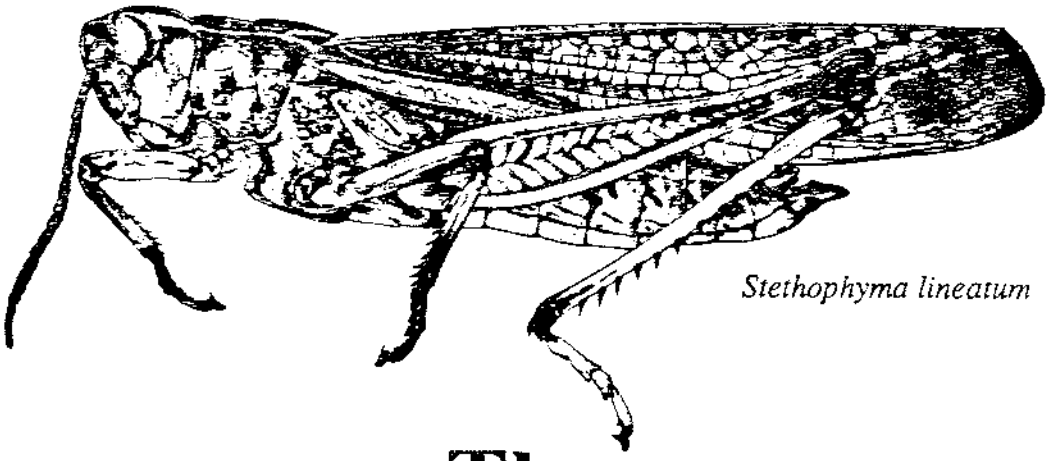


Stethophyma lineatum

The ACRIDIDAE of MINNESOTA

John Haarstad
Cedar Creek Natural History Area
Bethel, Minn. 55005
December, 1990

TABLE OF CONTENTS

Introduction	1
Materials and Methods	2
Part I: Survey of the Acrididae of Western Minnesota	3
Part II: Synopsis of the Acrididae of Minnesota	10
Discussion	21
Key to the Acrididae of Minnesota	22
Bibliography	26
Checklist of Minnesota Orthoptera	27
Generic Index to Minnesota Acrididae	28

INTRODUCTION

The last synopsis of Minnesota Orthoptera was published over half a century ago (Hebard, 1932). Since that time many taxonomic changes have occurred and probably also the status of many of the species reported for the state. Roughly 135 species of Orthoptera occur in Minnesota. Walking sticks, cockroaches, long-horned meadow grasshoppers, various crickets, and pygmy grasshoppers account for 60 species. The remaining 70 plus species belong to the Acrididae (short-horned grasshoppers). In this report I attempt to provide an up-to-date summary of the status of the Acrididae known to occur in Minnesota.

The Acrididae of Minnesota can be divided into three groups. The Slant-faced Grasshoppers, **Gomphocerinae,** all feed upon grasses. The most common and widespread species is Chorthippus curtipennis which is found in rich growth of marsh edges, ditches, and old field swales throughout the state. Two other common but more local species are Orphulella speciosa (in pastures) and Ageneotettix deorum (in sparsely vegetated sandy areas). Chloealtis conspersa is a common inhabitant of dry oak woods in the eastern part of the state. Interesting rarer species include Eritettix simplex and Aeropedellus clavatus. None of the species in this group are of economic importance.

The Banded-wing Grasshoppers, **Oedipodinae,** generally have colored wings and are most abundant in xeric waste areas such as roadsides, gravel pits, and dry prairie. They are generally classified as mixed-feeders, feeding on both forbs and grasses. Perhaps the most conspicuous member of this group is the Carolina Grasshopper, Dissosteira carolina, the large black-winged species seen along roadsides in late summer. Other common species include Pardalophora apiculata (a large leopard spotted, red-winged species of early summer), Arphia conspersa and A. sulphurea (two yellow-winged species of early summer), Arphia pseudonietana (a red-winged species of late summer), and Spharagemon collare (a yellow-winged species found in sandy areas in late summer). Three rarer species confined to sandy areas are Psinidia fenestralis, Trimerotropis maritima-interior and Xanthippus corallipes-latefasciatus. The only pest species in this group is Camnula pellucida, the Clear-winged Grasshopper, which is sometimes destructive to cereals and pastures in northern Minnesota.

The third group of grasshoppers are the spur-throats, **Cyrtacanthacridinae** and **Melanoplinae**. Members of this group are primarily forb feeders, but a few grass feeders do occur (e.g. Phoetaliotes nebrascensis). Schistocerca emarginata (The Leather-winged Bird Locust) is confined to sandy soils of EC Minnesota where it feeds on legumes. Hypochlora alba, a pale-green brachypterous species, is a specialist on Artemisia ludoviciana. The largest genus in this group is Melanoplus (25 species), and it contains most of the state's pest species. Some of the most destructive species are M. femurrubrum (red-legged grasshopper), M. bivittatus (two-striped grasshopper), and M. sanguinipes (lesser migratory grasshopper). However, several other rarer species of Melanoplus inhabit the state. Some of the most interesting and seldom collected are brachypterous (short-winged) species found in woodlands and marshes (e.g. M. viridipes, M. walshii, M. islandicus, M. huroni and M. gracilis).

Most of the grasshoppers found in Minnesota overwinter as eggs deposited in the soil which hatch in the spring. As these nymphs feed and grow they pass through five instars before becoming adults in late summer (July-Sept.). There is only one generation per year. Adults that appear in early spring overwintered as half-grown nymphs (e.g. Chortophaga viridifasciata, Arphia conspersa, Pardalophora apiculata).

Mulkern, et.al. (1969) provides information on the food habits of many species of grasshoppers found in Minnesota. Otte (1970) discusses the mating behavior of many North American species. Excellent general works with distribution and habitat information include Otte (1981, 1984) on the Gomphocerinae and Oedipodinae of North America; Vickery and Kevan (1985) on the Orthoptera of Canada; and Helfer (1972) on the Orthoptera of the U.S. Regional works of interest include Cantrall (1943, 1968) for Michigan; Capinera and Sechrist (1982) for Colorado and xxxxx (1985) for South Dakota.

MATERIALS AND METHODS

My contract with the Minnesota DNR was to survey the Acrididae occurring on natural areas of western Minnesota. Under this contract I spent 20 days from 16 July to 30 August 1990 collecting grasshoppers from more than 50 sites (14 State Parks, 14 SNA's, 11 TNC preserves, 6 WMA's, and 12 miscellaneous sites--County parks, railroad sidings). The procedure was to sweep with an insect net along separate transects within the various natural communities present at the site. Sweep-strokes were counted, net contents were transferred to a plastic bag, and insects killed with ethyl acetate. Additional hunting-sweeping was also conducted at most of the sites. These sweeps were uncounted, but interesting species collected were retained and contributed to information on the grasshopper composition of the site. At the end of the day the grasshoppers in the bags were counted and sorted to species. Representative specimens were preserved in alcohol. Of the 5000 specimens collected ca. 2000 of them were later pinned and labelled and deposited in the Univ. of Minnesota Entomology Collection, St. Paul, as voucher specimens.

This report is divided into two parts. In Part I results of my grasshopper survey on natural areas in western Minnesota are presented. Included is a map of sites visited. This is followed by a brief description of the sites visited, the date of the collection, total number of sweeps made, and mean number of grasshoppers collected per 100 sweeps. Mention is made of the most common and any noteworthy species collected. At the end of this section I present a Site-by-Species tabulation of all the species collected at each site with an indication of their abundance at each site. Many common species (e.g. Dissosteira carolina, Chorthippus curtipennis, Orphullela speciosa, Phoetaliotes nebrascensis, and the Melanoplus species M. femurrubrum, M. bivittatus, M. sanguinipes, M. keeleri-luridus were collected at most of the sites and although recorded in the Table are rarely mentioned in the text. I also include in Part I the results of personal collecting trips in northeast, east-central, and southeast Minnesota during the summer of 1990.

Part II is a synopsis of all the Acrididae known or suspected to occur in Minnesota. Included in this section are species range in North America, adult flight season in Minnesota, and brief notes on habitat preference, abundance, and diet. Maps of species distribution within Minnesota accompany these species synopses. This information is based on a variety of sources. The main references consulted were Hebard (1932), Otte (1981, 1984), and Vickery and Kevan (1985). Specimens examined include the following:

1. 900 specimens collected by TNC staff in July of 1989 from Bluestem Prairie SNA and Felton Prairie SNA (both in Clay Co.).

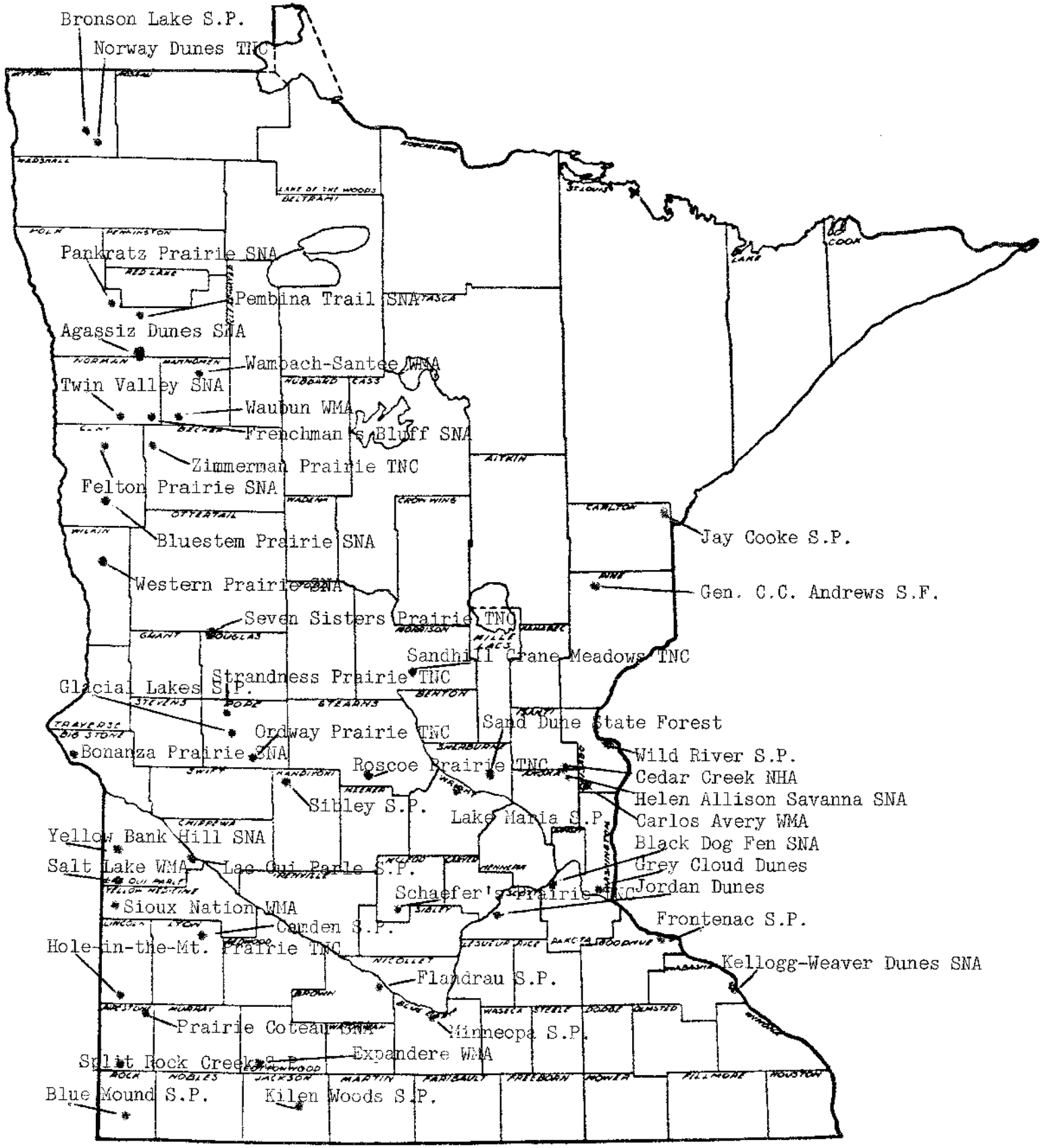
2. 1500 specimens collected by Minnesota Dept. of Agriculture technicians from cropland in 50 western counties in Aug-Sept of 1989.

3. The 5000 specimens collected by myself during the summer of 1990 plus hundreds of additional specimens collected by me over the past four years at various sites in east-central Minnesota.

4. Several thousand grasshoppers in the Univ. of Minnesota Collection collected since Hebard's 1932 publication.

5. 4000 specimens collected by Dean Hansen under a separate Univ. of Minn. contract during the summer of 1990. These were collected at diverse sites across much of the state and have proved invaluable in presenting a clearer picture of the status of some of the state's rarer species.

Even with this number of specimens several deficiences exist in the present study. Little recent collecting has been done in early summer except in east-central Minnesota. The distribution and status of such species as Pardalophora haldemanii, Eritettix simplex and Arphia conspersa and A. sulphurea across southern Minnesota is unkown. The north-central, northeast, and southeast regions of the state received little attention, and the current status of Booneacris glacialis-canadensis, Scirtetica marmorata, Dendrotettix quercus, and the Melanoplus species M. bruneri, M. huroni, M. stonei and M. scudderi are unknown.


Bronson Lake S.P.
Norway Dunes TNC
Pankratz Prairie SNA
Pembina Trail SNA
Agassiz Dunes SNA
Wambach-Santee WMA
Twin Valley SNA
Waubun WMA
Frenchman's Bluff SNA
Zimmerman Prairie TNC
Felton Prairie SNA
Bluestem Prairie SNA
Western Prairie SNA
Seven Sisters Prairie TNC
Sandhill Crane Meadows TNC
Strandness Prairie TNC
Glacial Lakes S.P.
Ordway Prairie TNC
Sand Dune State Forest
Bonanza Prairie SNA
Roscoe Prairie TNC
Wild River S.P.
Cedar Creek NHA
Helen Allison Savanna SNA
Sibley S.P.
Lake Maria S.P.
Carlos Avery WMA
Yellow Bank Hill SNA
Black Dog Fen SNA
Salt Lake WMA
Lac Qui Parle S.P.
Grey Cloud Dunes
Schaefer's Prairie TNC
Jordan Dunes
Sioux Nation WMA
Frontenac S.P.
Camden S.P.
Hole-in-the-Mt. Prairie TNC
Kellogg-Weaver Dunes SNA
Flandrau S.P.
Prairie Coteau SNA
Minneopa S.P.
Split Rock Creek S.P.
Expandere WMA
Blue Mound S.P.
Kilen Woods S.P.
Jay Cooke S.P.
Gen. C.C. Andrews S.F.

PART I--**Survey of the Acrididae of Western Minnesota--1990**

MCLEOD CO. (16 July 1990)

Schaefer Prairie (TNC) (500 sweeps, mean = 5 grasshoppers per 100 sweeps) = (500,5)
This lush forb-diverse tall grass prairie on gently rolling gravel moraine ranges from drier knolls to heavy wet blacksoil prairie. Very few grasshoppers were collected. Chorthippus curtipennis was most common. Noteworthy finds were M. dawsoni and the prairie walking stick, Diapheromera velii.

BROWN CO. (16 July 1990)

Flandrau State Park (200, 20)
The park contains no native prairie. An open hillside is covered with brome and flowering spurge. Chloealtis conspersa was collected in woods bordering this field. Only common species (M. femurrubrum, M. bivittatus, M. differentialis) were encountered elsewhere in the park.

BLUE EARTH CO. (16 July 1990)

Minneopa State Park (200, 22)
Some admirable efforts at prairie transplants have been made in the boulder-studded old field near the campground nestled under large bur oaks. No grasshoppers of note were collected.

JACKSON CO. (17 July 1990)

Kilen Woods State Park (900, 8)
This park contains Prairie Bush Clover SNA--a ravine dissected mesic mid-grass prairie on gravelly soil. M. keeleri-luridus, P. nebrascensis, and Q. speciosa were common here. Lush blacksoil prairie near the Des Moines River, wooded ravines, and overgrown bur oak savanna contained no grasshoppers of note.

COTTONWOOD CO. (18 July 1990)

Expandere WMA (600, 2)
This wet-mesic blacksoil prairie yielded few grasshoppers. However, two more northern species of note were collected--M. borealis and Stethophyma gracile.

ROCK CO. (18-19 July 1990)

Blue Mound State Park (1000, 12)
The top of the mound contains Sioux quartzite exposures and is very uneven in quality. Poa compressa and other weedy grasses and thistles are common. A single Eritettix simplex and several Aeropedellus clavatus were noteworthy collections. Chloealtis conspersa was taken from oak woods bordering the mound.

PIPESTONE CO. (19-20 July 1990)

Split Rock Creek State Park (200, 30)
M. keeleri-luridus, P. nebrascensis, and Q. speciosa were common in the good quality prairie slope below the observation tower.

Prairie Coteau SNA (600, 8)
Rolling mixed-grass gravelly hilltops with lusher somewhat weedy swales. Hypochlora alba was collected from Artemisia on the upland. Pseudopomala brachyptera and M. dawsoni were taken from lower slopes.

LINCOLN CO. (20 July 1990)

Hole-in-the-Mountain Prairie (TNC) (1200, 6)
Rolling hills with gravelly mixed-grass knolls and lusher growth in the swales. Hypochlora alba, Aeropedellus clavatus, M. dawsoni, and the prairie walking stick, D. velii, were noteworthy collections on this fine tract of prairie.

LYON CO. (21 July 1990)

Camden State Park (400, 35)
I only collected from a fine prairie slope near the 'upper campground'. M. keeleri-luridus, P. nebrascensis, and O. speciosa were fairly numerous. Chloealtis conspersa was collected from adjacent oak woods.

YELLOW MEDICINE CO. (23 July 1990)

Sioux Nation WMA (700, 2)
A luxuriant growth of tall grass prairie on gentle slopes yielded very few grasshoppers. Chorthippus curtipennis was most common. A single Pseudopomala brachyptera was collected.

LAC QUI PARLE CO. (23-24 July 1990)

Lac Qui Parle State Park (300, 150)
Primarily 'common' grasshoppers (M. differentialis, M. bivittatus, and M. femurrubrum) in the dense Phalaris undergrowth of this river bottomland. However, I did find Dichromorpha viridis relatively common here.

Salt Lake WMA (300, 120)
Garbage grasshoppers (M. differentialis, M. bivittatus, M. femurrubrum) were numerous in the weedy upland surrounding lake. I hoped to find rarer species of Trimerotropis in the exposed alkaline flats containing strange Chenopodiaceae, but none were found.

Yellow Bank Hill SNA (600, 200)
Grasshoppers were extremely numerous on this gravel-topped kame. Trachyrhachys kiowa and Ageneotettix deorum were abundant. Also collected were Hypochlora alba, Opeia obscura, Arphia pseudonietana, M. dawsoni and M. confusus plus several other common species.

BIG STONE CO. (25 July 1990)

Bonanza Prairie SNA (300, 50)
I collected along a steep prairie hillside bordering the gravel road descending to the lake and picnic area. Hypochlora alba and Hesperotettix viridis-pratensis were two noteworthy finds. The most common species were P. nebrascensis, M. keeleri-luridus, and O. speciosa.

WRIGHT CO. (21 July 1990)

Lake Maria State Park (200, 6)
A small patch of restored prairie near the park office yielded primarily M. femurrubrum and M. bivittatus. However, I did collect several Pseudopomala brachyptera here. I also found Dichromorpha viridis to be common along the lake margin.

STEARNS CO. (3 Aug 1990)

Roscoe Prairie (TNC) (500, 3)
Few grasshoppers were collected on this blacksoil tall-grass prairie. Chorthippus curtipennis was the most common species. I did collect a couple of M. dawsoni and the prairie walking, D. velii, at this site.

KANDIYOHI CO. (3 Aug 1990)

Sibley State Park (700, 10)
Two areas were collected. One a tract of restored prairie along Hwy 71 at the east side of the park, and the second a gravelly moraine with mixed-grass prairie just NW of the park off Hwy 9. M. keeleri-luridus, P. nebrascensis, and O. speciosa were common. Interesting species collected were Pseudopomala brachyptera, Spharagemon collare, Arphia pseudonietana, and the prairie walking stick, D. velii.

POPE CO. (25 July, 3-4 Aug 1990)

Ordway Prairie (TNC) (1000, 9)
Two attempts to collect on this large tract of fine quality prairie on hilly gravel moraine were both terminated by rain. M. keeleri-luridus, P. nebrascensis, and O speciosa were common on the drier uplands, and M. femurrubrum and M. bivittatus were common in the rather weedy swales. Also collected were Acropedellus clavatus, M. dawsoni, M. confusus, and the prairie walking stick, D. velei. Dean Hansen collected from a nearby gravel pit and grazed prairie and found M. gladstoni, Hypochlora alba, and Trachyrhachys kiowa.

Glacial Lakes State Park (1000, 5)
My collecting was confined to good quality hilly moraine prairie south and east of the main park office. Hypochlora alba and M. dawsoni were two species of note.

Strandness Prairie (TNC) (300, 2)
Few grasshoppers were collected on this heavily vegetated hilly moraine prairie. Chorthippus curtipennis was most common.

DOUGLAS CO. (4 Aug 1990)

Seven Sisters Prairie (TNC) (1000, 10)
This dry hill prairie overlooking Lake Christina and bordered by a gravel pit contained mostly common species. M. confusus, M. sanguinipes, M. foedus, M. bivittatus and Dissosteira carolina were common. One M. dawsoni was collected in denser grass at the base of the hill, and one Chloealtis conspersa near woods edge.

WILKIN CO. (4 Aug 1990)

Western Prairie South (300, 3) (400, 10)
The South Unit is a heavily vegetated wet-blacksoil prairie. M. borealis was among the few grasshoppers collected here. Four miles to the SE I swept a flat tract of tall grass prairie on private land that is periodically mowed for meadow hay. M. dawsoni was one of the more common species at this site.

CLAY CO. (4-5 Aug 1990)

Bluestem Prairie SNA (500, 5)
A large tract of fine quality prairie lying in the bed of glacial Lake Agassiz and containing drier beach ridges. I collected only in the vicinity of the SNA sign along an unmarked gravel road. Spharagemon collare, Aeropedellus clavatus, Eritettix simplex, Ageneotettix deorum and M. angustipennis were collected on lighter soils. Chorthippus curtipennis and M. borealis were found in lusher growth on heavier soils.

CLAY CO. contd. (4-5 Aug 1990)

Felton Prairie SNA (1000, 15)
Only the Blazing Star Unit was sampled. This tract is mixed-grass prairie on light soil with scattered moister swales. M. dawsoni, M. confusus, M. sanguinipes, and Spharagemon collare were all common. Also collected were Aeropedellus clavatus, Arphia pseudonietana, Ageneotettix deorum and M. angustipennis.

BECKER CO. (5 Aug 1990)

Zimmerman Prairie (TNC) (500, 15)
A gently sloping mesic to wet blacksoil prairie. Chorthippus curtipennis was most common in heavier vegetation. Spharagemon collare, Aeropedellus clavatus and M. dawsoni were three noteworthy species taken in the drier portion of the tract.

NORMAN CO. (5 Aug 1990)

Twin Valley Prairie SNA (300, 8)
Few grasshoppers were collected in this wet-mesic blacksoil prairie. Chorthippus curtipennis was the most common species in the lush vegetation where I sampled, but Pseudopomala brachyptera, Stethophyma gracile, and M. borealis were also taken. Spharagemon collare was common along the gravelly roadside.

Frenchman's Bluff SNA (300, 60) (300, 7)
Grasshoppers were abundant in the weedy, gravel-pit border of this preserve. They were much less common on the good quality dry bluff prairie itself. Noteworthy species collected were Aeropedellus clavatus, Hypochlora alba, Hesperotettix viridis-pratensis, and M. dawsoni. Dean Hansen collected M. gladstoni and Arphia pseudonietana from an adjacent grazed pasture.

MAHNOMEN CO. (5 Aug 1990)

Waubun WMA (500, 7)
Grasshoppers were numerous along the roadside ditch (M. femurrubrum, M. bivittatus), but were much less common on the tract itself. I collected M. dawsoni from mesic upland prairie, and M. borealis and a nymph of Stethophyma gracile? from wetter blacksoil prairie.

Wambach-Santee WMA (400, 15)
I only sampled a small lush patch of prairie south of the dike heading towards Santee Prairie. M. borealis and Chorthippus curtipennis were common here.

POLK CO. (6 Aug 1990)

Agassiz Dunes SNA (1200, 30)
Grasshoppers were common on this large tract of rolling sand prairie with numerous bare dune faces, scattered oak woods, and grassy swales. Many species were collected in the diverse habitats present on the preserve. S. collare and D. carolina were conspicuous in bare dune areas. On the sparsely vegetated sandy soil Ageneotettix deorum, M. angustipennis, and M. packardii were common. This was one of the few places I collected M. flavidus, another xerophilic species. Hypochlora alba, Aeropedellus clavatus, Pseudopomala brachyptera, M. dawsoni, and M. gladstoni were also collected here.

Pembina Trail Preserve SNA (500, 7)
A mesic blacksoil prairie with drier beach ridge of glacial Lake Agassiz. I collected only in the vicinity of the SNA sign off Co. Rd. 45. M. femurrubrum and M. bivittatus were the most common species at this site. Spharagemon collare was collected in drier and Stethophyma gracile wetter portions of the site.

POLK CO. contd. (6 Aug 1990)

Pankratz Prairie SNA (500, 7)
Another flat mesic blacksoil prairie. Chorthippus curtipennis, M. dawsoni, and M. femurrubrum were the most common species in the prairie. M. borealis was collected in the ditch, and S. collare was common along the gravel roadside.

KITTSON CO. (7-8 Aug 1990)

Norway Dunes (TNC) (500, 10)
Gently rolling Arctostaphylus (Bearberry) covered dunes with scattered bur oaks. Spharagemon collare, Arphia pseudonietana, Ageneotettix deorum, M. angustipennis, M. packardii, and M. dawsoni were all common. Also collected were Aeropedellus clavatus, Hesperotettix viridis-pratensis, M. gladstoni and M. flavidus. Arphia conspersa nymphs and another nymph, possibly of Pardalophora haldemanii, were also collected. A solitary M. borealis was taken from dunes at the north end of the preserve. It probably came from the wetland beyond.

Lake Bronson State Park (700, 8)
Collecting was confined to flat gravel prairie east of the campground and another piece of mesic prairie further east beyond the footbridge over the river. Common species included S. collare, M. dawsoni and M. keeleri-luridus. Also collected were Arphia pseudonietana, Aeropedellus clavatus, Ageneotettix deorum, M. angustipennis, M. confusus and M. gladstoni.

MORRISON CO. (9 Aug 1990)

Sandhill Crane Meadows (TNC) (500, 20)
Dry sand prairie with overgrown bur oak savanna surrounded by shrub-carr wetland. Common species on the sandy uplands were S. collare, Arphia conspersa nymphs, M. keeleri-luridus and M. dawsoni. Also present were Aeropedellus clavatus, Ageneotettix deorum and M. angustipennis.

SHERBURNE CO. (9 Aug 1990)

Sand Dune State Forest (500, 13)
This large site also includes Uncas Dunes SNA. The State Forest land is a diverse tract with dry sand prairie, exposed dune faces, overgrown bur oak savanna, and isolated grassy swales. Common species on the barren to sparsely vegetated sandy soils were Spharagemon collare, Ageneotettix deorum, M. angustipennis, and Psinidia fenestralis. Spharagemon bolli, Schistocerca emarginata, Aeropedellus clavatus, Orphulella pelidna, M. dawsoni, M. fasciatus and Chloealtis conspersa were also collected at this site. On a mid-May collecting trip I found Pardalophora apiculata, Arphia conspersa, and Xanthippus corallipes-latefasciatus to be common.

ANOKA CO. (30 July 1990)

Helen Allison Savanna SNA (800, 25)
An 80 acre tract of rolling dry sand prarie, fire-maintained bur oak savanna and isolated sedge swales with a diverse grasshopper fauna. Common late-summer upland inhabitants were Spharagemon collare, Arphia pseudonietana, Schistocerca emarginata, Ageneotettix deorum, M. angustipennis and M. foedus. M. dawsoni, M. flavidus, Hypochlora alba, Hesperotettix viridis-pratensis, Orphulella pelidna, Chloealtis conspersa and Psinidia fenestralis were also collected on the site. Early summer species collected include Pardalophora apiculata, Arphia conspersa, and Xanthippus corallipes-latefasciatus.

ANOKA/ISANTI CO.

Cedar Creek Natural History Area

Cedar Creek NHA is a 5400 acre reserve situated on the Anoka Sand Plain in southern Isanti and northern Anoka counties. Habitats are diverse including dry sand prairie, sandy old fields, bur oak savanna, dry oak woods, northern hardwoods, tamarack/white cedar/alder swamps, shrub carr, marshes, and bogs. I have collected grasshoppers at this field station over the past several years. 35 species of acridids have been collected on the area. Some of the rarer include: Stethophyma gracile and M. borealis in marshes and bogs, M. punctulatus-griseus in tamarack swamps, Chloealtis conspersa and Spharagemon bolli in dry oak woods, and Hypochlora alba, Hesperotettix viridis-pratensis, M. flavidus, Eritettix simplex, Psinidia fenestralis and Xanthippus corallipes-latefasciatus in sand prairie. Aeropedellus clavatus, Ageneotettix deorum, Spharagemon collare, Arphia pseudonietana, A. conspersa, Pardalophora apiculata, M. angustipennis, M. dawsoni, Schistocerca emarginata are all quite common in many of the preserve's old fields.

CHISAGO CO. (1 Aug 1990)

Carlos Avery WMA (600, 15)

East of the radio tower NE of Wyoming lies a patch of rolling sand prairie and overgrown bur oak savanna. Spharagemon collare, Ageneotettix deorum, and M. angustipennis were common at this site. I also collected Arphia pseudonietana, Psinidia fenestralis, Arphia sulphurea, Spharagemon bolli, Aeropedellus clavatus, Orphulella pelidna, Pseudopomala brachyptera, Schistocerca emarginata, M. confusus and M. dawsoni at this site.

Wild River State Park (300, 10)

Grasshoppers collected in the park's abandoned fields were for the most part ordinary. Ageneotettix deorum, Arphia pseudonietana, Trachyrhachys kiowa, and Camnula pellucida were four of the more unusual species present. More interesting were the grasshoppers collected in wooded areas. Chloealtis conspersa was common along wood-field borders, and I caught a single M. islandicus in rich mesic woods. In the woods at Sunrise Landing I found M. viridipes and M. walshii to be fairly common. I also collected M. walshii at Interstate State Park.

PINE CO. (29 Aug 1990)

Gen. C.C. Andrews State Forest

This State Forest is primarily Jack Pine on sandy soil. I was hoping to find Melanoplus stonei and Booneacris glacialis-canadensis here but had no luck. Arphia pseudonietana was seen, and the expected species Camnula pellucida, Dissosteira carolina, Chorthippus curtipennis, M. femurrubrum, M. bivittatus, and M. sanguinipes were common.

CARLTON CO. (29-30 Aug 1990)

Jay Cooke State Park

Trimerotropis verruculata was common in exposed rocky areas. Other interesting finds were Chloealtis conspersa and M. borealis. Most notable was a large population of M. islandicus along the Grand Portage Trail of the St. Louis in a rich northern hardwood forest.

WASHINGTON CO. (15 July 1989)

Grey Cloud Dunes

I visited this sand terrace overlooking the Minnesota River in 1989. Collections of note include Spharagemon bolli, S. collare, Arphia sulphurea, A. pseudonietana, Psinidia fenestralis, Chloealtis conspersa, Pseudopomala brachyptera, Ageneotettix deorum, M. angustipennis, Schistocerca emarginata, and Hypochlora alba. Dean Hansen collected M. flavidus at this site in 1990 as well as many of the above mentioned species.

GOODHUE CO. (24 May 1990)

Frontenac State Park

A visit to this park in early summer showed Pardalophora apiculata, Arphia sulphurea, and Eritettix simplex to be common on bluff prairie.

Although not visited by myself I here report with his permission the results of Dean Hansen's fall collecting trips to Black Dog Fen (Dakota Co.), Jordan Dunes (Scott Co.), and Kellogg-Weaver Dunes (Wabasha Co.).

DAKOTA CO.

Black Dog Fen SNA

Dean found M. walshii and M. gracilis to be common along the grassy walk to the fen. He also collect one Stethophyma gracile here.

SCOTT CO.

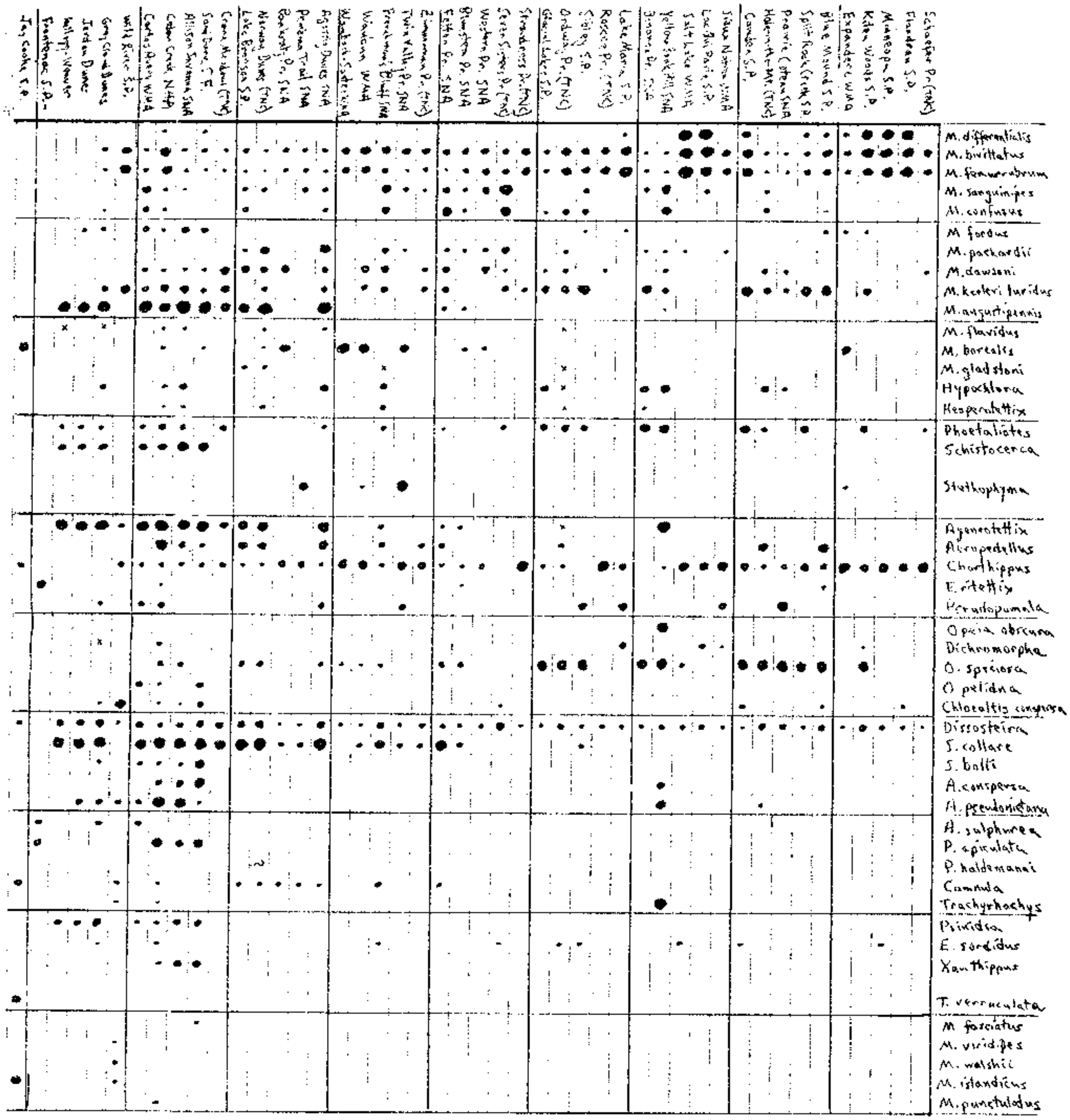
Jordan Dunes

Dean collected Spharagemon collare, Arphia pseudonietana, Psinidia fenestralis, Ageneotettix deorum, M. angustipennis, and Schistocerca emarginata at this site.

WABASHA CO.

Kellogg-Weaver Dunes SNA and environs

The same six species (excepting A. pseudonietana?) were collected by Dean at this site. In addition, he also found Hesperotettix viridis-pratensis, Hypochlora alba, and Melanoplus flavidus in the vicinity.


Jay Cooke S.P.
Frontenac S.P.
Whitewater WMA
Jordan Dunes
Gray Cloud Dunes
Wild River S.P.
Carlos Avery WMA
Cedar Creek NHA
Allison Savanna SNA
Sand Dunes S.F.
Crane Meadows (TNC)
Lake Bronson S.P.
Nerstrand Dunes (TNC)
Roscoe Pr. SNA
Prairie Trail SNA
Agassiz Dunes SNA
Waubun Sidewiring
Weaver WMA
Frenchman's Bluff SNA
Twin Valley Pr. SNA
Zimmerman Pr. (TNC)
Felton Pr. SNA
Bluestem Pr. SNA
Western Pr. SNA
Seven Sisters Pr. (TNC)
Strandness Pr. (TNC)
Glacial Lakes S.P.
Ordway Pr. (TNC)
Sibley S.P.
Roscoe Pr. (TNC)
Lake Maria S.P.
Jinxman Pr. SNA
Yellow Bank Hills SNA
Salt Lake WMA
Lac Qui Parle S.P.
Sioux Nation SNA
Camden S.P.
Hole-in-the-Mt. (TNC)
Prairie Coteau SNA
Split Rock Creek S.P.
Blue Mound S.P.
Expandere WMA
Kilen Woods S.P.
Minneopa S.P.
Flandrau S.P.
Schaefer Pr. (TNC)
M. differentialis
M. bivittatus
M. femurrubrum
M. sanguinipes
M. confusus
M. fordus
M. packardii
M. dawsoni
M. keeleri luridus
M. angustipennis
M. flavidus
M. borealis
M. gladstoni
Hypochlora
Hesperotettix
Phoetaliotes
Schistocerca
Stethophyma
Ageneotettix
Aeropedellus
Chorthippus
Eritettix
Pseudopomala
Opeia obscura
Dichromorpha
O. speciosa
O. pelidna
Chloealtis conspersa
Dissosteira
S. collare
S. bolli
A. conspersa
A. pseudonietana
A. sulphurea
P. apiculata
P. haldemanii
Camnula
Trachyrhachys
Psinidia
E. sordidus
Xanthippus
T. verruculata
M. fasciatus
M. viridipes
M. walshii
M. islandicus
M. punctulatus

Part II

Synopsis of the Acrididae of Minnesota

* The information on the following pages has come from a variety of sources. Vickery and Kevan (1985) was the major source for information on species range and habitat. Species preceded by an asterisk (*) have not yet been collected in Minnesota, but may possibly occur here. Adult flight seasons are for east-central Minnesota except when preceded by an asterisk (*). These flight seasons are primarily from Cantrall (1968) for Michigan.

The Dot Maps are derived from Hebard (1932) and from examining specimens in the Univ. of Minnesota Collection. Solid dots are relatively recent records, open dots are historical records or records reported in Hebard (1932), Otte (1981, 1984), and Vickery and Kevan (1985) but for which there is no material in the collection. Crosses (+) indicate new county records resulting either from my own collecting (red dots) or that of Dean Hansen (green dots).

ACRIDIDAE
GOMPHOCERINAE The Slant-faced Grasshoppers

*Metaleptea brevicornis (Johansson, 1753)
Range: Wisc-S.Ont-Mexico *Adults 9 Aug-15 Sept; OW eggs
The PanAmerican Grasshopper is found on the taller grasses and sedges of marshes and sloughs. No Minn. records exist, but it may occur in extreme SE Minn. in marshy bottomland along the Mississippi River.

*Mermiria bivittata maculipennis (Bruner, 1890)
Range: Abt-Wisc-Mexico *Adults 25 July-1 Sept; OW eggs
This grasshopperr feeds on Bouteloua curtipendula and Calamovilfa longifolia in sandy eroded areas. It may occur in W and SE Minn.

Pseudopomala brachyptera (Scudder, 1863)
Range: BC-Me-Ohio-Utah Adults 29 June-15 Sept; OW nymphs
The Bunch Grass Grasshopper is found in mesic tall grass prairie often in association with Andropogon gerardi. Collected in several scattered localities in W and EC Minn. It appears to be more common than it was in the 1930's.

Opeia obscura (Thomas, 1872)
Range: Abt-Manit-Neb-Utah *Adults 24 July-8 Sept; OW eggs
A western short grass prairie inhabitant favoring Bouteloua gracilis. Only collected from a few localities in WC Minn. This species appears to be much less common than it was in the 1930's.

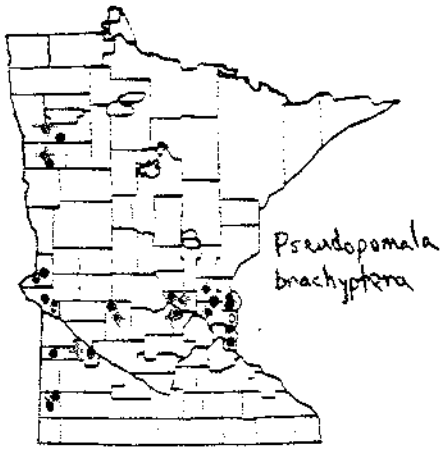
Eritettix simplex tricarinatus (Thomas, 1873)
Range: Abt-Minn-Colo Adults 30 Apr-18 July; OW nymphs
This early season species inhabits xeric prairie. Collected at a few scattered localities in W, EC, and SE Minn. Probably most common on bluff prairies of SE Minn.

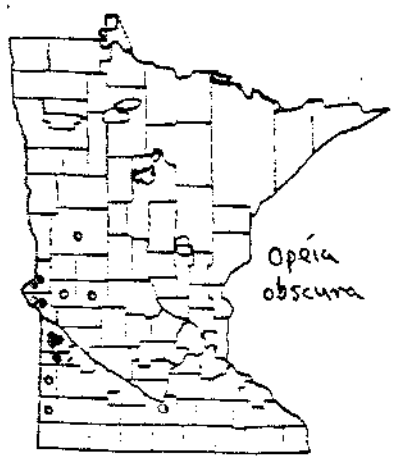
Amphitornus coloradus (Thomas, 1873)
Range: Abt-Manit-Colo-Utah *Adults 26 June-19Sept; OW eggs
This species inhabits dry grassy areas along river valleys and is reported to prefer Bouteloua and Stipa. No Minn. specimens, but a couple of records for the NW corner of the state (Otte, 1981). Its status requires verification.

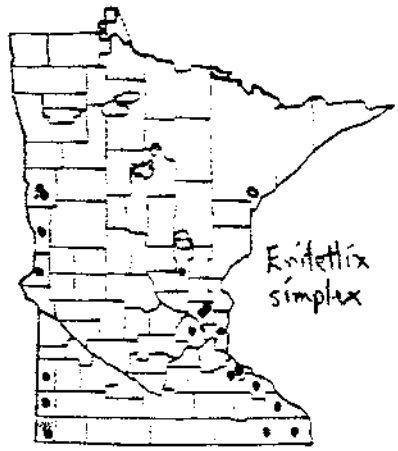
Chloealtis conspersa (Harris, 1841)
Range: BC-S.Que-Tenn-Colo Adults 1 July-24 Sept; OW eggs
The Sprinkled Grasshopper is found in or near dry deciduous woodlands. Eggs are deposited in decaying logs. Common in eastern and northern Minn. Collected at scattered wooded areas in SW Minn.

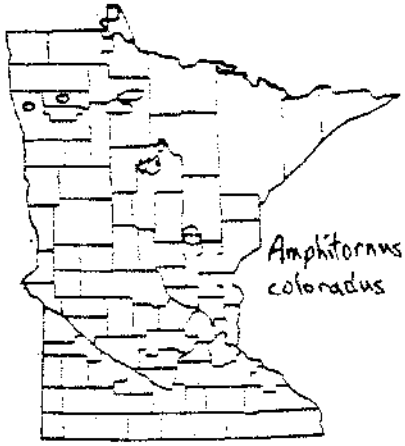
Chloealtis abdominalis (Thomas, 1873)
Range: Ask-E.Que-Ohio-Ariz Adults 9 July-18 Oct; OW eggs
Another woodland inhabitant. No Minn. specimens, but a few old records for the NW part of the state. Recent records desired.

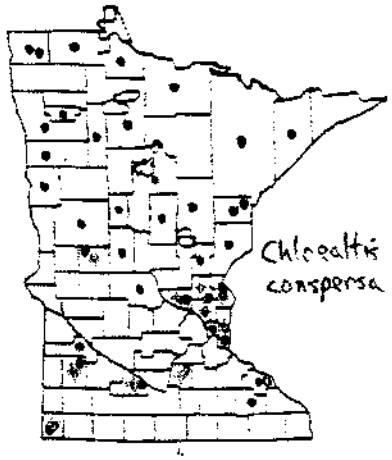
*Syrbula admirabilis (Uhler, 1864)
Range: Neb-Iowa-S.Ont-Fla-Ariz *Adults 3 July-3 Oct; OW eggs
A species found in sparse vegetation of poor fallow fields. No Minn. records, but it may occur in extreme S Minn.

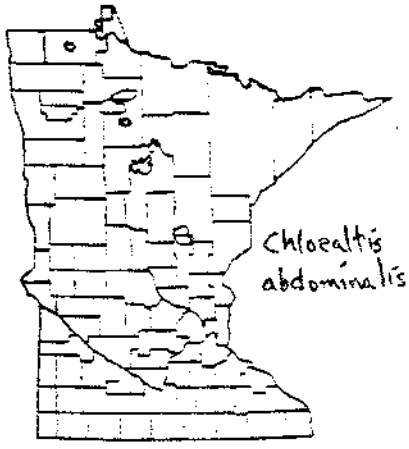

Pseudopomala
brachyptera

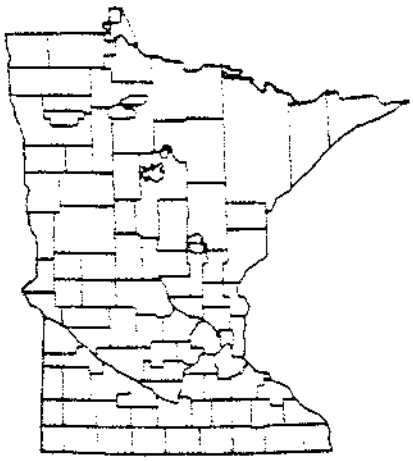

Opéia
obscura

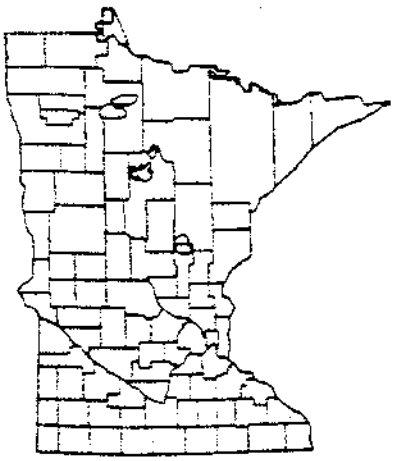

Enallagma
simplex

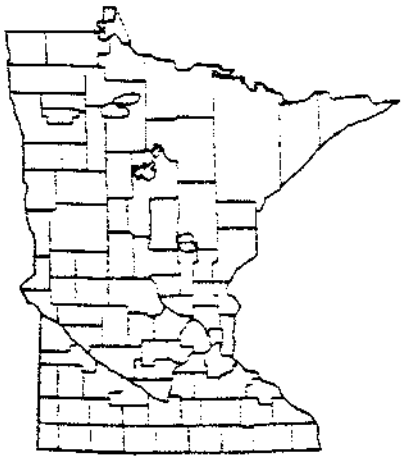

Amphiagrion
coloradus


Chloealtis
conspersa


Chloealtis
abdominalis







*Cordillacris occipitalis (Thomas, 1873)
Range: Abt-Manit-Tex-Ariz *Adults 7 July-15 Sept; OW eggs
A sand-loving species found near the margins of drifting sand in association with Sporobolus and Stipa. No Minn. records, but it may occur in extreme W Minn.

Chorthippus curtipennis (Harris, 1841)
Range: Ask-Nfld-Mexico Adults 19 June-11 Oct; OW eggs
This transcontinental species ranges from Arctic tundra to dry grasslands. In Minn. it is common throughout the state, primarily in marshes and the rank grass of old field swales.

Aeropedellus clavatus (Thomas, 1873)
Range: NWT-Manit-Ariz Adults 5 June-31 Aug; OW?
A mid-summer species with clubbed antennae found on light soils and reported to feed on Poa pratensis, occasionally cereals. Collected at several localities in W and EC Minn.

Phlibostroma quadrimaculatum (Thomas, 1871)
Range: Abt-Manit-Mexico *Adults 19 July-8 Sept; OW eggs
The Four-spotted Grasshopper is found in dry prairie and reported to prefer Bouteloua gracilis. One historical (1930's) record from Norman Co.

Ageneotettix deorum (Scudder, 1876)
Range: BC-Mich-Tex-NM Adults 12 July-10 Sept; OW eggs
The Sand Grasshopper prefers sparsely vegetated sandy/gravelly soils. Widespread and locally abundant over much of W and EC Minn.

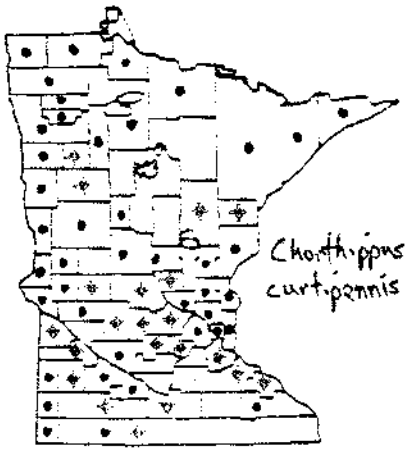
Aulocara elliotti (Thomas, 1870)
Range: BC-Manit-Tex Adults 14 July-7 Sept; OW eggs
The Bigheaded Grasshopper prefers dry sandy hillsides. It is a powerful jumper but doesn't fly much. Only historical records from extreme W Minn. in the 1930's.

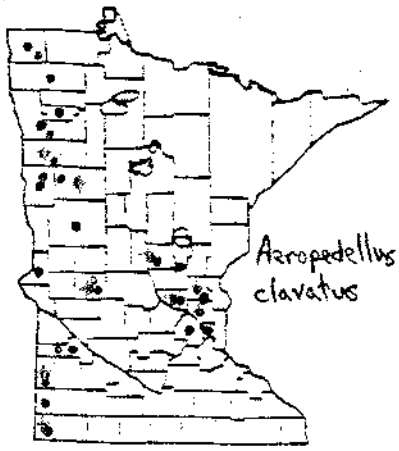
*Psoloessa delicatula (Scudder, 1876)
Range: Abt-Manit-Colo *Adults 12 May-4 July; OW e/n
The life cycle of this species requires two years. Eggs deposited in June hatch in August of the following year. These nymphs overwinter to become adults in May. It inhabits western grasslands. It may occur in extreme W Minn.

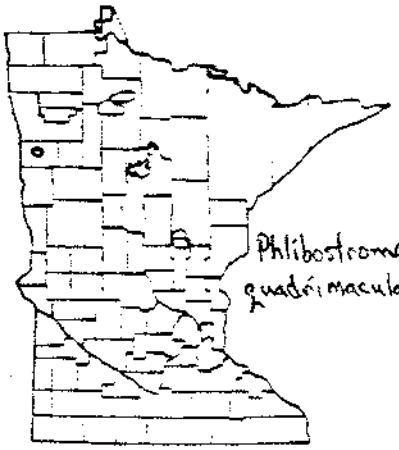
Orphulella speciosa (Scudder, 1863)
Range: Abt-NB-Va-Tex Adults 10 July-23 Sept; OW eggs
The Pasture Grasshopper is a common grass feeder found in sandy/loamy upland fields throughout much of the state.

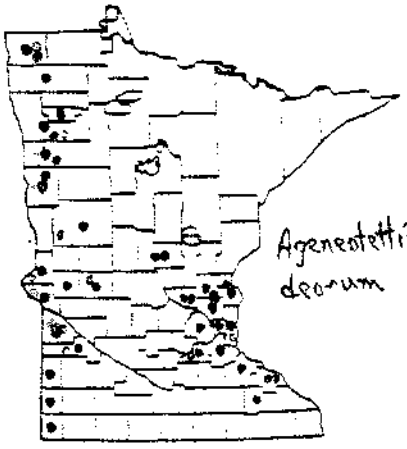
Orphulella pelidna (Burmeister, 1838)
Range: Abt-N.Eng-Mexico Adults 14 July-2 Sept; OW eggs
An apparently much less common species that feeds on grasses in open pine/oak woodlands. Collected at only a few widely scattered localities in W and EC Minn.

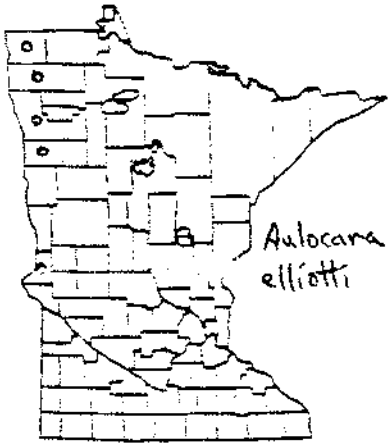
Dichromorpha viridis (Scudder, 1863)
Range: SD-N.Eng-Mexico Adults 19 July-24 Aug; OW eggs
A common southern species that is extending its range northward in deep luxuriant grasses of marshes, pastures, and fields on heavy soil. Collected at several localities in the southern half of Minn.

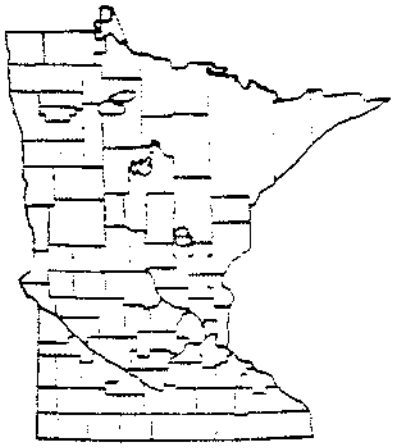

Chaetocnemus
curt.pennis

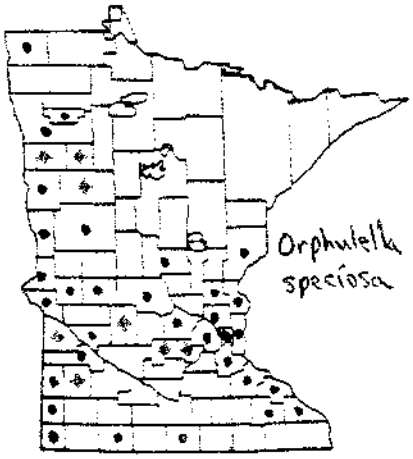

Aeropedellus
clavatus

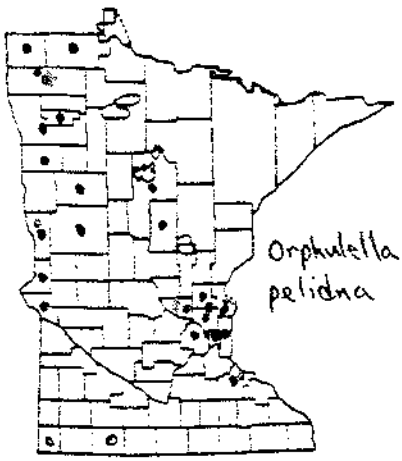

Phlibostroma
quadrimaculatum

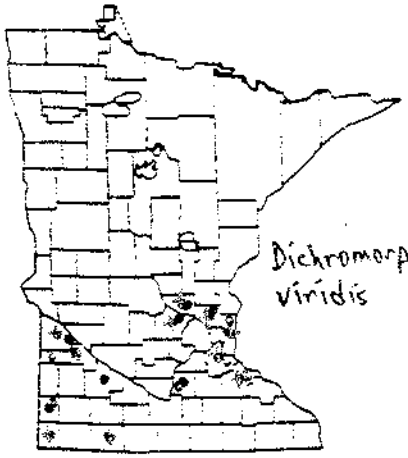

Agenestettix
deorum


Aulocara
elliotti




Orphulella
speciosa


Orphulella
pelidna


Dichromorpha
viridis

EPACROMIINI

Stethophyma celatum (Otte, 1979)
Range: Wyo-Mass-SC-Kan *Adults 22 June-25 Aug; OW eggs
Found in tall grasses, moist swales, and tamarack swamps. One Minn. record south of Ely (St. Louis Co.).

Stethophyma lineatum (Scudder, 1863)
Range: Ask-Nfld-NJ-Wash *Adults 30 June-1 Oct; OW eggs
Found in wet meadows, bogs, and tamarack swamps. A few records for NE and EC Minn. Collected in a leatherleaf bog in Sherburne Co.

Stethophyma gracile (Scudder, 1862)
Range: BC-Nfld-N.Eng- Colo Adults 25 July-4 Oct; OW eggs
A sedge feeder in semipermanent marshes and wet prairies. Most common in northern Minn. Collected at scattered localities in NW and EC Minn.

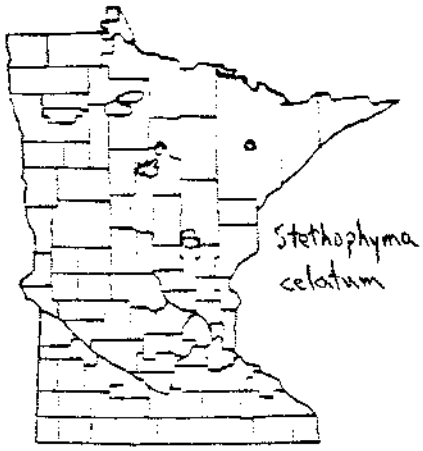
OEDIPODINAE-The Banded-Wing Grasshoppers

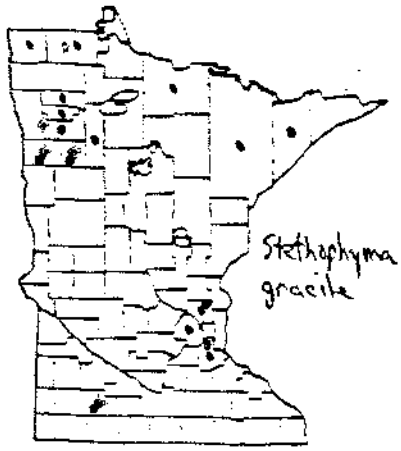
Arphia conspersa Scudder, 1875)
Range: Ask-W.Ont-Mexico Adults 19 Apr-16 June; OW nymphs
A common yellow-winged early summer species found in grasslands throughout much of the state. Most common in NW Minn.

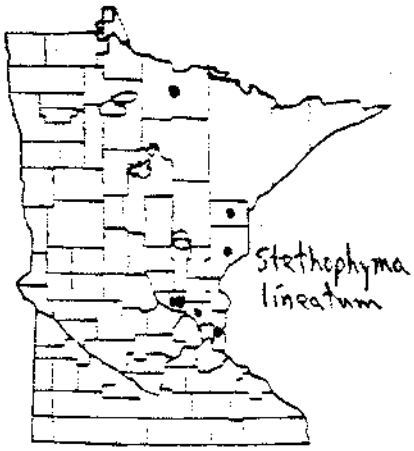
Arphia sulphurea (Fabricius, 1781)
Range: SD-Me-Fla-Tex Adults 24 May-6 July; OW nymphs
Another yellow-winged early summer species, most common in the SE part of the state on sparsely vegetated sandy soils and bluff prairie.

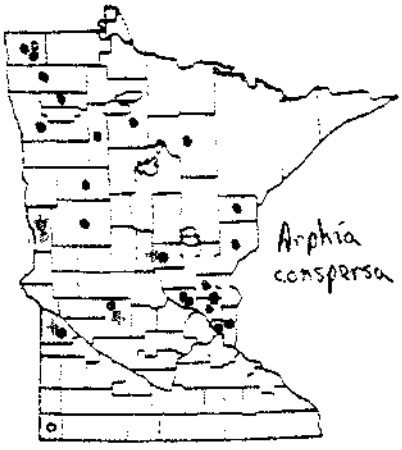
Arphia pseudonietana (Thomas, 1870)
Range: BC-S.Que-Ill-Tex Adults 12 July-23 Oct; OW eggs
The Red-winged Grasshopper is the common species found in dry sparsely vegetated old fields in late summer. Many records throughout the state except the NE. Yellow wing morphs occur in EC and SE Minn.

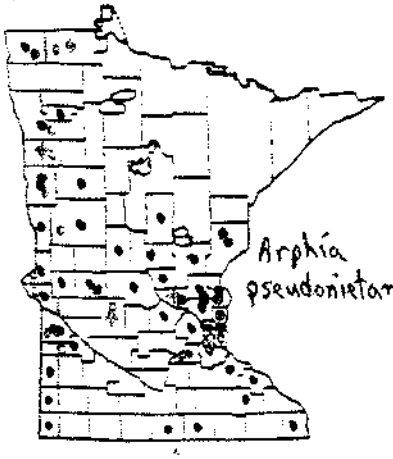
Arphia xanthoptera (Burmeister, 1838)
Range: SD-Me-Fla-Tex *Adults 31 Aug-23 Sept; OW eggs
A dry land inhabitant of old fields, wastelands, and weedy pastures. No Minn. specimens, but a solitary record for extreme SW Minn.(Otte, 1984).

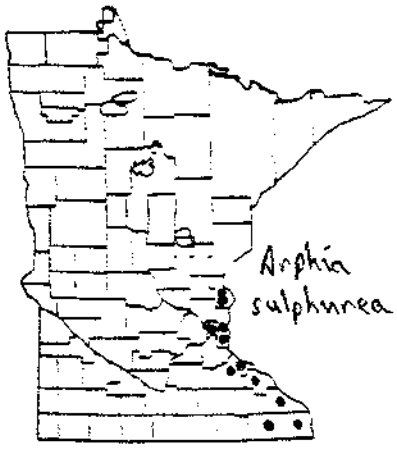

Stethophyma
celatum

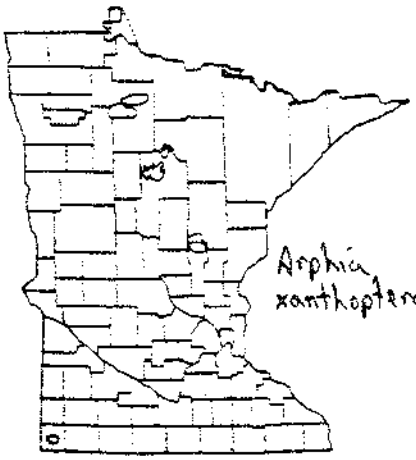

Stethophyma
gracile

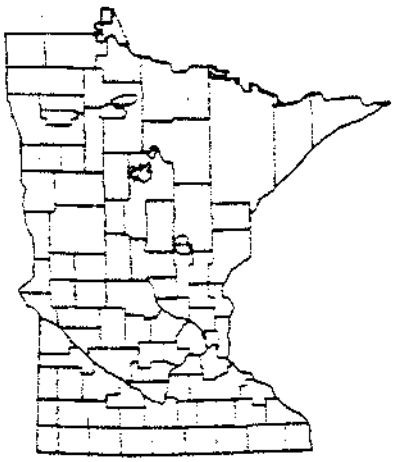

Stethophyma
lineatum

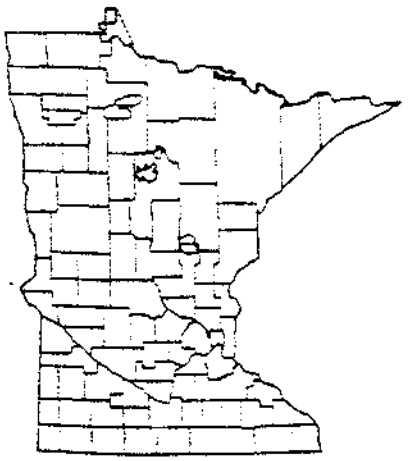

Arphia
conspersa


Arphia
pseudonietana


Arphia
sulphurea


Arphia
xanthoptera





Chortophaga viridifasciata (DeGeer, 1773)
Range: BC-NS-Va-NM Adults 5 May-12 Aug; OW nymphs
A common inhabitant of moister grassy fields throughout much of the state. One of the first species to appear as adults in spring. Males are generally small and brown, females are larger and green.

Camnula pellucida (Scudder, 1863)
Range: Ask-NS-Pa-Neb-Ariz Adults 12 July-19 Sept; OW eggs
The Clear-Winged Grasshopper is an abundant and sometimes destructive species of fields, pastures, and cereals in C and N Minn.

Encoptolophus sordidus (Burmeister, 1838)
Range: ND-Me-NC-Okla Adults 8 Aug-24 Sept; OW eggs
A relatively common late-season inhabitant of dry weedy places throughout much of the state (except the NE). Black tibiae distinguish this species from its blue-legged relative.

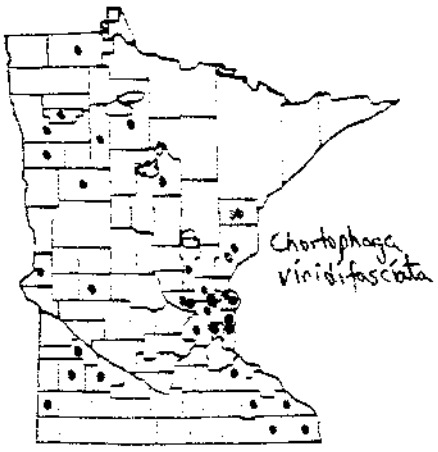
Encoptolophus costalis (Scudder, 1863)
Range: Abt-Minn-Tex-NM *Adults July-Oct; OW eggs
A few records of this blue-legged western prairie species exist for W Minn. It feeds primarily on grasses but can be injurious to alfalfa.

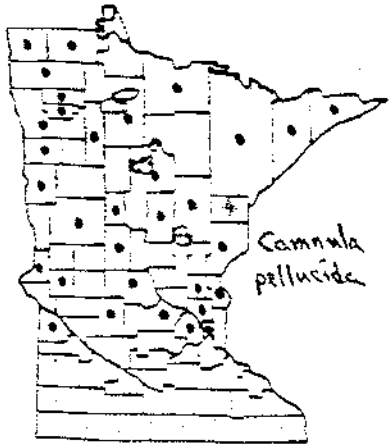
Dissosteira carolina (Linnaeus, 1758)
Range: BC-NS-Mexico Adults 3 July-5 Oct; OW eggs
The Carolina Grasshopper is the common black-winged species seen along roadsides and old field waste places in late summer. Found throughout the state.

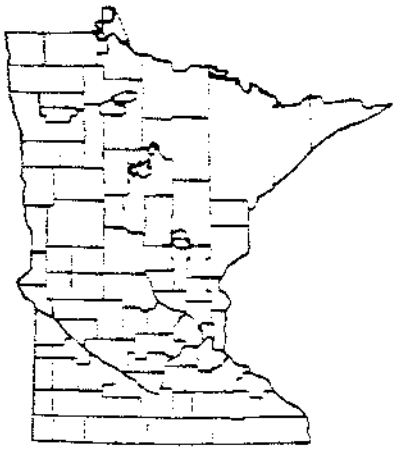
Scirtetica marmorata (Harris, 1841)
Range: Minn-N.Eng-NC *Adults 12 July-12 Sept; OW eggs
The Northern Marbled Grasshopper is associated with dry coniferous woodlands. No Minn. specimens and only a couple of records from Crow Wing, Lake, and Cook Co. More recent records are desired.

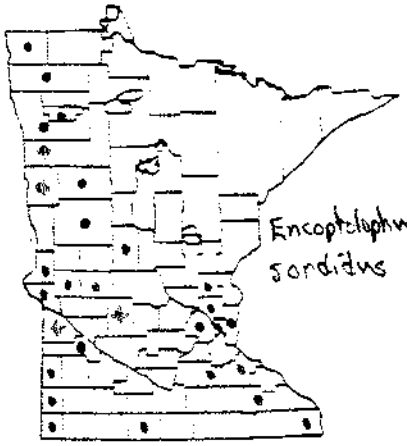
Spharagemon bolli (Scudder, 1875)
Range: Manit-E.Que-Fla-Ariz Adults 12 July-5 Oct; OW eggs
This species occurs in open woodlands of N and EC Minn. Collected at only a few localities in 1990 it appears to be much less common than S. collare.

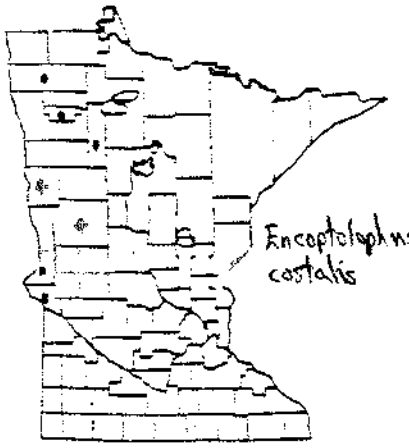
Spharagemon collare (Scudder, 1872)
Range: BC-Me-Fla-Mexico Adults 6 July-2 Oct; OW eggs
The Mottled-Sand Grasshopper is well camouflaged on the sparsely vegetated sandy soils it inhabits. Locally common throughout much of the state except the NE. Specimens inhabiting gravelly roadsides of the NW are larger and darker than those typically found on light sandy soils.

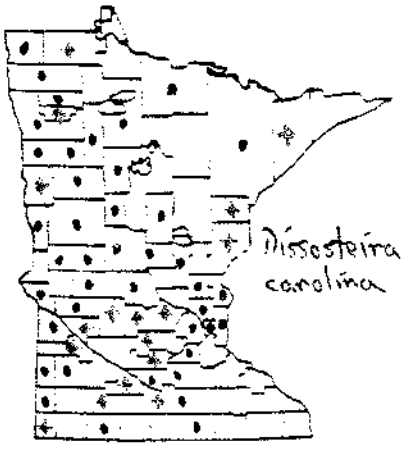

Chortophaga
viridifasciata

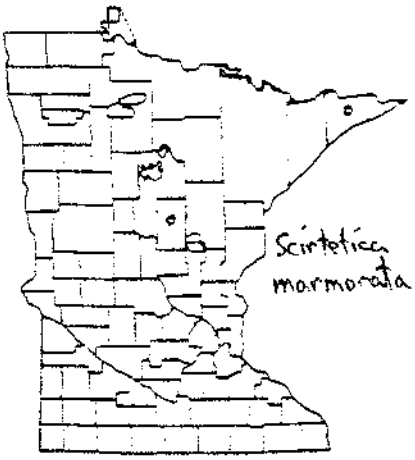

Camnula
pellucida

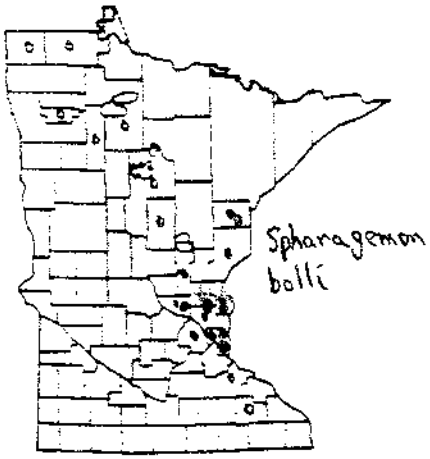


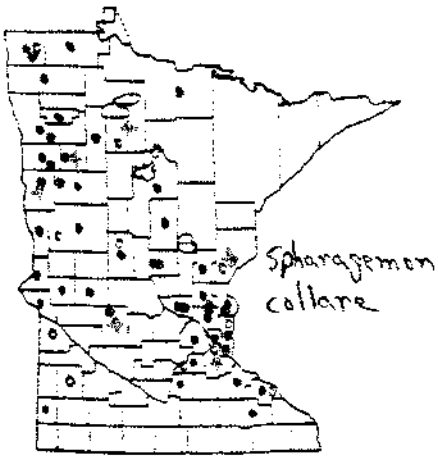

Encoptolophus
sordidus


Encoptolophus
costalis


Dissosteira
carolina


Scirtetica
marmorata


Spharagemon
bolli


Spharagemon
collare

Hippiscus ocelote (Saussure, 1861)

Range: Mont-Me-Fla-Mexico Adults Aug-Oct: OW e/n?

A large yellow(pink)-winged species similar to Pardalophora in appearance, but adults appear in late summer. A grass feeder in dry upland areas of open woodland and pastures. A couple of questionable records but no specimens for Minn.

Pardalophora apiculata (Harris, 1835)

Range: NWT-NB-NC-Cole Adults 22 Apr-29 June; OW e/n

The common leopard-spotted, red-winged , large species found in upland fields in the eastern half of the state in early summer. Reported to prefer forbs, this species spends its first winter as eggs which hatch the following July; the second winter is spent as half grown nymphs which mature early the following spring.

Pardalophora haldemanii (Scudder, 1872)

Range: Mont-Mich-Tex-Ariz *Adults 27 May-30 Aug; OW e/n?

A native of prairies of the middle U.S. Several historical records from W and EC Minn. This species is very similar to, and may be confused with Xanthippus corallipes. Recent records are desired.

Xanthippus corallipes latefasciatus (Scudder, 1892)

Range: Abt-Manit-Minn-Colo Adults 4 May-29 June; OW e/n

This large leopard-spotted, yellow-winged grasshopper of early summer feeds primarily on Stipa in sparsely vegetated sandy habitats. Collected at a few localities in EC Minn. It is probably more widely distributed in W Minn. than the few records would indicate.

*Cratypedes neglectus (Thomas, 1870)

Range: BC-Manit-NM-Cal *Adults June-Aug; OW eggs

Another species resembling Pardalophora in appearance. It is a grass feeder of short grass prairies in dry sandy areas. It may occur in extreme NW Minn.

Trachyrhachys kiowa (Thomas, 1872)

Range: BC-Mich-Pa-Ark-Mexico Adults 13July-19 Sept; OW eggs

An inhabitant of xeric, sparsely vegetated, gravelly grasslands. Two forms of this wide-ranging species exist in Minn.--the unbanded T. kiowa-kiowa in the west, and the yellow-banded T. kiowa-thomasi in the east. Collected at only a few localities in 1990, this species appears to be less common than it was historically.

Psinidia fenestralis (Serville, 1938)

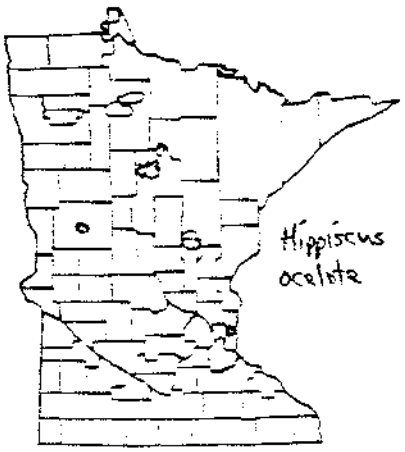
Range: Minn-Me-Fla-Tex Adults 13 July-2 Oct; OW eggs

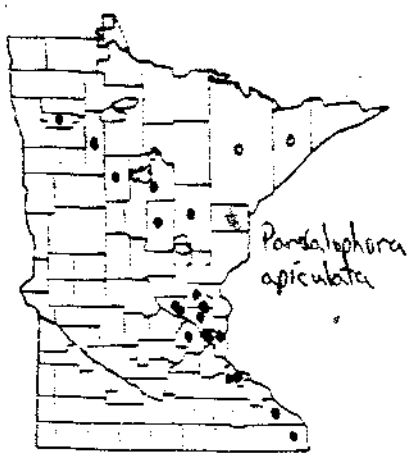
A small species resembling Trachyrhachys, but it has long ensiform antennae and its wing discs are red(yellow). Collected only from sandy (dune) areas in EC and SE Minn.

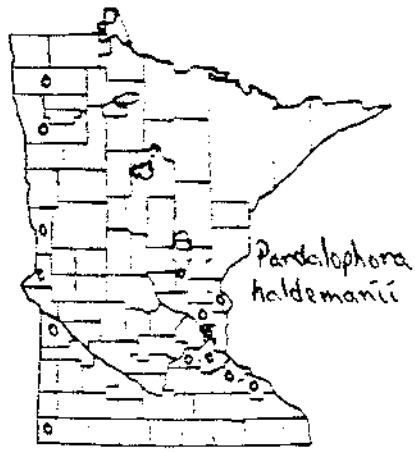
Metator pardalinus (Saussure, 1884)

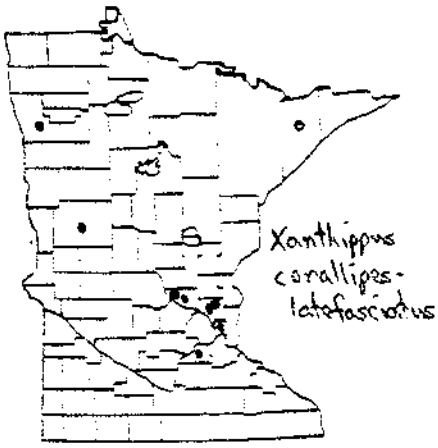
Range: Abt-Manit-Tex-Ariz *Adults July-Sept; OW eggs

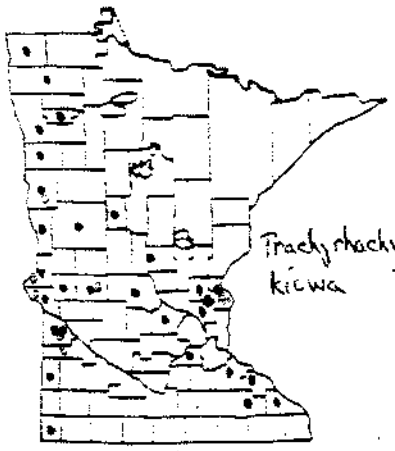
A grass feeder of short grass prairie. Individuals cut off blades of grass and drop to the soil to eat it. Only a few historical records from extreme W Minn.

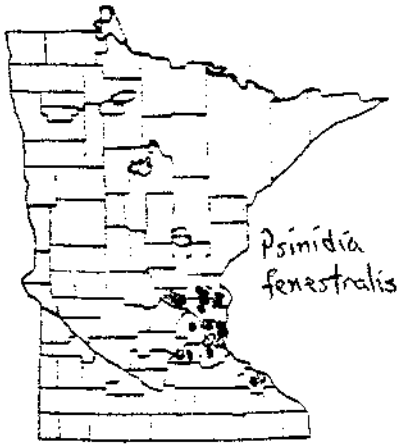

Hippiscus
ocelote

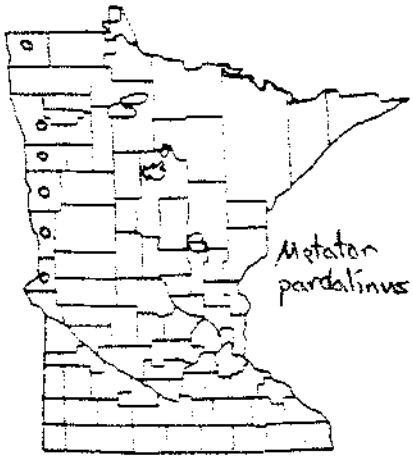

Pardalophora
apiculata

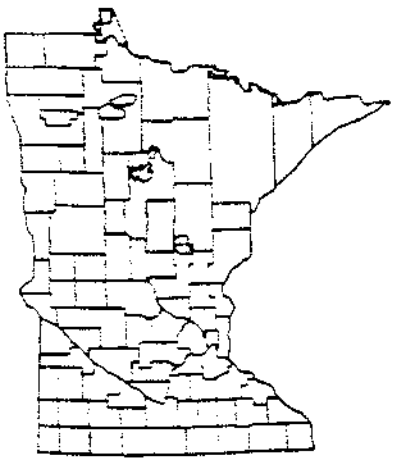

Pardalophora
haldemanii

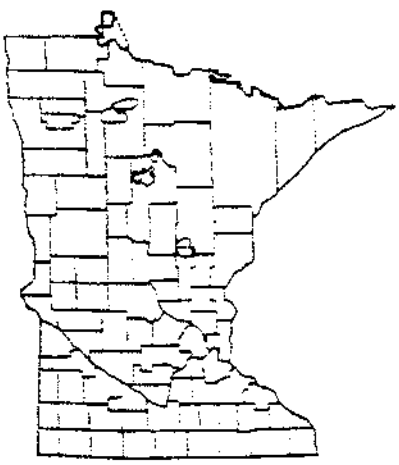

Xanthippus
corallipes-
latefasciatus


Trachyrhachys
kiowa


Psinidia
fenestralis


Metator
pardalinus





*Hadrotettix trifasciatus (Say, 1825)

Range: Abt-Manit-Mo-Colo-Mexico Adults July-Sept; OW eggs

A large, strikingly marked species that feeds on forbs on dry gravelly hillsides. It may occur in extreme SW Minn.

Trimerotropis verruculata (Kirby, 1837)

Range: NWT-Nfld-Mass-Minn-Wash *Adults 8 July-22 Sept; OW eggs

The Cracker Grasshopper is found in exposed rocky/gravelly areas in forested terrain. Common in northern Minn.

Trimerotropis maritima interior (EMWalker, 1898)

Range: Manit-E.Ont-Mich-Iowa *Adults 9 July-11 Sept; OW eggs

The Seaside Grasshopper inhabits sandy areas near the Great Lakes and inland dunes. Adults bury themselves for the night. A few historical records from EC Minn. The only recent record for this species is from Gleason Lake, Hennepin Co., 25 July 1971.

Trimerotropis diversellus (Hebard, 1928)

Range: BC-Manit-Mn-Colo-Cal Adults July-Sept; OW eggs

This species is referred to as T. pallidipennis-salina by Vickery (1985). An inhabitant of bare alkaline flats and margins of alkaline sloughs. One questionable record from Hubbard Co.

Four other Trimerotropis species may occur in Western Minn. Adults are to be found July-Sept. All overwinter as eggs.

*Trimerotropis agrestis (McNeill (1900)

an inhabitant of bare sand that resembles Spharagemon collare.

*Trimerotropis campestris(McNeill, 1900)

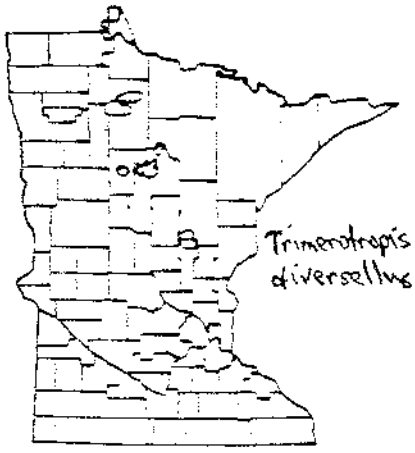
an inhabitant of open grasslands, dry hillisdes, and gravelly spots in parkland that feeds primarily on Astragalus and resembles Hadrotettix.

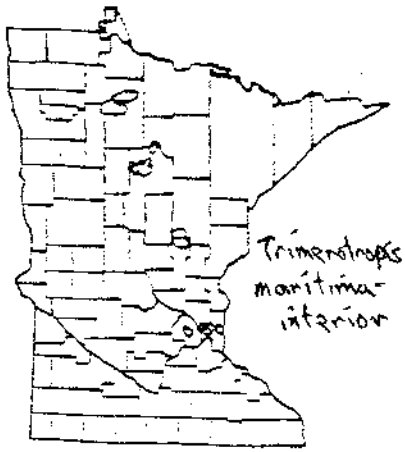
*Trimerotropis pistrinaria(Saussure, 1884)

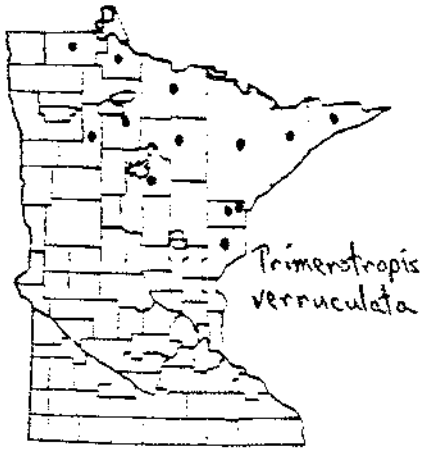
an inhabitant of gravelly spots on hillsides, a strong circleback flier that also feeds on Astragalus.

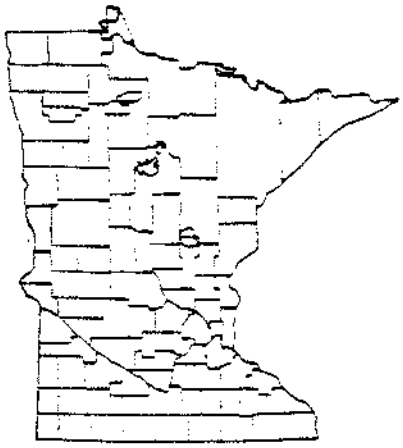
*Trimerotropis latifasciata(Scudder, 1881)

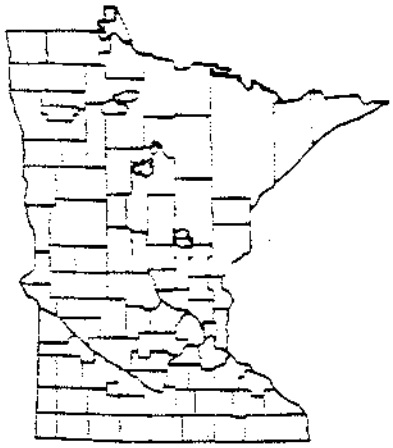
an inbatitant of bare sand alkaline flats with sagebrush and greasewood.

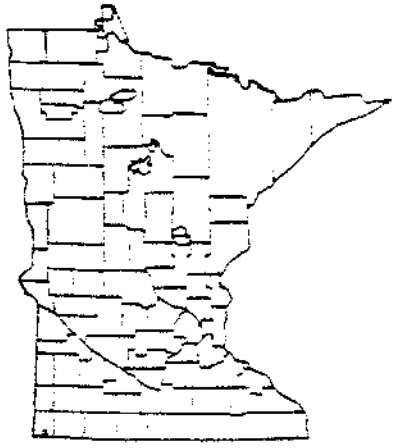

Trimerotropis diversellus

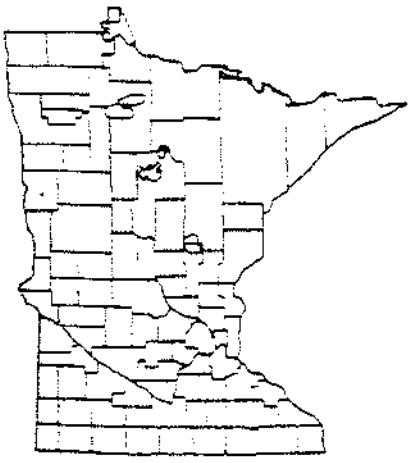

Trimerotropis maritima-interior

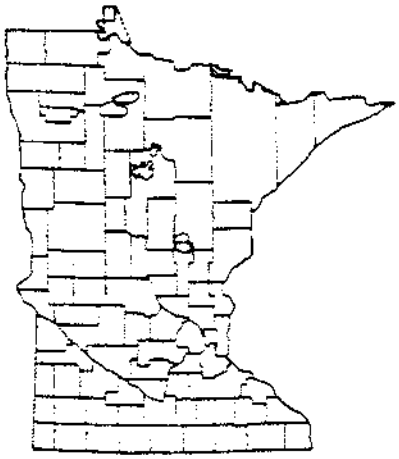

Trimerotropis verruculata

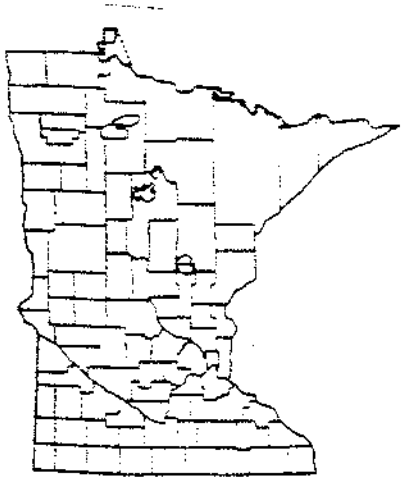












CYRTACANTHACRIDINAE--The Bird Locusts

Schistocerca americana (Drury, 1773)
Range: East US-S.A. *Adults July-Oct; OW eggs
The American Bird Locust is a strong flier sometimes carried north by winds. Generally found in damp areas near marshes/lakes. Migrants only in Minn.

Schistocerca alutacea (Harris, 1841)
Range: Minn-Mass-Fla-Okla *Adults 30 June-7 Oct; OWeggs
Reported to prefer marshes, bogs, shrubby swamps and brushy thickets in moist environments. Confusion exists in the U/Mn collection between this species and S. emarginata.

Schistocerca emarginata (Scudder, 1872)
Range: Abt-E.Ont-NC-NM Adults 13 July-14 Oct; OW eggs
Formerly called S. lineata, this species inhabits dry sandy areas of oak scrub, dunes, old fields. Said to prefer vetch and other legumes. Common on sandy soils in EC and SE Minn.

MELANOPLINAE
Hypochlora alba (Dodge, 1876)
Range: Abt-Manit-Mn-Tex-Colo Adults 20July-2 Oct; OW eggs
The Gray Sage Grasshopper is found exclusively on Artemisia ludoviciana (A. frigida?) in prairie/savanna habitats of W and EC Minn.

Hesperotettix speciosus (Scudder, 1872)
Range: Mont-Minn?-Tex-NM Adults
A western species reported to feed on Asteraceae (Helianthus) in dry sandy areas. No Minn specimens, one questionable record for EC Minn.

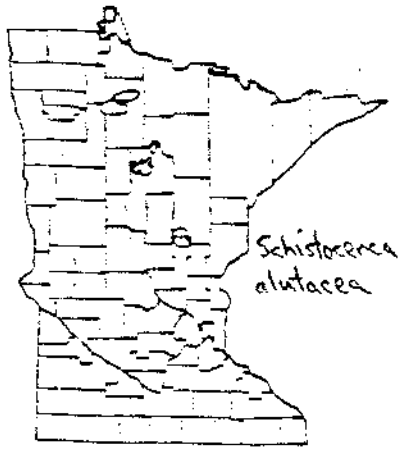
Hesperotettix viridis pratensis ((Scudder, 1897)
Range: BC-Mich-Okla *Adults 11 July-16 Sept; OW eggs
Reported to feed on Asteraceae (Ambrosia, Artemisia, Solidago) in dry grassy fields and pastures. A few isolated, scattered records from W, EC and SE Minn.

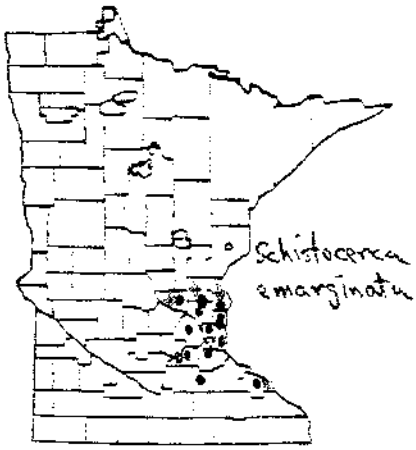
Booneacris glacialis canadensis (EMWalker, 1903)
Range: Minn-W.Que *Adults 9 July-18 Sept; OW eggs
This wingless black species with green marks is said to prefer the foliage of Rubus spp. Several records from brushy areas and leatherleaf bogs of NE Minn. Recent records desired.

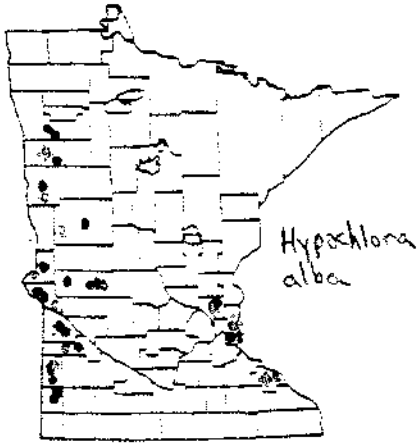
Phoetaliotes nebrascensis (Thomas, 1872)
Range: BC-Mass-Va-Tex-Ariz Adults 12 July-16 Oct; OW eggs
A common grass feeder in xeric grasslands of W and EC Minn.

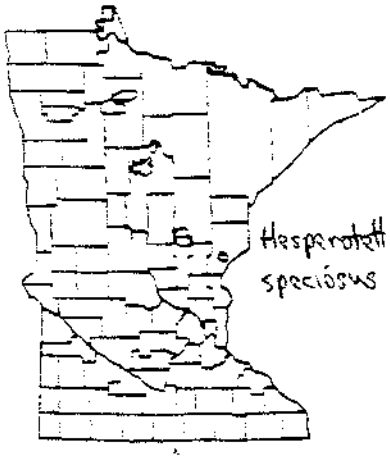
Dendrotettix quercus (Packard, 1890)
Range: Neb-S.Ont-Tenn- Tex *Adults 10 July-8 Sept; OW eggs
A robust generally short-winged species that feed on oaks in red oak woodlands. No Minn specimens, one record from SE Minn. (Vickery, 1985). Verification desired.

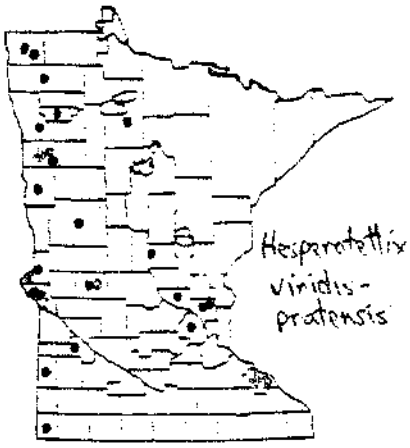

Schistocerca
americana

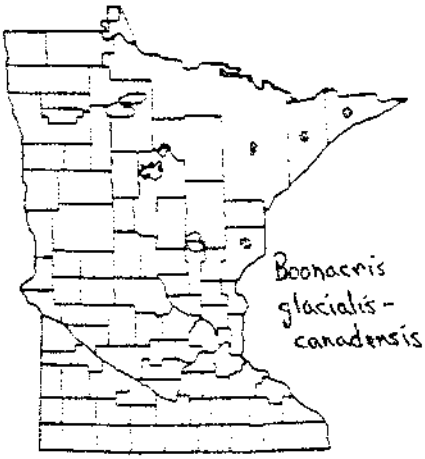

Schistocerca
alutacea

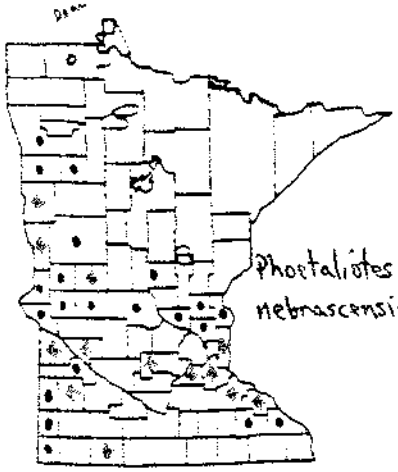

Schistocerca
emarginata

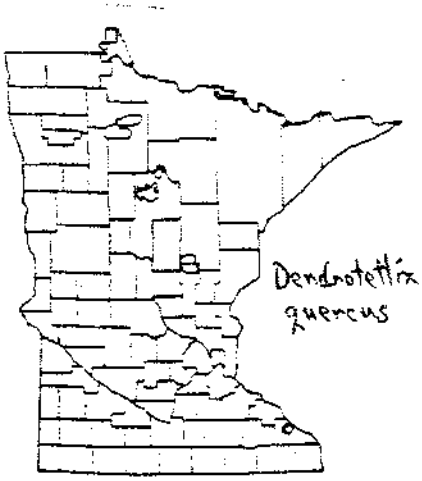

Hypochlora
alba


Hesperotettix
speciosus


Hesperotettix
viridis-
pratensis


Boopedon
glacialis-
canadensis


Phoetaliotes
nebrascensis


Dendrotettix
quercus

Melanoplus gracilis (Bruner, 1876)

Range: Minn-Mich-Tenn-Miss *Adults 13 July-4 Oct; OW eggs

An uncommon forb feeder (Vernonia, Impatiens) in rank herbage on low moist ground. A few records from southern Minn. Recently taken at Black Dog Fen SNA (Dakota Co.).

Melanoplus viridipes viridipes (Scudder, 1897)

Range: Minn-Mich-Ind-Iowa *Adults 4 June-28 Aug; OW eggs

An uncommon species of shrubby growths in mesic woods. A few records from EC and SE Minn. Recently collected at Wild River and William O'Brien State Parks (Chisago and Washington Co.).

Melanoplus dawsoni (Scudder 1875)

Range: BC-Que-Pa-Utah Adults 4 July-2 Oct; OW eggs

A short-winged species (with abdomen ringed in black and pale) of grassy old fields, prairie and savanna. Found throughout most of the state. Common in the northwest.

Melanoplus scudderi (Uhler, 1864)

Range: Minn-Mass-Fla-Tex *Adults 22Aug-6 Nov; OW eggs

An uncommon forb feeder (Aster, Achillea, Solidago) in mesic shrubby open areas. A few scattered historical records from southern Minn. Recent records desired.

Melanoplus walshii (Scudder, 1897)

Range: SD-Mich-Ga Adults 1 Aug-4 Oct; OW eggs

A relatively uncommon, short-winged species found in shrubby growths near deciduous woods. Several scattered records from eastern Minn. Recently collected in Chisago, Washington, Dakota, and Wabasha counties.

Melanoplus islandicus (Blatchley, 1898)

Range: Manit-Que-Va Adults 1 Aug-19 Sept; OW eggs

An uncommon? forest dweller found in shady woods near paths/clearings. A few scatteredd records from NE Minn. Recently collected at Wild River SP (Chisago Co.) and found to be common along Grand Portage Trail in Jay Cooke SP (Carlton Co.).

Melanoplus huroni (Blatchley, 1898)

Range: BC-E.Que-Mich-Neb *Adults 14 July-27 Aug; OW eggs

Found in undergrowth of conifer and mixed deciduous woods. A few scattered records from northern Minn. Recent records desired.

Melanoplus fasciatus (FWalker, 1870)

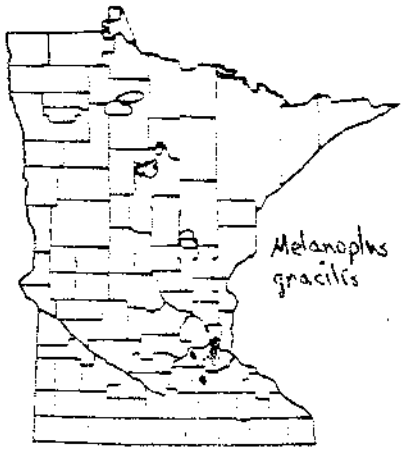
Range: Ask-Nfld-NJ-Colo-Wash *Adults 19 June-18 Oct; OW eggs

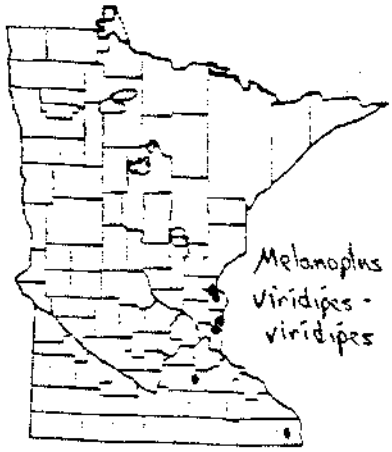
The Huckleberry Grasshopper is associated with Vaccinium species in sunny open woodlands. Several scattered , mostly historical, records from NE and EC Minn. Recently collected in Sherburne Co. (Sand Dune State Forest). Recent records desired.

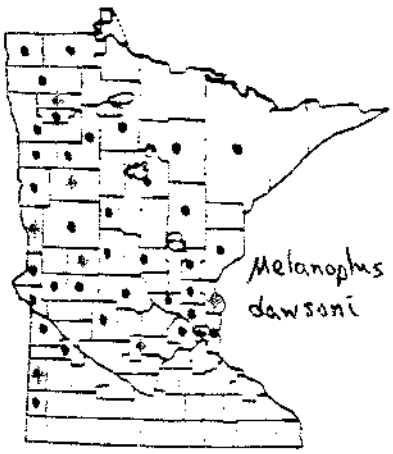
Melanoplus borealis (Fieber, 1853)

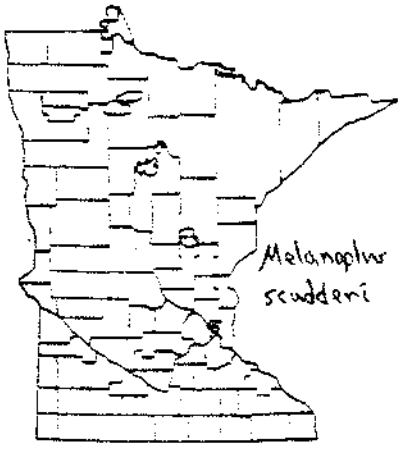
Range: Ask-Nfld-Mass-Colo Adults 18 July-30 Sept; OW eggs

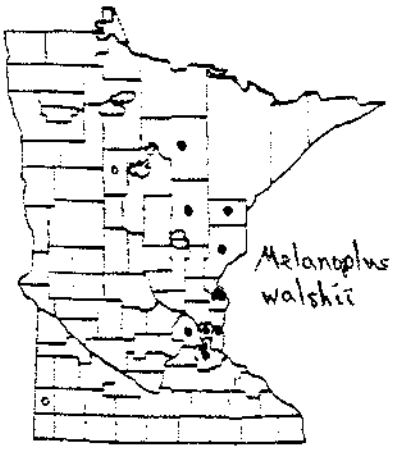
A truly boreal species often found in cool damp places such as bogs and wet meadows. Many scattered records throughout northern Minn. Recently collected as far south as Cottonwood Co. (Expandere WMA).

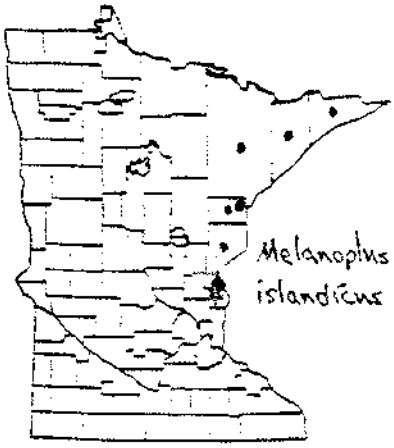

Melanoplus
gracilis

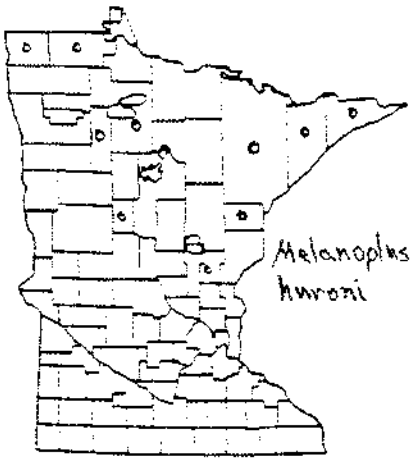

Melanoplus
viridipes -
viridipes

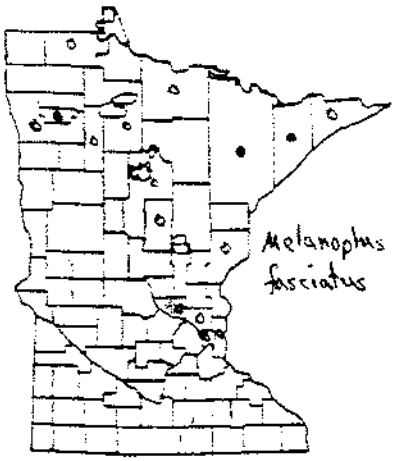

Melanoplus
dawsoni

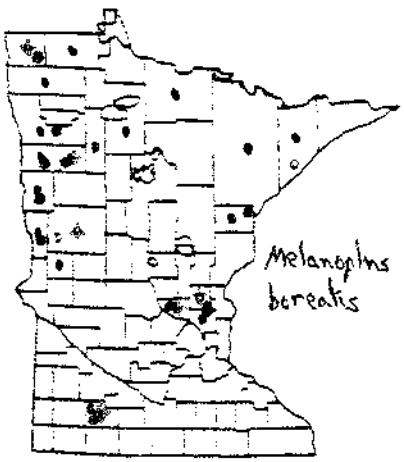

Melanoplus
scudderi


Melanoplus
walshii


Melanoplus
islandicus


Melanoplus
huroni


Melanoplus
fasciatus


Melanoplus
borealis

Melanoplus bruneri (Scudder, 1896)

Range: Ask-NB-?-Ariz *Adults 5 July-3 Oct; OW eggs

In the West this species inhabits conifer-savanna and brushy rangeland where it may become a pest. Several scattered records from northern Minn. suggest a preference for aspen parkland and bracken grasslands? Recent records desired.

Melanoplus punctulatus griseus (Thomas 1872)

Range: ND-Pa-Tex Adults 23 July-5 Oct; OW eggs

An arboreal species of tamarack and deciduous? trees. A few widely scattered historical records from western Minn. Recently collected from a tamarack swamp and white pine stand in Isanti and Anoka Co. (Cedar Creek NHA).

Melanoplus angustipennis (Dodge, 1877)

Range: Abt-E.Ont-Ohio-Colo Adults 21 June-14 Oct; OW eggs

A locally common to abundant inhabitant of dry sand prairie in NW, EC and SE Minn. Reported to prefer forbs such as Helianthus, Solidago, Ambrosia and Artemisia.

Melanoplus confusus (Scudder, 1897)

Range: BC-Me-Va-Okla *Adults 30 May-6 Sept; OW eggs

A relatively common species of weedy fields, brushy pastures and cropland throughout much of the state. Generally found on light gravelly soils.

Melanoplus flavidus (Scudder, 1879)

Range: Abt-Mich-Kan-Colo Adults 11 July-2 Oct; OW eggs

A Great Plains species favoring open, sparsely vegetated, sandy areas. Reported to feed on forbs such as Helianthus. A few widely scattered records from W, EC and SE Minn.

Melanoplus gladstoni (Scudder, 1897)

Range: Abt-Minn-NM-Ariz Adults Aug-Oct; OW eggs

A western species that appears to be confined to grazed pastures and dry upland fields of western Minn. Relatively few recent collections suggest this species is much rarer than it was in the 1930's.

Melanoplus infantilis (Scudder, 1879)

Range: BC-Minn-NM Adults Aug-Oct?; OW eggs

A grass feeder of the short grass prairie. Numerous historical records from western Minn. This species has not been recently collected, and may no longer occur here.

Melanoplus keeleri luridus (Dodge, 1876)

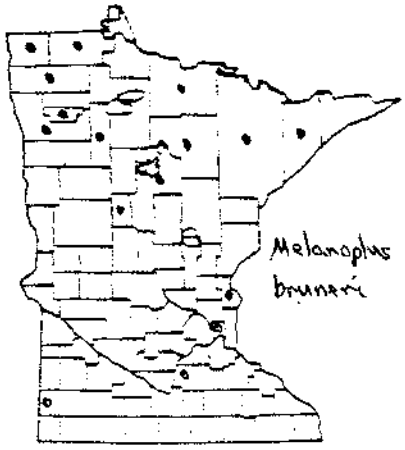
Range: Abt-NS-NJ-Utah Adults 27 July-23 Oct; OW eggs

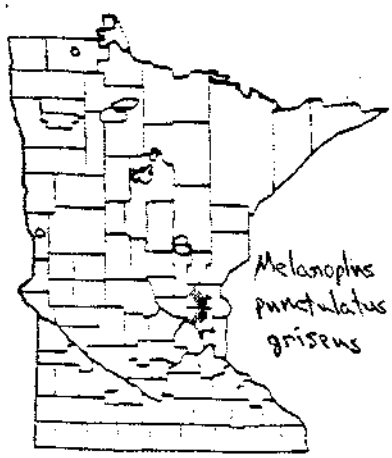
A relatively common species of upland fields and mesic prairie. Reported to prefer forbs. Throughout most of the state.

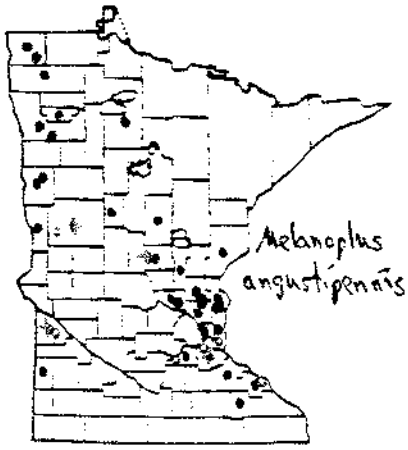
Melanoplus occidentalis (Thomas, 1872)

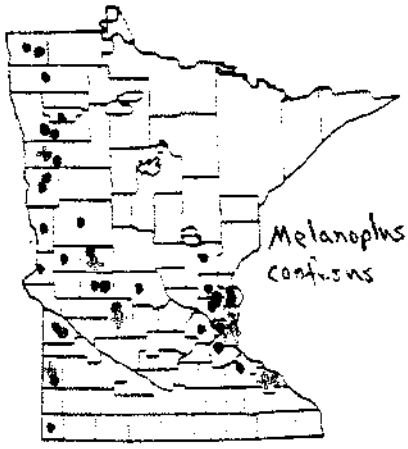
Range: BC-Sask-Minn-Tex-Ariz *Adults 26 June-5 Oct; OW eggs

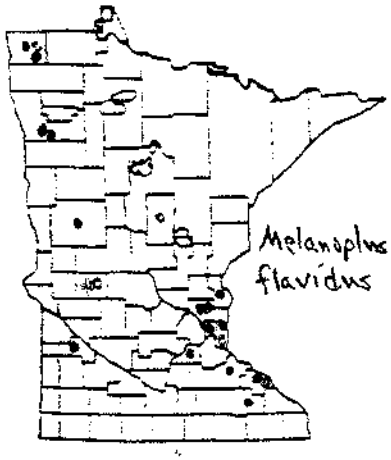
Another short grass prairie species. One dubious historical record from Ottertail Co.

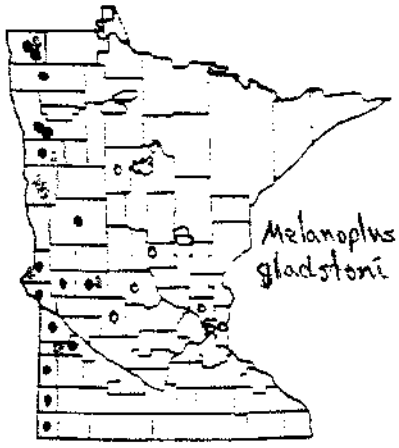

Melanoplus
brunneri

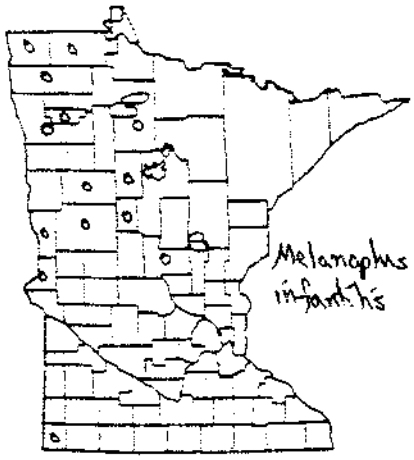

Melanoplus
punctulatus-
griseus

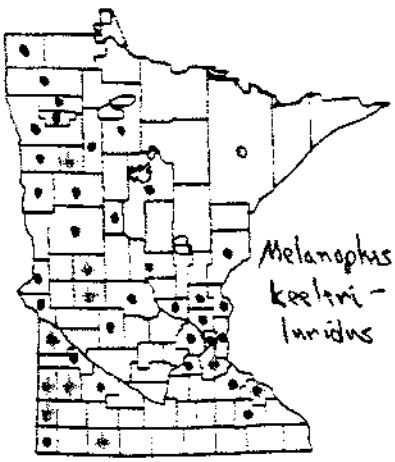

Melanoplus
angustipennis

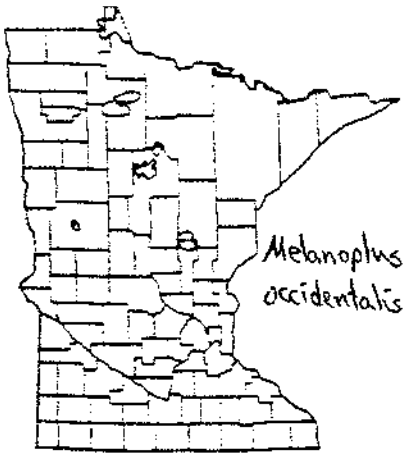

Melanoplus
confusus


Melanoplus
flavidus


Melanoplus
gladstoni


Melanoplus
infantilis


Melanoplus
keeleri-
luridus


Melanoplus
occidentalis

Melanoplus bivittatus (Say, 1825)
Range: BC-Nfld-Ga-Cal Adults 29 June-10 Oct; OW eggs
The Two-striped Grasshopper is a very common inhabitant of mesic upland fields, wood margins, and marshes. May be destructive to crops. Common throughout the state.

Melanoplus differentialis (Thomas, 1865)
Range: SD-NJ-Va-Miss Adults 8 Aug-5 Oct; OW eggs
A large, army-green Melanoplus with a herringbone pattern on hind femora. It is common in low moist areas of southern Minnesota, rarer northwards.

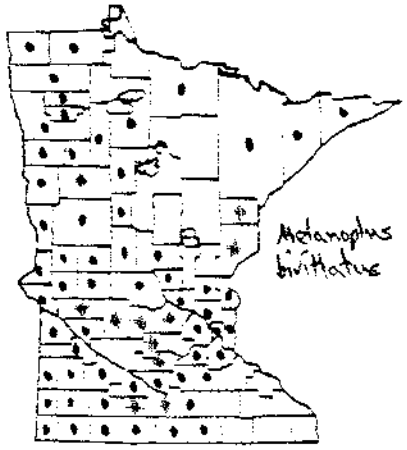
Melanoplus femurrubrum (DeGeer, 1773)
Range: NWT-NS-SC-Tex-Cal Adults 13 July-23 Oct; OW eggs
The Red-legged grasshopper is a common to abundant inhabitant of upland fields and marshes. At times destructive to crops. Common throughout the state.

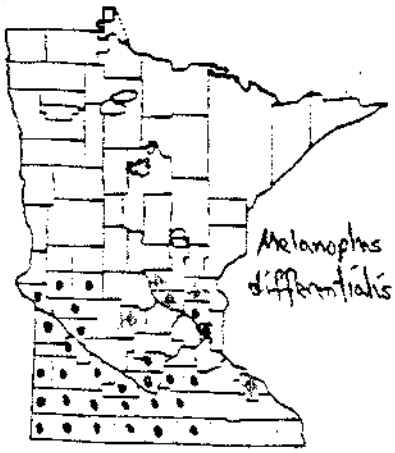
Melanoplus sanguinipes (Fabricius, 1798)
Range: Ask-Nfld-NJ-N.Cal Adults 14 June-2 Oct; OW eggs
The Lesser Migratory Grasshopper (formerly S. mexicanus, S. bilituratus) is a common to abundant, at times destructive, species of upland fields and cropland. Throughout the state but much rarer southwards.

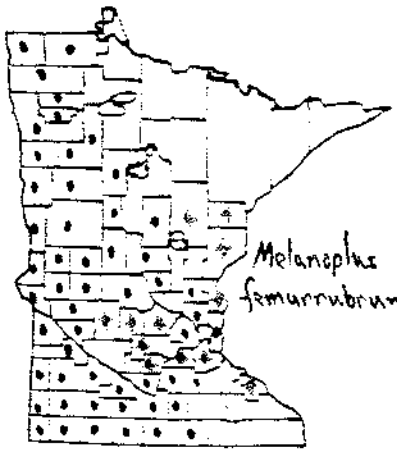
Melanoplus stonei (Rehn, 1904)
Range: Manit-NB-Mich *Adults 20 June-13 Sept; OW eggs
This species was found in the Jack Pine Barrens of N. Michigan in association with reindeer moss and scant ground cover (Cantrall, 1968). A few scattered records from northern Minn. Recent records desired.

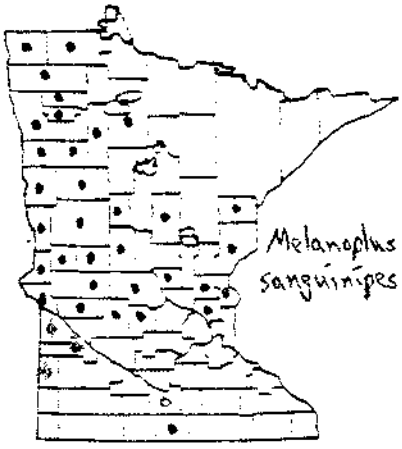
Melanoplus foedus (Scudder, 1879)
Range: BC-Manit-Okla-Colo Adults 2 July-15 Sept; OW eggs
This species is relatively common in sandy areas often near streams or lakes, but it also occurs on sparse sand prairie far from water. Many records over much of the state.

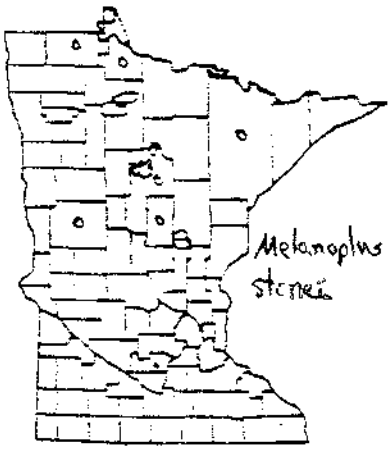
Melanoplus packardii (Scudder, 1878)
Range: BC-Manit-Tex-Cal Adults July-Sept; OW eggs
A legume feeder in grasslands on sandy/drift soils. Quite common in extreme western Minn. This species is very difficult to distinguish from M. foedus whose range extends across the state

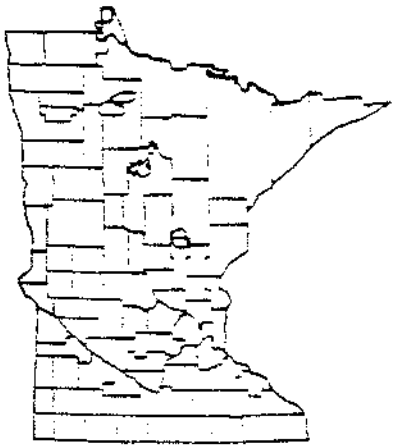

Melanoplus
bivittatus

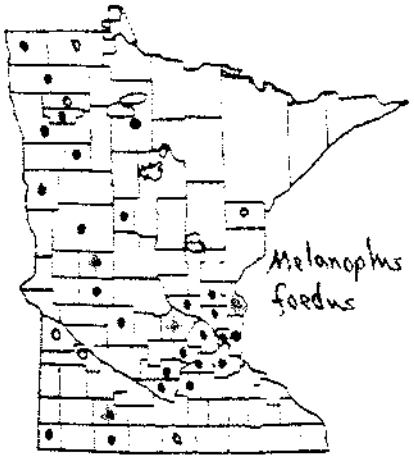

Melanoplus
differentialis

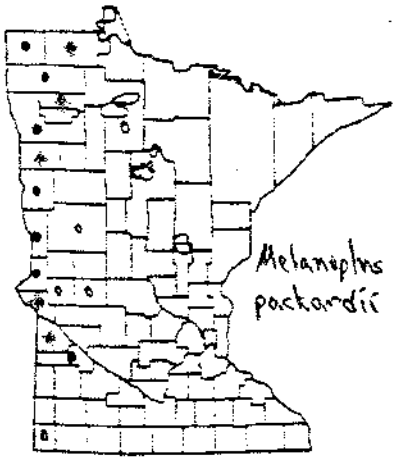

Melanoplus
femurrubrum

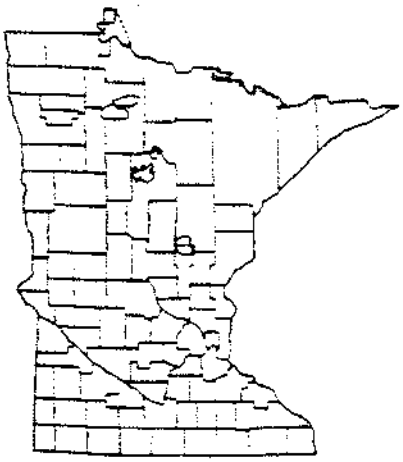

Melanoplus
sanguinipes


Melanoplus
stonei




Melanoplus
foedus


Melanoplus
packardii



DISCUSSION

The Distribution Dot Maps on the preceding pages are to some degree misleading. Common species are likely to occur in every county within their range, and any gap is more likely due to the county being uncollected rather than the species being absent. Conversely, some widely distributed, conspicuous species having strict habitat requirements may over a period of years be collected in many counties and give an impression of being 'common' that is not apparent in the field. For example, some species of banded-wing grasshoppers may regularly show up at gravel pits and few places else. The same can be said for grasshoppers inhabiting sand prairie, leatherleaf bogs, etc. Finally, the ranges of some species appear to have contracted in recent years, and they may no longer occur in counties where they were collected historically. For these reasons I would like to present in this section my subjective impression of the status of some of these infrequently collected species.

One of the primary objectives I had when I undertook this survey was to determine the status of several species collected in western Minnesota in the 1930's but not collected subsequently. Of this group only M. gladstoni and Opeia obscura were found. The others (M. infantilis, *M. occidentalis, Aulocara elliotti, *Amphitornus coloradus, Phlibostroma quadrimaculatum, *Hippiscus ocelote, *Metator pardalinus, *Arphia xanthoptera, *Trimerotropis diversellus, *Hesperotettix speciosus) were not collected. Many of these species(marked with an *), although reported for Minnesota, are not represented by specimens in the University Collection, and it is possible that some of these species were incorrectly determined. M. infantilis is well represented in the University Collection, and it appears that this species is no longer present within the state. M. gladstoni, Opeia obscura and Trachyrhachys kiowa are abundantly represented from many counties during the 1930's, but were collected by Dean Hansen and myself at only a few localities. Their distribution within the state has apparently contracted. My guess is that many of the western prairie species mentioned above migrated into Minnesota during the drought years of the 1930's and retreated westward as the drought ended.

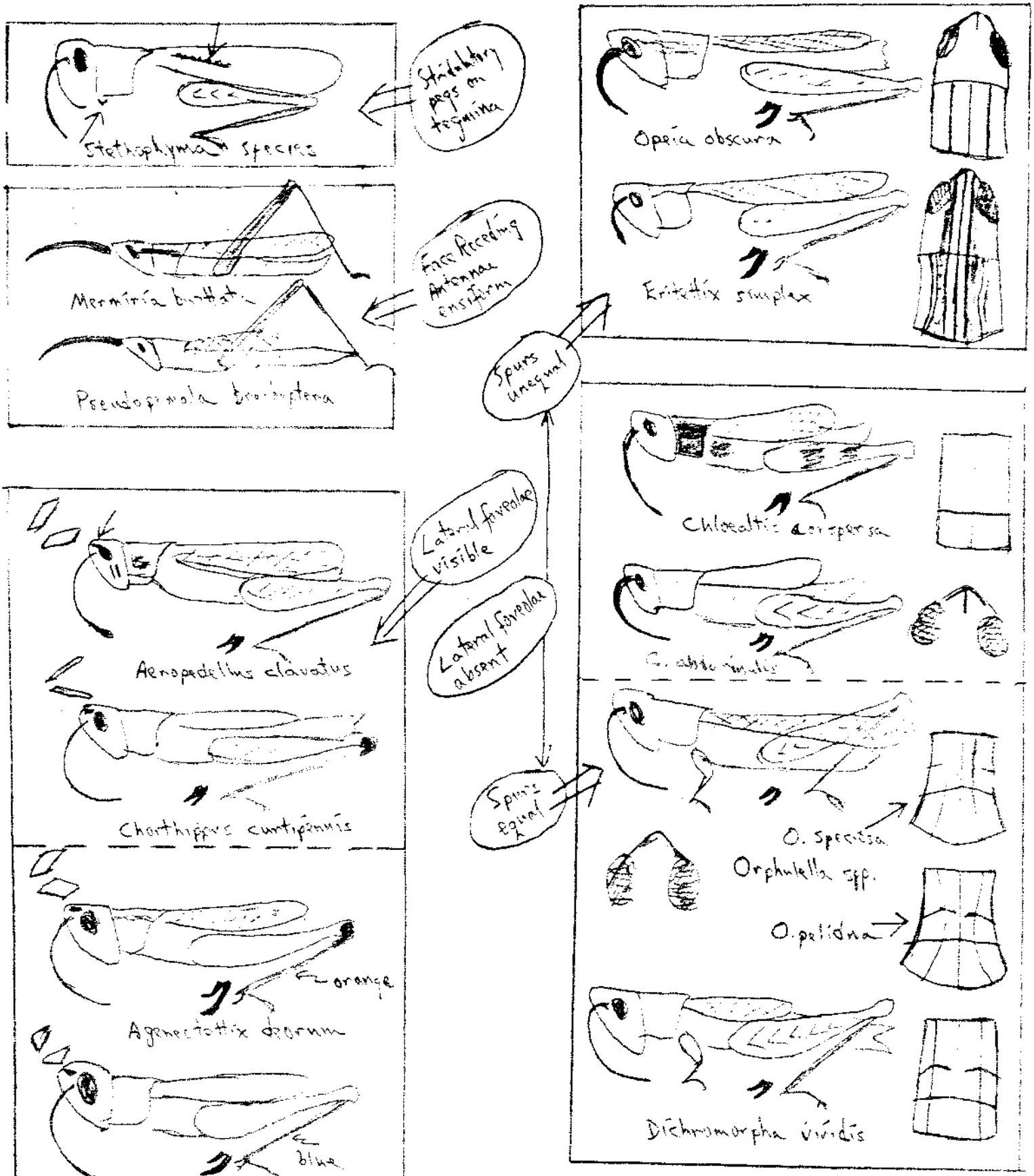
Seldom collected species from other regions of the state about which more information is desired include: *Chloealtis abdominalis (northern forests), *M. stonei (Jack Pine Barrens), *Scirtetica marmorata, *Booneacris glacialis-canadensis, *M. bruneri, *M. huroni, M. islandicus (northeastern forests), M. walshii, M. fasciatus, M. viridipes (eastern forests), M. punctulatus-griseus (tamarack swamps), the three species of Stethophyma (bogs and marshes), *Dendrotettix quercus (SE oak woods), *M. scudderi (brushy pastures?), M. gracilis (marshes), *Pardalophora haldemanii (prairies), *Trimerotropis maritima-interior (EC sand prairies). Those species marked with an (*) have not been collected in recent years. Several of these species are northern forest species. Some may well prove to be common, but neither Dean Hansen nor I collected in this part of the state.

Probably the most diverse grasshopper communities to be found in Minnesota are those occurring on sand prairies and bur oak savanna. Several species are found only on the sand prairies of EC and SE Minn. These include Psinidia fenestralis, Schistocerca emarginata, and Trimerotropis maritima-interior. The last mentioned species has not been collected since 1971, and its continued existence requires verification. Three species infrequently collected on sand prairies scattered throughout the state are Xanthippus corallipes-latefasciatus, M. flavidus and Hesperotettix viridis-pratensis. Hypochlora alba and Orphulella pelidna are somewhat more abundant but still far from being common. Common species that are charactistic of sand prairie and light sparsely-vegetated soils include M. angustipennis, Ageneotettix deorum, Spharagemon collare, and three species of Arphia (A. sulphurea, A. conspersa, A. pseudonietana).

Until more collecting has been conducted, nothing definitive can be said about the real status of many 'apparently' rare species. I conclude by encouraging other field workers to be on the lookout for those little known species.

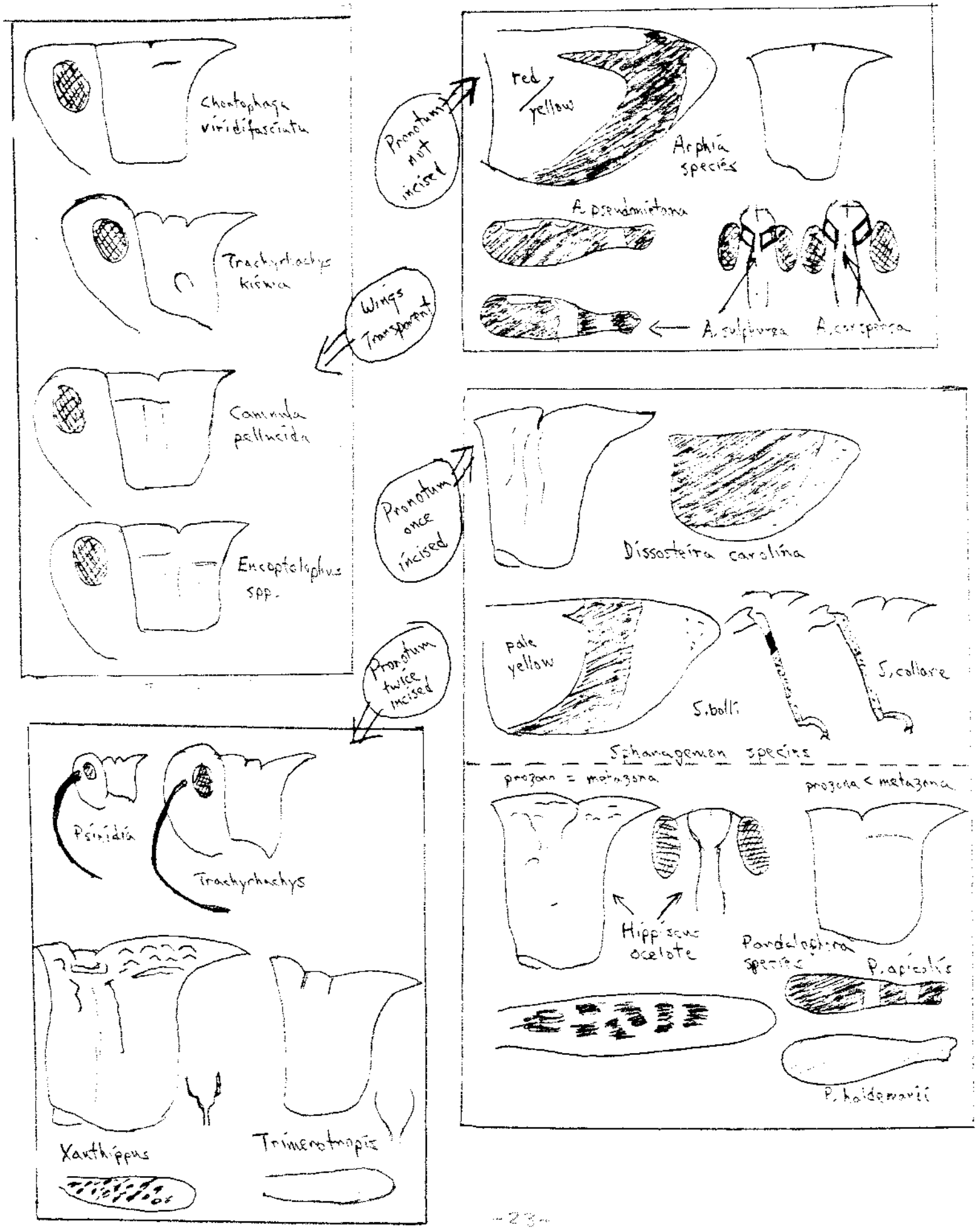
GOMPHOCERINAE

1	Males with stridulatory pegs on tegmina; prosternum with tubercle; face vertical	Stethophyma species(2)
	No stridulatory pegs on male tegmina; face receding and prosternum without tubercle	4
2	Tibial spines yellow with black tips	S. celatum
	Tibial spines entirely black	3
3	Lateral carinae of pronotum cut by 3 sulci	S. lineatum
	Lateral carinae of pronotum cut by 1-2 sulci	S. gracile
4	Face strongly receding, antennae generally ensiform	5
	Face weakly to moderately receding, antennear generally filiform	6
5	Wings short, abdo surpasses hind femora; vertex with median carina	Pseudopomala brachyptera
	Wings long, rounded apically, hind tibiae red; vertex w/o median carina	*Mermiria bivittata
6	Lateral foveolae visible from above	7
	Lateral foveolae invisible from above or absent	10
7	Antennae clavate, lateral foveolae large rectangular, face and pronotum with white marks laterally	Aeropedellus clavatus
	Antennae filiform	8
8	Hind tibial spurs equal in length; lateral foveolae narrow; tibiae buff	Chorthippus curtipennis
	Hind tibial spurs unequal in length	9
9	Lateral foveolae triangular; tibiae blue	Aulocara elliotti
	Lateral foveolae rectangular; hind tibiae orange	Ageneotettix deorum
10	Hind tibial spurs unequal in length	11
	Hind tibial spurs equal in length	12
11	Head and pronotum with supplementary longitudinal ridges; antennae short and weakly clavate	Eritettix simplex
	Head lacking supplementary ridges; antennae strongly ensiform	Opeia obscura
12	Vertex with median carina; male fore femora normal	13
	Vertex without median carina; male fore femora swollen	14
13	Sides of pronotum(males) and first abdominal segments black	Chloealtis conspersa
	Sides of pronotum and abdomen brown	Chloealtis abdominalis
14	Lateral carinae of pronotum parallel, wings short	Dichromorpha viridis
	Lateral carinae of pronotum diverging posteriorly, wings long	15
15	Lateral carinae cut by 1 sulcus	Orphulella speciosa
	Lateral carinae cut by 2 sulci	Orphulella pelidna


Stethophyma species
Stridulatory pegs on tegmina
Opeia obscura
Mermiria bruttata
Face Receding Antennae ensiform
Pseudopomala brachyptera
Eritettix simplex
Spurs unequal
Chloealtis conspersa
Lateral foveolae visible
Aeropedellus clavatus
Lateral foveolae absent
Chorthippus curtipennis
Spurs equal
O. speciosa
Orphulella spp.
O. pelidna
orange
Agnecrotettix oberonum
Dichromorpha viridis
blue
Aulocara elliotti

OEDIPODINAE--KEY to Minnesota species.

1	Wings transparent and unbanded; at most translucent with poorly defined outer band	2
	Wings with opaque disc and external band	6
2	Pronotum lacking lateral carinae and smoothly arched; body uniformly green or brown	Chortophaga viridifasciata
	Pronotum with lateral carinae; body with contrasting marks	3
3	Median carina of pronotum once incised	4
	Median carina of pronotum twice incised	Trachyrhachys kiowa-kiowa
4	This carina low, pale species with dark marks, tibiae yellow	Camnula pellucida
	This carina high, dark species with pale tegminal bands	Encoptolophus species(5)
5	Hind tibiae black	E. sordidus
	Hind tibiae blue	E. costalis
6	Median carina of pronotum smoothly arched and only faintly incised	Arphia species(7)
	Median carina of pronotum once incised	9
	Median carina of pronotum twice incised	15
7	Hind femora with single pale band internally; wing disk red (yellow); adults in fall	A. pseudonietana
	Hind femora with two pale bands internally; wing disk yellow; adults in spring	8
8	Frontal ridge narrow between lateral foveolae; SE Minn.	A. sulphurea
	Frontal ridge broad between lateral foveolae; EC and W Minn.	A. conspersa
9	Wing disc black	Dissosteira carolina
	Wing disc yellow or pink	10
10	Wing disc always yellow; smaller species (<35 mm)	11
	Wing disc pink or yellow; larger mottled species (>35 mm)	13
11	Tegmina contrastingly mottled; hind tibiae orange with black annuli; NE	Scirtetica marmorata
	Tegmina pale and inconspicuously mottled	Spharagemon species (12)
12	Hind tibiae entirely orange; median carina high, cristate	S. collare
	Hind tibiae orange with white and black basal annuli	S. bolli
13	Prozona = Metazona; carinae of vertex faint; adults July-Sept.	*Hippiscus ocelote
	Prozona < Metazona	Pardalophora species (14)
14	Tegmina with large spots, solidly colored basally; hind femora pale and banded internally, wing disc always pink, tibiae yellow; common	P. apicalis
	Tegmina with numerous smaller spots; hind femora pale and unbanded internally, wing disc sometimes yellow, tibiae yellow or orange; uncommon	P. haldemanii
15	Head and pronotum at same level; median pronotal crest reduced; pronotum rounded latero-ventrally; larger species (> 35 mm); hind tibiae generally orange	16
	Head large, held higher than pronotum; median pronotal crest pronounced; pronotum angulate latero-ventrally; small species(< 30 mm); hind tibiae generally pale blue	18


Chontophaga viridifasciata
Trachyrhachys kiskra
Wings Transparent
Camnula pellucida
Encoptolophus spp.
Pronotum not incised
red
yellow
Arphia species
A. pseudonietana
A. sulphurea
A. conspersa
Pronotum once incised
Dissosteira carolina
pale yellow
S. bolli
S. collare
Schistocercan species
Psinidia
Trachyrhachys
Xanthippus
Trimerotropis
prozona = metazona
prozona < metazona
Hippiscus ocelote
Pandeleptera species
P. apicalis
P. haldemanii

16 Pronotum strongly rugose; tegmina mottled green and brown, carinae of vertex undulating as converging anteriorly,wing disc yellow, hind femora red internally, hind tibiae orange — Xanthippus corallipes-latefasciatus
Pronotum smooth; tegmina faintly speckled to strikingly banded — Trimerotropis species (16)

17 Hind tibiae yellow, pale unbanded species of sandy areas in EC region — T. maritima-interior
Hind tibiae dark, dark species of NE region — T. verrucullata

18 Antennae long ensiform, wing disc red(yellow); EC sandy areas — Psinidia fenestralis
Antennae long filiform; wing disc red, hind tibiae blue; NW region — Metator pardalinus
Antennae long filiform; wing disc yellow; SE region — Trachyrhachys kiowa-thomasi

CYRTACANTHACRIDINAE and MELANOPLINAE

1 Mesosternal lobes longer than wide; LARGE species — Schistocerca species(2)
Mesosternal lobes shorter than wide; generally smaller species — 3

2 Very large species (>50 mm); male cerci small, tapering; upper valve of female ovipositor deeply excavated — S. americana
Eyes separated by much less than eye width, male cerci large with pronounced apical emargination; female with upper valve shallowly excavated; male and female with pale dorsal stripe — S. alutacea
Eyes separated by nearly an eye width; male cerci small with weaker apical emargination; female with long upper valve deeply excavated; male and female with/without pale dorsal stripes — S. emarginata

3 Tegmina lacking; black species with green markings — Booneacris glacialis-canadensis
Tegmina present — 4

4 Tegmina padlike; color pale gray; on Artemisia ludoviciana — Hypochlora alba
Tegmina variable — 5

5 Head oversized, tegmina padlike (rarely long), cerci slender, sub-genital plate with pre-apical tubercle; — Phoetaliotes nebrascensis
Not as above — 6

6 Tegmina short, robust species on oaks in SE Minn., male cerci short sublamellate twisted apically; pronotum rugose flaring anteriorly to receive head — Dendrotettix quercus
Not as above — 7

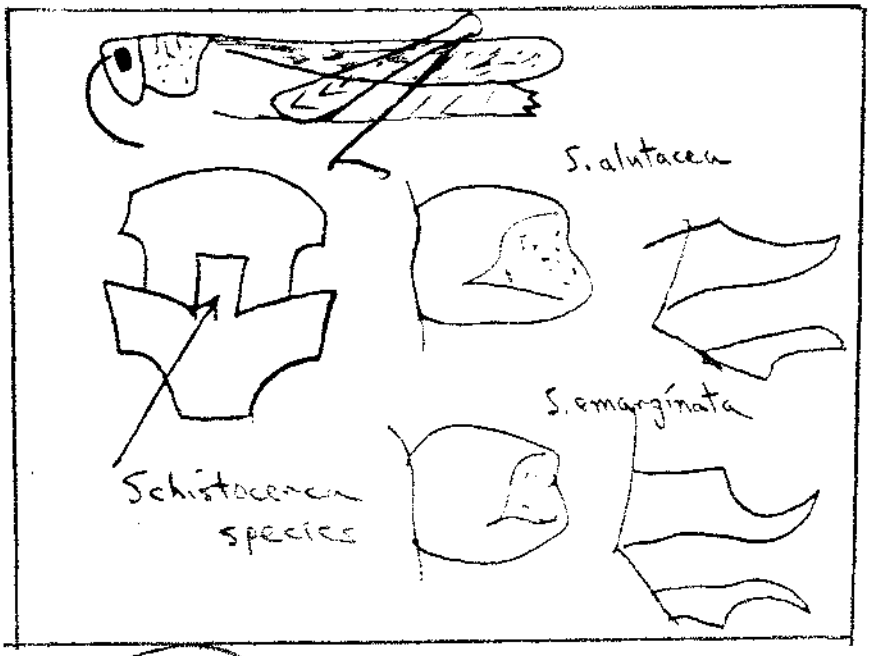
7 Legs pale green; prosternal tubercle nearly concealed by projecting mesosternal plate — Herperotettix viridis pratensis
Not as above — Melanoplus species (see below)

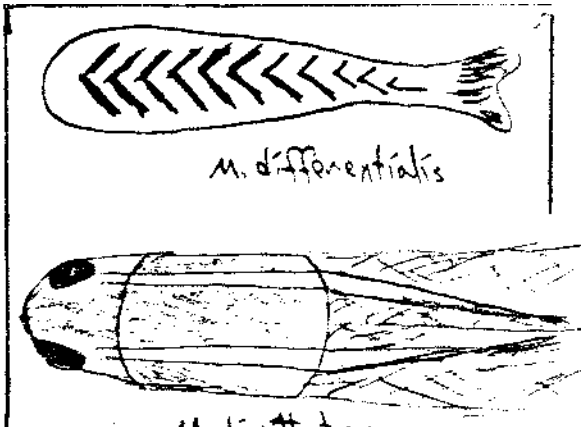
KEY TO MELANOPLUS MALES

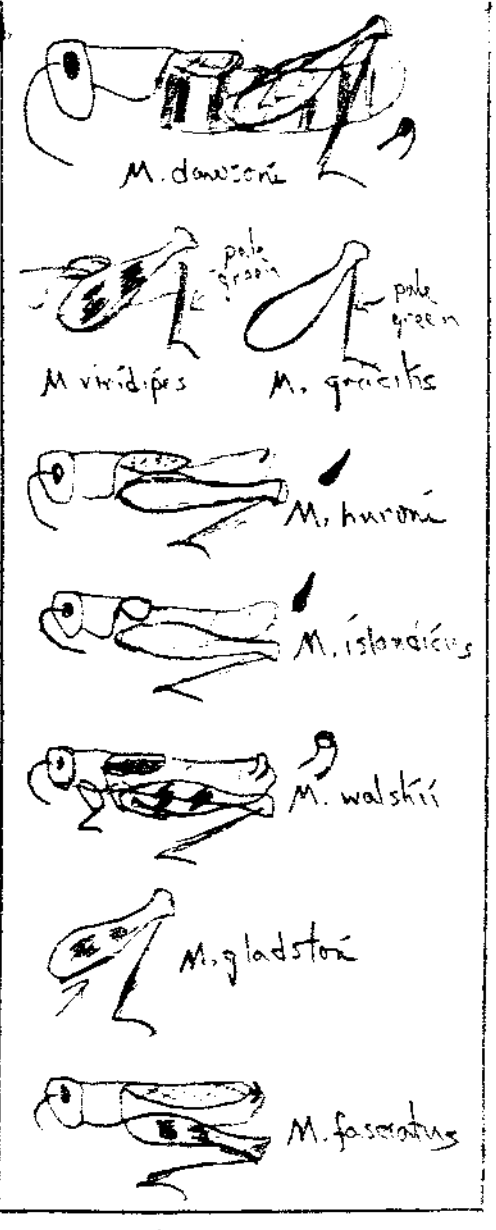
1 Male cerci with lateral process; tegmina long — 2
Male cerci lacking lateral process — 5

2 Size larger (> 30 mm) — 3
Size smaller (< 25 mm) — 4

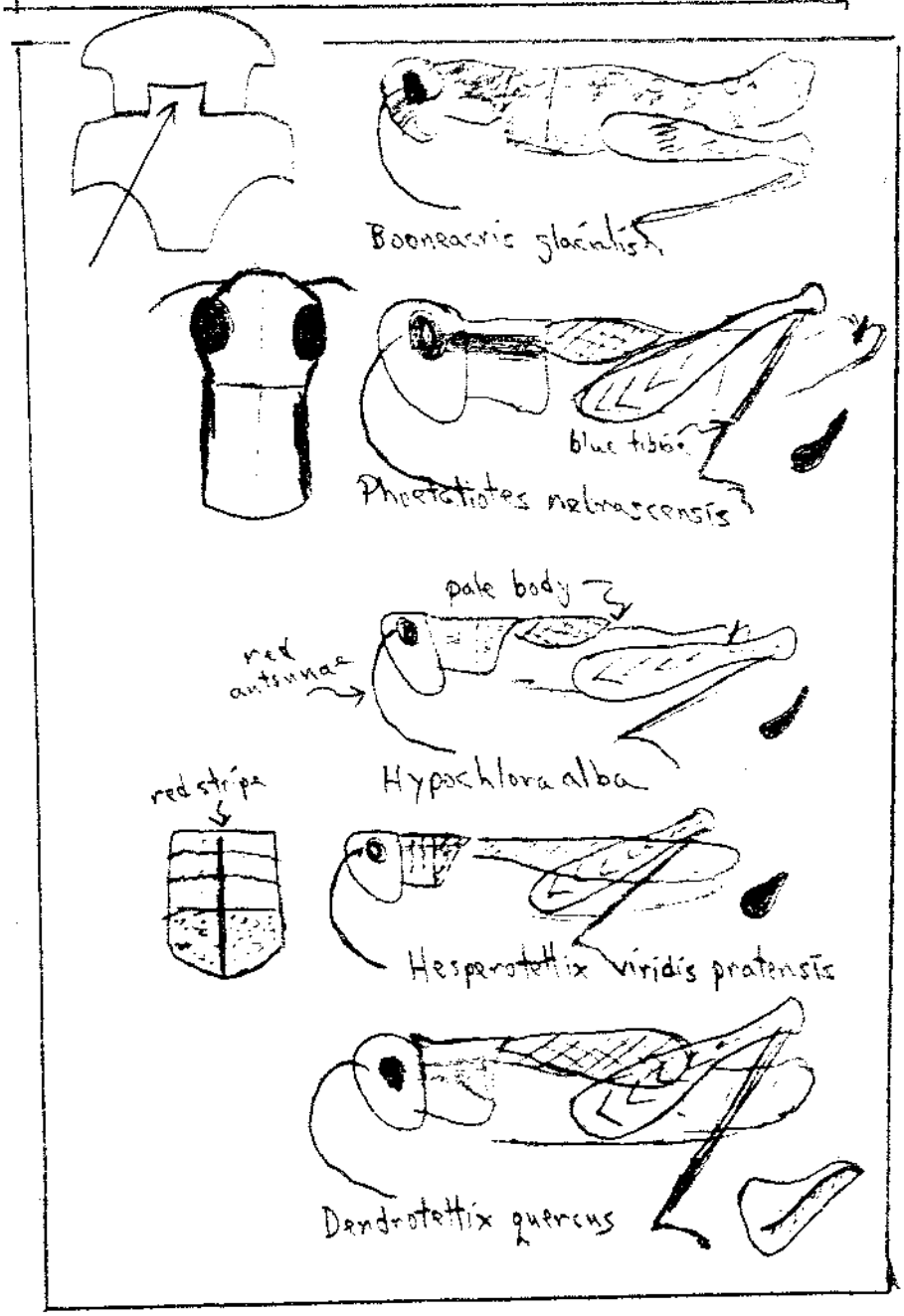
3 Herringbone pattern on hind femora — M. differentialis
Pronotum and tegmina with converging yellow stripes — M. bivittatus







Melanoplus species



4	Tibiae red, male cerci as in Ic	M. keeleri-luridus
	Tibiae blue, cerci as in Id	M. infantilis
	Tibiae blue, cerci as in Ie	M. confusus
5	Male cerci broadly expanded apically, furcula small or absent	6
	Male cerci tapering or only weakly expanded apically, furcula variable	7
6	Subgenital plate triangular, found in woods	M. punctulatus-griseus
	Subgenital plate quadrate, fields of W Minn.	*M. occidentalis
7	Male furcula large	8
	Male furcula small	11
8	Tegmina short padlike (sometimes long); subgenital plate triangular, abdomen pale with basal black rings on each segment	M. dawsoni
	Tegmina surpassing abdomen	9
9	Cerci strongly tapering, tibiae blue	M. flavidus
	Cerci more robust; tibiae red	10
10	Subgenital plate emarginate dorsally; cerci slender	M. femurrubrum
	Subgenital plate emarginate and outlined in black; cerci broader	M. borealis
	Subgenital plate elongate trapezoidal	M. bruneri
11	Male furcula small, cerci slender and tapered; tegmina short	12
	Male furcula small, cerci more robust; tegmina generally long	15
12	Hind tibiae green, tegmina short padlike, small delicate species, SE Minn	13
	Hine tibiae red	14
13	Cerci tip acute; hind femur banded externally	M. viridipes
	Cerci tip blunt; hind femur unbanded	M. gracilis
14	Tegmina lanceolate and speckled reaching 3rd abdominal segment	M. huroni
	Tegmina very short, oval	M. islandicus
15	Tegmina much shorter than abdomen	16
	Tegmina nearly as long or longer than abdomen	17
16	Cerci evenly tapered, tegmina uniformly dark, smaller species	M. scudderi
	Cerci upturned and spatulate, tegmina pale dorsally, larger species	M. walshii
17	Cerci straplike; hind femora FLAT below	M. gladstoni
	Not as above	18
18	Subgenital plate notched dorsally	19
	Subgenital plate convex dorsally	20
19	Cerci constricted medially, spatulate apically. Small species with blue (pink) tibiae.	M. angustipennis
	Cerci larger more robust w/o median constriction. Larger species	M. sanguinipennis
	Cerci elongate and blackened apically, hind femora banded	M. fasciatus
20	Hind tibiae red, northern woods	M. stonei
	Hind tibiae blue, grasslands	21
21	Pronotum with lateral dark lines	M. packardii
	Pronotum unicolorous	M. foedus

KEY TO MALE MELANOPLUS OF MINNESOTA

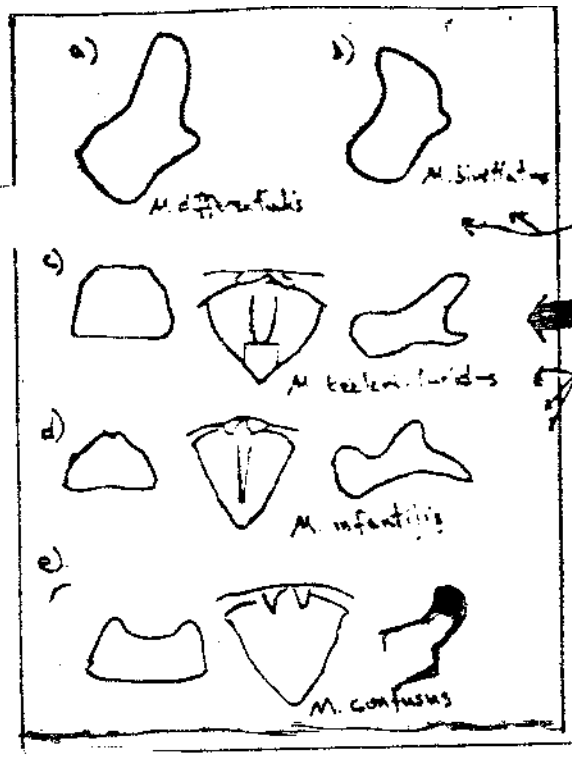
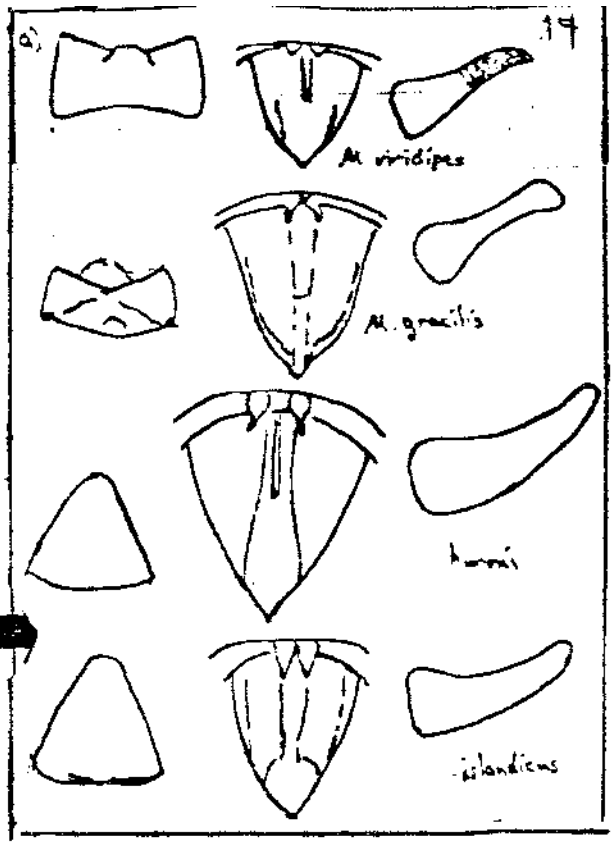


FIG. 1
Male cerci with lateral process
medium

FIG. 2
Small furcula
Slender cerci



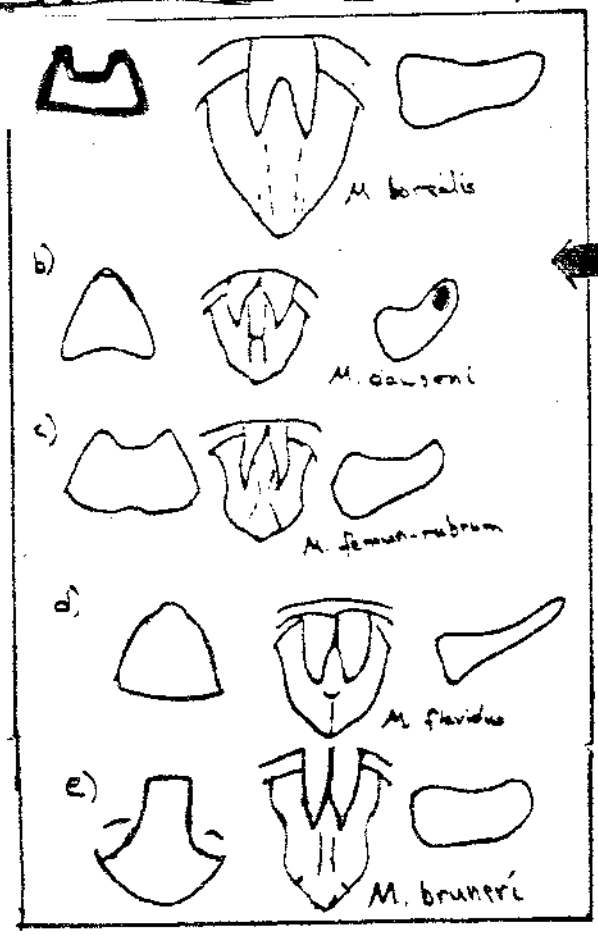
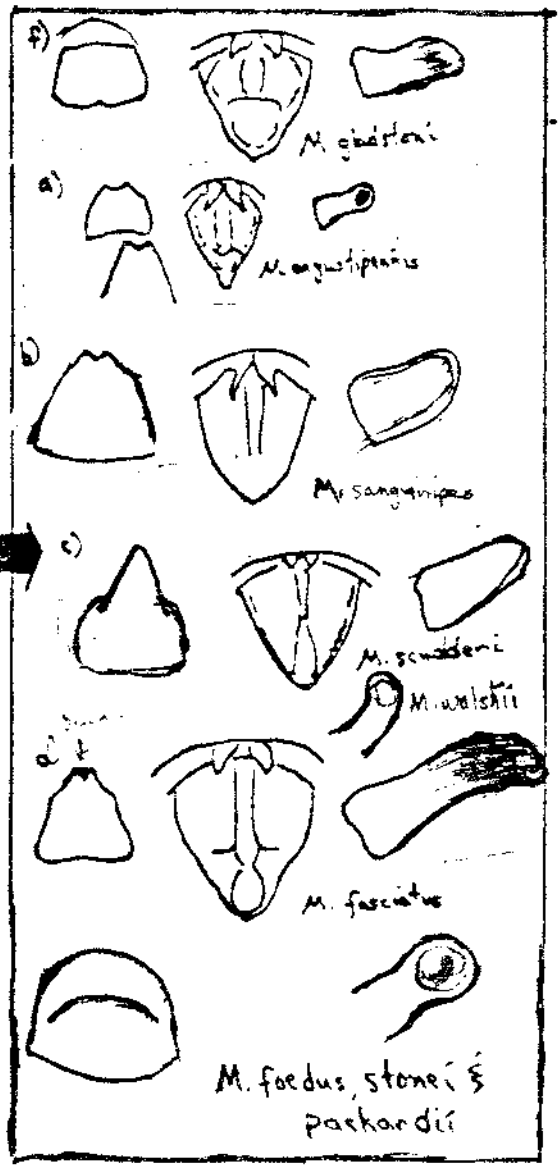


FIG. 4
Large furcula

FIG. 3
Small furcula
Broader cerci



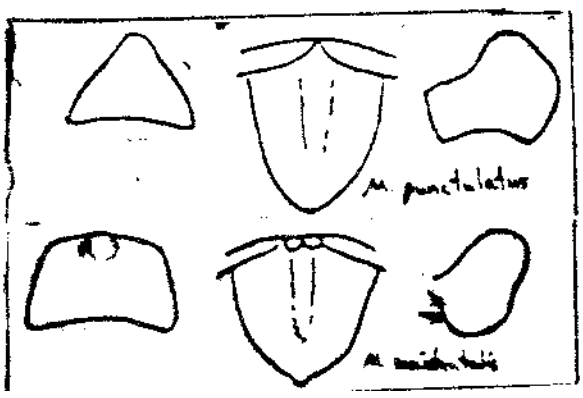


FIG. 5
Male cerci with expanded apices

BIBLIOGRAPHY

Cantrall, I.J. (1943) The ecology of Orthoptera and Dermaptera of the George Reserve, Michigan. Misc. Pub. Mus. Zool. Univ. Mich. 54: 1-182

Cantrall, I.J. (1968) An annotated list of the Dermaptera, Dictyoptera, Phasmatoptera, and Orthoptera of Michigan. Michigan Entomologist 1: 299-346

Capinera, J.L. and T.S. Sechrist (1982) Grasshoppers (Acrididae) of Colorado: identification, biology and management. Colo. State Univ. Expt. Station, Bull. No. 584S, Fort Collins, Colorado

Hebard, M. (1932) The Orthoptera of Minnesota. Univ. Minn. Ag. Expt. Station, Tech. Bull. 85; St. Paul, Minn.

Helfer, J.R. (1972) How to know the grasshoppers, cockroaches, and their allies. Wm. C. Brown Pub., Dubuque, Iowa.

Mulkern, G.B., K.P. Preuss, H. Knutson, A.F. Hagen, J.B. Campbell and J.D. Lambley (1969) Food habits and preferences of grassland grasshoppers of the north central Great Plains. Bull. N. Dakota Ag. Expt. Station 481: 1-32.

Otte, D. (1970 A comparative study of communication behavior in grasshoppers. Misc. Pub. Mus. Zool. Univ. Mich. 141: 1-168

Otte, D. (1981) The North American Grasshoppers. Vol. I: Gomphocerinae and Acrididinae. Harvard Univ. Press, Cambridge, Mass.

Otte, D. (1984) The North American Grasshoppers. Vol. II: Oedipodinae. Harvard Univ. Press, Cambridge, Mass.

Vickery, V.R. and D.K.McE. Kevan (1985) The grasshoppers, crickets, and related insects of Canada and adjacent regions. Biosystematics Research Institute. Ottawa, Canada.

CHELEUTOPTERA

PHASMATIDAE

Diapheromera: femorata, velii, (blatchleyi)

DICTYOPTERA

BLATTIDAE

Blatta: orientalis
Periplaneta: americana, australasiae

BLATTELLIDAE

Blattella: germanica
Supella: (longipalpa)
Parcoblatta: virginica, pennsylvanica, (uhleriana)

GRYLLOPTERA

PHANEROPTERIDAE

Scudderia: septentrionalis, pistillata, curvicauda, texensis, furçata
Amblycorypha: oblongifolia, rotundifolia-iselyi
Microcentrum: (rhombifolium)

PSEUDOPHYLLIDAE

Pterophylla: camellifolia

CONOCEPHALIDAE

Neoconocephalus: ensiger, robustus, (lyristes, nebrascensis)
Orchelimum: vulgare, gladiator, delicatum, campestre, silvaticum, (concinnum, nigripes, volantum)
Conocephalus: fasciatus, brevipennis, strictus, nigropleurum, saltans, attenuatus

TETTIGONIIDAE

Atlanticus: testaceus
Anabrus: simplex
Sphagniana: (sphagnorum)

RAPHIDOPHORIDAE

Tachycines: asynamorus
Udeopsylla: robusta
Ceuthophilus: maculatus, silvestris, fusiformis, (brevipes, pallidus, divergens, pallescens, pallidipes, latens)

GRYLLIDAE

Gryllus: veletis, pennsylvanicus
Acheta: domesticus
Nemobius: carolinus, maculatus,fasciatus, griseus, palustris, (allardi)

TRIGONIIDAE

Anaxipha: (exigua)

OECANTHIDAE

Neoxabea: (bipunctata)
Oecanthus: nigricornis, quadripunctatus, argentinus, fultoni, (exclamationis, niveus, latipennis)

GRYLLOTALPIDAE

Neocurtilla: hexadactyla

ORTHOPTERA

TRIDACTYLIDAE

Neotridactylus: apicialis
Ellipes: minutus

TETRIGIDAE

Nomotettix: cristatus, parvus
Tetrix: ornata(=acadica, =hancocki), arenosa-angusta, subulata(=granulata), (brunnerii)
Paratettix: cucullatus
Tettigidea: lateralis

ROMALEIDAE

Brachystola: magna

ACRIDIDAE

GOMPHOCERINAE

Metaleptea:	(brevicornis)
Mermiria:	(bivittata-maculipennis)
Pseudopomala:	brachyptera
Opeia:	obscura
Eritettix:	simplex-tricarinatus
Amphitornis:	coloradus
Chloealtis:	conspersa, abdominalis
Syrbula:	(admirabilis)
Cordillacris:	(occipitalis)
Chorthippus:	curtipennis
Aeropedellus:	clavatus
Phlibostroma:	quadrimaculatum
Ageneotettix:	deorum
Aulocara:	elliotti
Psoloessa:	(delicatula)
Orphulella:	speciosa, pelidna
Dichromorpha:	viridis
Stethophyma:	celatum, gracile, lineatum

OEDIPODINAE

Arphia:	sulphurea, conspersa, pseudonictana, xanthoptera
Chortophaga:	viridifasciata
Camnula:	pellucida
Encoptolophus:	costalis, sordidus
Dissosteira:	carolina
Scirtetica:	marmorata
Spharagemon:	bolli, collare
Hippiscus:	ocelote
Pardalophora:	apiculata, haldemanii
Xanthippus:	corallipes-latefasciatus
Cratypedes:	(neglectus)
Hadrotettix:	(trifasciatus)
Trachyrhachis:	kiowa-kiowa, kiowa-thomasi
Psinidia:	fenestralis
Metator:	pardalinus
Hadrotettix:	(trifasciatus)
Trimerotropis:	maritima-interior, verruculata, diversellus, (agrestis, latifasciata, pistrinaria, campestris)

CYRTACANTHACRIDINAE

Schistocerca:	americana, emarginata(=lineata), alutacea

MELANOPLINAE

Hypochlora:	alba
Hesperotettix:	viridis-pratensis, speciosus
Booneacris:	glacialis-canadensis
Phoetaliotes:	nebrascensis
Dendrotettix:	quercus
Melanoplus:	gracilis, viridipes, dawsoni, scudderi, walshii, islandicus, huroni, fasciatus, borealis, bruneri, punctulatus-griseus, angustipennis, confusus, flavidus, gladstoni, infantilis, keeleri-luridus, occidentalis, bivittatus, differentialis, femurrubrum,sanguinipes, stonei, foedus, packardii

GENERIC INDEX OF THE ACRIDIDAE OF MINNESOTA

Genus	Page
Aeropedellus	12
Ageneotettix	12
Amphitornus	11
Arphia	13
Aulocara	12
Booneacris	17
Camnula	14
Chloealtis	11
Chorthippus	12
Chortophaga	14
Cordillacris	12
Cratypedes	15
Dendrotettix	17
Dichromorpha	12
Dissosteira	14
Encoptolophus	14
Eritettix	11
Hadrotettix	16
Hesperotettix	17
Hippiscus	15
Hypochlora	17
Melanoplus	18
Mermiria	11
Metaleptea	11
Metator	15
Opeia	11
Orphulella	12
Pardalophora	15
Phlibostroma	12
Phoetaliotes	17
Pseudopomala	11
Psinidia	15
Psoloessa	12
Scirtetica	14
Schistocerca	17
Spharagemon	14
Stethophyma	13
Syrbula	11
Trachyrhachys	15
Trimerotropis	16
Xanthippus	15