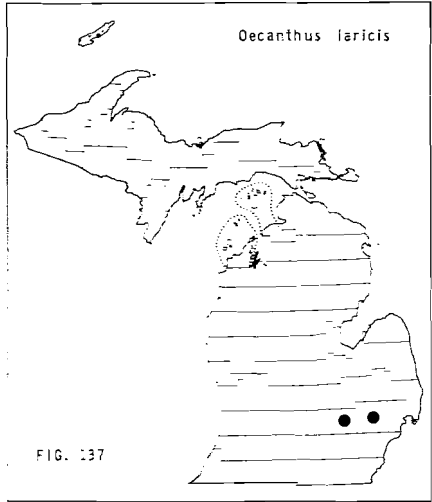
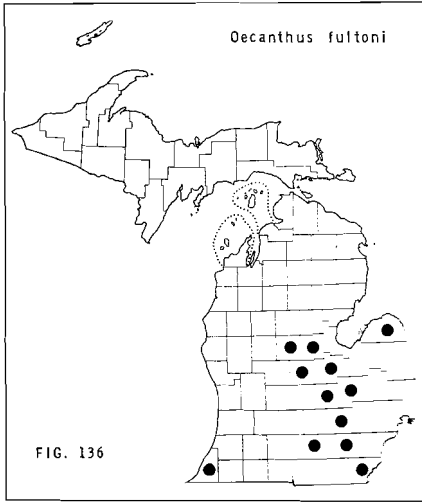
fultoni T. J. Walker 1962. (*niveus* of authors) (Snowy Tree Cricket). (Fig. 136). August 1 to October 22. Arboreal in deciduous trees.

laricis T. J. Walker 1963. (Tamarack Tree Cricket). (Fig. 137). August 3 to September 14. Described from the Edwin S. George Reserve, Livingston County, this cricket is known to occur in Michigan only on tamarack. In Ohio it is found on hemlock.

nigricornis F. Walker 1869. (Black-horned Tree Cricket). (Fig. 138). July 21 to October 7. This species lives among the coarse weeds and brambles of more heavily vegetated old field environments.

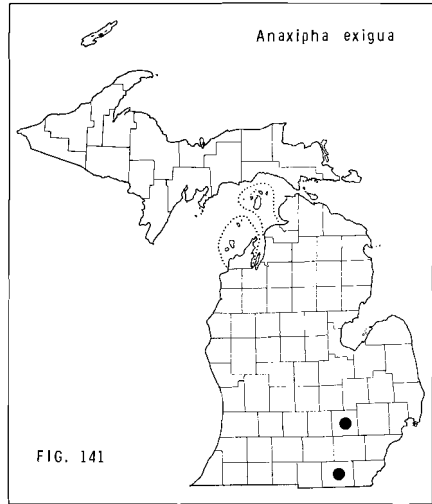
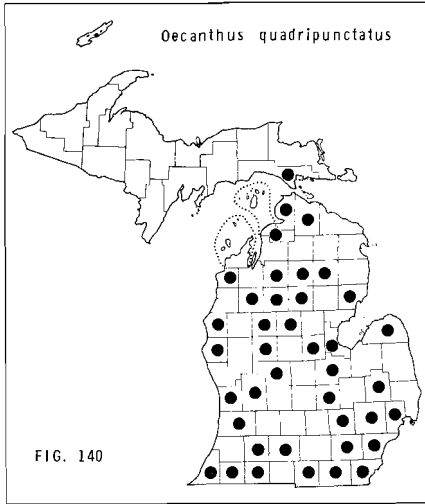
niveus (DeGeer) 1773. (*angustipennis* of authors) (Narrow-winged Tree Cricket). (Fig. 139). August 20 to November 2. An arboreal insect living in the crowns of deciduous trees, and among tangled undergrowth and reproduction.

quadripunctatus Beutenmuller 1894. (Four-spotted Tree Cricket). (Fig. 140). July 29 to September 30. Found on herbaceous growths of upland fields.



Subfamily TRIGONIDIINAE
The Winged Bush Crickets
Genus ANAXIPHA Saussure

exigua (Say) 1825. (Say's Bush Cricket). (Fig. 141). July 20 to September 5. This tiny cricket favors shrubby growths such as the button-bush and dogwood which grow in hydric environments.



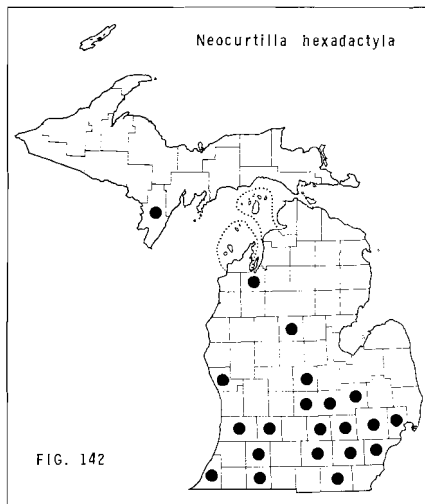
Family GRYLLOTALPIDAE

The Mole Crickets

Subfamily GRYLLOTALPINAE

Genus NEOCURTILLA Kirby

hexadactyla (Perty) 1832. (Northern Mole Cricket). (Fig. 142). June 6 to October 25. This insect burrows in the moist mud and sand of such low ground as that found along the margins of ponds, streams, and small lakes. Long-winged individuals are occasionally taken at light. The Menominee County record for this species is based on the call of a singing male which I heard in June, 1940.



LITERATURE CITED

- Alexander, R. D. 1957. The song relationships of four species of ground crickets. Ohio J. Sci. 57: 153-163.
- Alexander, R. D. and Robert S. Bigelow. 1960. Allochronic speciation in field crickets, and a new species, *Acheta veletis*. Evol. 14: 334-346.
- Alexander, R. D. and Edward S. Thomas. 1959. Systematics and behavioral studies on the crickets of the *Nemobius fasciatus* group (Orthoptera: Gryllidae: Nemobiinae). Ann. Ent. Soc. Amer. 52: 591-605.
- Blatchley, Willis S. 1920. Orthoptera of northeastern America, with especial reference to the faunas of Indiana and Florida. Indianapolis, Indiana.
- Cantrall, Irving J. 1943. The ecology of the Dermaptera and Orthoptera of the George Reserve, Michigan. Univ. Mich. Mus. Zool. Misc. Publ. 54.
- Graham, S. A. 1937. The walking stick as a forest defoliator. Univ. Mich. Sch. For. and Cons. Cir. 3.
- Gurney, Ashley, B. 1953. Distribution, general bionomics, and recognition characters of two cockroaches recently established in the United States. Proc. U.S. Nat. Mus. 103: 39-56.
- Hebard, Morgan. 1934. The Dermaptera and Orthoptera of Illinois Ill. Dept. Reg. Educ., Bull. Div. Nat. Hist. Surv. 20(3), iv, 125-279.
- Hubbell, Theodore H. 1922. The Dermaptera and Orthoptera of Berrien County, Michigan. Univ. Mich. Mus. Zool. Occ. Pap. 116.
- _____. 1936. A monographic revision of the genus *Ceuthophilus* (Orthoptera, Gryllacrididae, Rhabdophorinae). Univ. Fla. Publ., Biol. Sci., Ser. II (1).
- _____. 1960. The sibling species of the *Atutacea* group of the Bird-locust genus *Schistocerca* (Orthoptera, Acrididae, Cyrtacanthacridinae). Univ. Mich. Mus. Zool. Misc. Publ. 116.
- Pettit, R. H. and Eugenia McDaniel. 1918. Key to Orthoptera of Michigan with annotations. Mich. Agr. Coll. Spec. Bull. 83.
- Rehn, James A. G. and Harold J. Grant, Jr. 1956. The components of *Tetrix ornata* (Orthoptera; Acridoidea; Tetrigidae). Proc. Acad. Nat. Sci., Phil. 58: 117-153.
- _____. 1961. A monograph of the Orthoptera of North America (north of Mexico). Vol. I. Monographs Acad. Nat. Sci., Phil. 12.
- Thomas, Edward S. and Richard D. Alexander. 1962. Systematic and behavioral studies on the meadow grasshoppers of the *Orchelimum concinnum* group. (Orthoptera: Tettigoniidae). Univ. Mich. Mus. Zool. Occ. Pap. 626.
- Walker, Thomas J. 1962. The taxonomy and calling songs of United States tree crickets (Orthoptera: Gryllidae: Oecanthinae). I. The genus *Neoxabea* and the *niveus* and *varicornis* groups of the genus *Oecanthus*. Ann. Ent. Soc. Amer. 55: 303-322.
- _____. 1963. The taxonomy and calling songs of the United States tree crickets (Orthoptera: Gryllidae: Oecanthinae). II. The *nigricornis* group of the genus *Oecanthus*. Ann. Ent. Soc. Amer. 56: 772-789.