BULLETIN 404

JUNE 1970

A SYNOPSIS OF ORTHOPTERA (*Sensu Lato*) OF ALABAMA

AGRICULTURAL EXPERIMENT STATION
AUBURN UNIVERSITY

E. V. Smith, *Director*

Auburn, Alabama

A SYNOPSIS OF ORTHOPTERA (*Sensu Lato*) OF ALABAMA

Matt E. Dakin, Jr., and Kirby L. Hays

CONTENTS

FIRST PRINTING 4M, JUNE 1970

A SYNOPSIS OF ORTHOPTERA (*Sensu Lato*) OF ALABAMA

MATT E. DAKIN JR. and KIRBY L. HAYS[1]

INTRODUCTION

This study was begun in 1958 as a survey of the subfamily Cyrtacanthacridinae of Alabama. In the course of this survey it was realized that the State contained many species of Orthoptera previously unreported. The project was therefore expanded to include all Orthoptera. Most of the extensive collecting was completed by 1963, but specimens were added through the summer of 1965.

The order Orthoptera as treated in this study represents a polyphyletic group. The order has been considered here in its broadest modern sense; however, the order Dermaptera, included within the Orthoptera by some early workers, has not been included. The authors are aware of recent work of McKittrick *(43)* that suggests Blattidae and Mantidae be removed from the Orthoptera and included along with termites in the order Dictyoptera. It is also understood that the usual European classification of placing the Phasmidae in a separate order is a more accurate indication of their actual phylogenetic position. Despite these facts, it was felt that a survey of only the saltatorian (or true) Orthoptera would be much less desirable than one that included all other families which have traditionally been included in most American studies. Therefore, the following families of insects within the order Orthoptera found in the State of Alabama are included:

[1] Former Assistant Professor, Department of Zoology-Entomology, now Associate Professor, Department of Biology, University of Southwestern Louisiana; Professor, Department of Zoology-Entomology.

1. Blattidae – cockroaches
2. Mantidae – praying mantids
3. Phasmidae – walking sticks
4. Tridactylidae – pygmy mole crickets
5. Tetrigidae – grouse locusts
6. Acrididae – short-horned grasshoppers
7. Gryllacrididae – cave or camel crickets
8. Tettigoniidae – long-horned grasshoppers
9. Gryllidae – crickets

There is at present no listing of the species of Orthoptera known to occur in Alabama. The relatively few Alabama records are scattered throughout the literature, and apparently some of the very common species have never been officially reported. The purpose of this study was to summarize the available information on the Alabama Orthoptera.

Keys have been constructed for identification of families, genera, and species and in some cases subspecies. It is hoped that these keys are reliable and simple enough for the non-specialist to identify with some confidence and accuracy any orthopteran specimens that might be found within the State. There may be some species that occur in the State not included in this study. To minimize this problem species have been included in the keys that have not been reported from the State, but which are probably present.

History of Collections of Alabama Orthoptera

Most previously published records of Orthoptera from Alabama are of specimens collected during a few brief but intensive collecting trips into the State by workers from other parts of the country. Some of the important out-of-state collectors include A. P. Morse, Morgan Hebard, J. A. G. Rehn, T. H. Hubbell, I. J. Cantrall, H. S. Wallace, and J. J. Friauf. The collections of A. P. Morse were reported, in part, in his 1906 and 1907 papers on North American Acrididae.

Many of the specimens taken from the State by Morgan Hebard and J. A. G. Rehn have been reported in the hundreds of papers dealing with Orthoptera published since the beginning of this century by the Philadelphia Academy of Science.

Most Alabama specimens collected by the other people listed have not been reported in the literature. Many of these specimens

are in the University of Michigan Museum of Zoology. These were examined by the senior author and are recorded here.

Zoogeography

The State of Alabama may be divided into three major geologic regions ranging in age from Precambrian to Recent. These formations are usually called the Piedmont Plateau, the Limestone Valleys, and the Coastal Plain. The Piedmont Plateau is the oldest of the three and the Coastal Plain the youngest formation. However, most of the species of Orthoptera in the State are not limited in their distribution by these geologic divisions or by the different types of soil associated with them. Apparently the most important factors determining their distribution are the combined effects of moisture and vegetation [for an excellent discussion of these interrelationships see Cantrall *(6)*]. An attempt has been made to emphasize these factors in the notes that follow each species description.

Sources of Information

The records given in this study are derived from three main sources. The most important of these is the Auburn University Entomological Museum (AU). Most of these specimens were collected from 1958 to 1963 during a survey of the State. To this were added the specimens in the University of Michigan Museum of Zoology (UMMZ) and reliable records published.

Because of space limitations distributional data are given by county. Each county name is followed by one or more superscripts indicating the source of the record. The superscript "1" indicates that the specimens are in the collections of the Auburn University Entomological Museum; "2" indicates that the specimens are in the University of Michigan Museum of Zoology collection; and "3" indicates that the record has been previously published.

Use of the Keys

An attempt has been made to make the keys in this study simple as possible. They are entirely artificial, with no consideration given to the phylogenetic relationships of the organisms. The keys are designed in a series of couplets consisting of two more or less opposite statements. In using the keys **both** statements should be read carefully. In some cases it is impossible to make

completely infallible statements. This is especially true in many of the keys to females. The short descriptions following the keys will provide a check on the accuracy of a determination. In addition, a reference is usually cited that will give a more complete description or an illustration of the species in question.

SYSTEMATIC TREATMENT

As considered here the order Orthoptera can be diagnosed as follows: forms exhibiting incomplete (gradual) metamorphosis (the paurometabolous development of some authors); chewing type mouthparts; two pairs of wings usually present, but one or both pairs may be reduced or absent, front wings (tegmina) usually much thickened and covering the membranous hind wings when at rest; legs adapted for walking, running, jumping, grasping, or digging; tarsi with one to five segments, terminating in two claws, and with or without an arolium.

The best general source covering the entire order Orthoptera for this area is Blatchley (5). At present 9 families are known to occur in the State.

Key to the Families of the Order Orthoptera Known to Occur in Alabama

1. Hind femora not enlarged, adapted for walking or running; tarsi with 5 segments 2
   Hind femora enlarged, suited for jumping; tarsi with less than 5 segments 4
2. Wings usually present; cerci segmented. (If wings are absent and cerci hidden, then the head is concealed beneath the pronotum) 3
   Wings lacking; cerci unsegmented ..... Phasmidae page 21
3. Front legs not raptorial, head more or less covered dorsally by pronotum ..... Blattidae page 9
   Front legs raptorial; head not covered by pronotum ..... Mantidae page 18
4. Front and middle tarsi with only 2 segments 5
   Front and middle tarsi with at least 3 segments 6
5. Pronotum prolonged caudally so that it covers all the dorsal surface of the abdomen; hind tarsi with 3 segments ..... Tetrigidae page 24
   Pronotum not covering abdomen; hind tarsi with 1 segment or absent ..... Tridactylidae page 23
6. All tarsi with 3 segments 7
   Middle tarsi, and usually all tarsi, with 4 segments 8
7. Antennae shorter than body; auditory organs located on sides of first abdominal segment; ovipositor short ..... Acrididae page 29

Antennae usually longer than body; auditory organs located on base of front tibia ..... Gryllidae page 83

8. Wings always present (may be greatly reduced or concealed by pronotum); front tibia with auditory organs; color variable but often green ..... Tettigoniidae page 61
Wings absent; front tibia without auditory organs; color usually gray or brown ..... Gryllacrididae page 80

FAMILY BLATTIDAE — COCKROACHES

Form oval, depressed; head more or less covered by pronotum; legs slender, adapted for running; tegmina membranous or leathery and, when well developed, overlapping along their caudal margins; males with nine visible abdominal sternites, females with seven; tenth abdominal segment in both sexes with a pair of segmented cerci; females without external ovipositor.

Most of the Alabama species of this ancient family are found outdoors, especially in wooded areas where they are common in decaying logs, under loose bark, and in leaf litter. Some species have become associated with man and are commonly found indoors. These "domestic" forms are usually cosmopolitan in their distribution, and probably occur statewide.

The North American species of this family were thoroughly discussed by Hebard *(19)*. His work contains keys and descriptions to all the known Alabama species. Other important works include J. W. H. Rehn *(69)* and McKittrick *(43)*.

Key to the Species of the Family Blattidae Known to Occur in Alabama

1. Ventral margins of all femora with numerous spines (Figs. 1, 2, and 3) 2
Ventral margins of femora unarmed or with a few distal spines or only posterior femora armed with spines 26

2. Anteroventral margins of anterior femora with a row of spines that either decrease gradually in size and length distad or are of nearly equal length throughout (Figs. 1 and 2) 3
Anteroventral margins of anterior femora with a row of heavy proximal spines followed by a row of slender and shorter distal spines (Fig. 3) 10

3. Tegmina reduced or not, if the latter, then with longitudinal discoidal sector extending to apex of tegmina 4
Tegmina not decidedly reduced, discoidal sector extending to posterior margin of tegmina ..... *Supella supellectilium* (Serville) page 14

4. Anteroventral margins of anterior femora with three robust distal spines 5

Anteroventral margin of anterior femora with two robust distal spines ..... *Cariblatta lutea lutea* (Saussure and Zehntner) page 14

5. Male with subgenital plate symmetrical; female with subgenital plate valvate 6
   Male with subgenital plate strongly asymmetrical; female with subgenital plate simple, not valvate ..... *Blattella germanica* (Linnaeus) page 14
6. Arolia present; size medium to large, over 24 mm 7
   Arolia absent; size medium, under 21 mm ..... *Blatta orientalis* Linnaeus page 12
7. Tegmina and wings fully developed, extending beyond apex of abdomen 8
   Tegmina represented by subquadrate pads, shorter than abdomen ..... *Eurycotis floridana* (Walker) page 13
8. Color a uniform, shining, blackish brown ..... *Periplaneta fuliginosa* (Serville) page 13
   Color not uniform blackish brown, pronotum with light yellow markings 9
9. Supra-anal plate prolonged beyond the subgenital plate, its apex deeply notched (Fig. 4) ..... *Periplaneta americana* (Linnaeus) page 12
   Supra-anal plate not prolonged beyond the subgenital plate, its apex feebly notched (Fig. 5) ..... *Periplaneta brunnea* Burmeister page 13
10. Four proximal tarsal joints each bearing a pulvillus 11
    Fourth tarsal joint only bearing a pulvillus ..... *Aglaopteryx gemma* Hebard page 13
11. Males with sixth abdominal tergite bearing two minute chitinous projections armed with elongate teeth on meson; styles of subgenital plate not deflexed; female with general color uniform, shining, blackish brown ..... *Ischnoptera deropeltiformis* (Brunner) page 15
    Males with abdominal tergites either specialized or not, but never with armed projections on sixth abdominal tergite, styles of subgenital plate deflexed; female never uniform, shining, blackish brown 12
12. Meson of dorsal surface of first and sometimes second* abdominal segments of males with specialized areas in the form of patches of hair or paired ridges; female with hind wings present, tegmina reduced or not 13
    Dorsal surface of abdomen of male without specialized areas; female with hind wings absent, tegmina represented by very small pads. ..... *Parcoblatta bolliana* (Saussure and Zehntner) page 15
13. Males with 9 visible abdominal sternites 14
    Females with 7 visible abdominal sternites 20
14. Only first abdominal segment with specialized areas 15
    Both first and second abdominal segments with specialized areas 18
15. First abdominal segment with a pair of ridges 16
    First abdominal segment with a single medial patch of hair ..... *Parcoblatta virginica* (Brunner) page 15

---

* These two abdominal segments are usually referred to as the median and first dorsal abdominal segments, respectively, in previous works.

16. Specialized areas of first abdominal segment represented by raised medial ridges, cephalic faces supplied with heavy tufts of hair 17
Specialized areas of first abdominal segment represented by mesal ridges overhanging the segment which is concave cephalad, ventral faces of overhanging extremities with short hairs ..... *Parcoblatta divisa* (Saussure and Zehntner) page 17

17. Tegmina broader than pronotum. Cerci with inner distal angles of sixth to ninth joints slightly produced; subgenital plate not elevated at base of right style ..... *Parcoblatta uhleriana* (Saussure) page 16
Tegmina subequal in width to pronotum, inner distal angles of cerci not produced; subgenital plate distinctly elevated at base of right style ..... *Parcoblatta fulvescens* (Saussure and Zehntner) page 16

18. Specialized areas of the first and second abdominal segments represented by a pair of low mesal ridges with their cephalic faces bearing tufts of hair 19
Specialized areas of the first and second abdominal segments represented by high mesal ridges overhanging the segments which are concave cephalad, their ventral faces bearing tufts of hairs ..... *Parcoblatta pennsylvanica* (DeGeer) page 17

19. Body length 16 mm or less; pronotum less than 4 mm long and less than 5 mm wide ..... *Parcoblatta caudelli* Hebard page 16
Body length 17 mm or more; pronotum more than 4 mm long and 5 mm wide ..... *Parcoblatta lata* (Brunner) page 16

20. Tegmina not covering more than one-half of abdomen 21
Tegmina covering more than one-half of abdomen 24

21. Tegmina subquadrate slightly overlapping, distal margins truncate 22
Tegmina subtriangular, not overlapping, distal margins pointed ..... *Parcoblatta uhleriana* (Saussure) page 16

22. Truncation of distal margins of tegmina beginning at apex of anal field 23
Truncation of distal margins of tegmina beginning beyond apex of anal field ..... *Parcoblatta lata* (Brunner) page 16

23. Length of body 10-12 mm; supra-anal plate with lateral margins normally straight, apex sharply rounded ..... *Parcoblatta virginica* (Brunner) page 15
Length of body 11-16 mm; supra-anal plate with lateral margins slightly concave, apex bluntly rounded ..... *Parcoblatta fulvescens* (Saussure and Zehntner) page 16

24. Tegmina usually not surpassing tip of abdomen; (A few specimens of *P. divisa* have the tegmina fully developed.) coloration dark brown with lighter lateral markings 25
Tegmina surpassing tip of abdomen; coloration a uniform pale brownish yellow ..... *Parcoblatta caudelli* Hebard page 16

25. Lateral margins of pronotum much lighter than the dark brown disk ..... *Parcoblatta pennsylvanica* (DeGeer) page 17
Lateral margins of pronotum less strikingly paler than disk ..... *Parcoblatta divisa* (Saussure and Zehntner) page 17
(Females of the above 2 spp. are indistinguishable.)

26. Subgenital plate present, distal portion of abdomen not covered by produced sclerites; tegmina and wings present 27
Subgenital plate absent, distal portion of abdomen covered by produced seventh dorsal and sixth ventral abdominal sclerites; wingless ..... *Cryptocercus punctulatus* Scudder page 12
27. Four proximal tarsal joints each bearing an arolium 28
Fourth tarsal joint only bearing an arolium ..... *Chorisoneura texensis* Saussure and Zehntner page 14
28. Arolia present; body length less than 30 mm ..... *Pycnoscelus surinamensis* (Linnaeus) page 18
Arolia absent; body length more than 40 mm ..... *Blaberus craniifer* Burmeister page 17

Cryptocercus punctulatus Scudder

Body length 23-29 mm. General color a dark and shining brown, almost black. Dorsal surface of the body finely punctate. The produced abdominal segments cover the cerci. Sexes inseparable externally.

Alabama Distribution: DeKalb[1], Jackson[1], and Tallapoosa[1] counties.

Specimens examined: 4 adults AU.

This odd cockroach is colonial and lives in decaying logs (especially pine) in the Piedmont Plateau and Limestone Valley areas of the State. Like the termites, it has symbiotic protozoa in its digestive system which digest cellulose [Cleveland et al. *(7)*]. Dates on the specimens range from March to June.

Blatta orientalis Linnaeus

Body length 18-24 mm. Sexes different in appearance.

Male: General coloration nearly uniform shining dark brown; pronotum and tegmina often slightly paler, the latter covering about two-thirds of the abdomen, strongly overlapping.

Female: General coloration nearly uniform shining blackish brown; tegmina represented by small, widely separated pads.

Alabama distribution: Morgan[3] County.

Specimens examined: None.

This cosmopolitan species is found in houses, sheds, barns, and other buildings. It probably occurs throughout the State. The single record above only indicates a lack of collecting of the domestic species and should not be taken as an accurate representation of its actual distribution.

Periplaneta americana (Linnaeus)

Body length 27-34.5 mm. Sexes similar. General coloration reddish brown, disk of pronotum with yellow markings usually in the shape of an anchor, lateral margins of disk sometimes light yellow also.

Alabama distribution: Blount[1], Lee[1], and Morgan[3] counties.

Specimens examined: 1 nymph, 1 male, 1 female AU.

This is another domestic species with a cosmopolitan distribution. It probably occurs statewide.

Periplaneta brunnea Burmeister

Body length 25-33 mm. Sexes similar in appearance. In size slightly shorter but somewhat broader than *P. americana*. Coloration much the same as *P. americana* except that the yellow area of pronotal disk is more extensive; occasionally the entire disk is yellow with a vague hint of two reddish-brown spots.

Alabama distribution: Lee[2] and Mobile[2] counties.

Specimens examined: 2 adults UMMZ.

This species is found in tropical and subtropical areas throughout the world. It is most likely to occur in large numbers in southern Alabama, but it may be introduced into houses in any part of the State.

Periplaneta fuliginosa (Serville)

Body length 24.5-32.5 mm. Sexes similar. Differs from our other members of the genus in its uniform coloration.

Alabama distribution: Conecuh[3], Lee[1], and Mobile[1,2] counties.

Specimens examined: 3 males, UMMZ; 2 males, 5 females AU.

According to Hebard *(20)*, this species is more often found outdoors than indoors. However, it is a common house pest in certain parts of the United States and may be found in houses in Alabama.

Eurycotis floridana (Walker)

Body length 30-39.5 mm. Sexes similar. General coloration almost uniform dark reddish brown. Outer apical angles of sixth and seventh dorsal abdominal tergites prolonged caudally into sharp spines. Cerci short and flat.

Alabama distribution: Baldwin[2] and Mobile[1] counties.

Specimens examined: 1 male UMMZ; 1 female AU.

This species is found under bark of dead trees, in stumps, under signs, and in other hiding places in the southern portion of the southeastern United States. No specific information is available on the Alabama specimens except collection dates of November 15 and December 3.

Aglaopteryx gemma Hebard

Body length 7.5-10 mm. General color pale brown with dark brown markings; pronotum with a dark anchor-shaped marking mesad. Tegmina subquadrate, longer than wide, but extending only slightly beyond margin of first abdominal segment.

Alabama distribution: Barbour[1], Conecuh[2], Covington[1], Geneva[1], Houston[3], Lee[1], and Mobile[3] counties.

Specimens examined: 1 adult, 1 nymph UMMZ; 4 adults AU.

The original description by Hebard *(19)* was based on specimens from Mobile and Spring Hill, Mobile County. The Lee County record (Auburn) appears to be the northernmost for this species. It is commonly found in wooded areas under loose bark or old signs. Dates on the Alabama specimens range from August 29 to October 5.

Supella supellectilium (Serville)

Body length 10-12 mm. General coloration light brown with chestnut brown markings; pronotal disk chestnut with lateral margins light yellowish brown. Tegmina of male surpassing tip of abdomen, those of female not extending beyond abdomen. Sixth abdominal segment of male with a deep, depressed area mesad bounded by a slightly raised and rounded ridge, bottom of the depression with a tuft of hair.

Alabama distribution: Lee[1] County.

Specimens examined: 6 males, 7 females AU.

This predominantly tropical and subtropical cockroach is a household pest in warm climates. The only Alabama specimens seen were taken from buildings on the Auburn University Campus. However, it may be introduced into any part of the State. Adults may be found throughout the year.

Cariblatta lutea lutea (Saussure and Zehntner)

Body length 5.8-9.5 mm. Sexes similar. General coloration light brownish yellow, pronotum with fine dark brown markings. Tegmina usually just reaching tip of abdomen. Dorsal margin of subgenital plate of male produced into a transverse rectangle.

Alabama distribution: Baldwin[1], Barbour[1], Cherokee[1,2], Covington[1], DeKalb[1], Houston[1], Lee[1,2], Macon[1], Mobile[2,3], Perry[1,2], and Winston[1] counties.

Specimens examined: 26 adults UMMZ; 34 adults AU.

Apparently this species is abundant throughout the State. It is often seen on low vegetation at night in the spring and summer. Dates on the specimens range from April 27 to August 24.

Chorisoneura texensis Saussure and Zehntner

Body length 7-8.5 mm. Sexes similar. General coloration uniform pale brownish yellow. Lateral margins of tegmina transparent.

Alabama distribution: DeKalb[1], Lee[1], and Mobile[1] counties.

Specimens examined: 4 adults AU.

Two specimens in the Auburn collection were taken from light traps. No other information on the habits of the species in Alabama is available. The dates on the Alabama specimens range from April 18 to June 17.

Blattella germanica (Linnaeus)

Body length 10.5-12.8 mm. General color light brownish yellow; pronotal disk with two distinct parallel lateral stripes of dark brown.

Alabama distribution: Lee[1] County.

Specimens examined: 9 adults, 1 nymph AU.

This is a very common household pest throughout most of the United States, and it is almost certain to occur throughout Alabama. It is known by a variety of common names but is best known in Alabama as the waterbug or German roach.

Ischnoptera deropeltiformis (Brunner)

Body length 11.5-18 mm. Sexes very different in appearance.

Male: General coloration of entire insect except wings and legs shining blackish brown; tegmina usually slightly paler near margins; legs brownish orange. Tegmina and wings fully developed.

Female: General color shining black with only a faint brownish tinge; legs dark brown. Tegmina subquadrate, covering only first 2 or 3 abdominal segments, caudal margins slightly overlapping, distal margin weakly convex.

Alabama distribution: Clay[3], Covington[1], DeKalb[1], Houston[1], Lee[1,2], Madison[1], Mobile[1,2], Perry[2], St. Clair[2], Shelby[1], Talladega[2], Tallapoosa[1], and Winston[1] counties.

Specimens examined: 30 nymphs, 4 males, 1 female UMMZ; 18 males, 7 females AU.

This species is frequently encountered in wooded areas throughout the State. Specimens are often found on the ground in dead pine needles and beneath the loose bark of trees. The males are often attracted to lights at night. This species appears to reach a peak of abundance during the summer. The earliest date of collection in the State is April 27 and no specimens have been collected later than late August.

Parcoblatta bolliana (Saussure and Zehntner)

Sexes very different in appearance.

Male: Body length 10-13 mm. Head, disk of pronotum, and base of tegmina dark brown; legs, lateral margin of pronotum, and rest of tegmina lighter brown. Tegmina and wings fully developed.

Female: Body length 9-10.7 mm. General coloration dark brown. General form elliptical, stout, and compact. Tegmina greatly reduced; wings absent.

Alabama distribution: Cherokee[2], DeKalb[1], Lee[1], and Tallapoosa[1] counties.

Specimens examined: 1 nymph UMMZ; 25 males AU.

Like the other Alabama members of this genus, this species probably spends the day hiding in wooded areas in leaf litter or under bark or similar places and may be found at night on vegetation. Almost all of the specimens in the Auburn collection were taken from light traps. The dates on the specimens range from late May to early August.

Parcoblatta virginica (Brunner)

Sexes different.

Male: Body length 11.5-15 mm. General coloration light brown with pronotal disk slightly darker than rest of body.

Female: Body length 10-12.5 mm. Head and abdomen very dark brown, pronotum and tegmina dark reddish brown. Tegmina covering less than half of the abdomen, caudal margins overlapping, tips truncate.

Alabama distribution: Cherokee[2], DeKalb[1], Lee[1,2,3], Madison[1], Mobile[2], Perry[2], Pike[1], and Tallapoosa[1] counties.

Specimens examined: 3 males, 8 females UMMZ; 9 males, 2 females AU.

The Pike County specimens were taken from beneath the loose bark of dead stumps and logs. The Madison County specimens were taken at night with one female from vegetation and two males taken from a screened porch where they had been attracted to a light. In Alabama adults have been taken from May 1 to August 25.

Parcoblatta uhleriana (Saussure)

Sexes very different in appearance.

Male: Body length 13.3-17 mm. General coloration nearly uniform brownish yellow, often with a reddish tinge.

Female: Body length 9.8-15 mm. Coloration usually shining blackish brown, occasionally reddish brown. Tegmina reduced to pads, triangular in shape, caudal margins not overlapping.

Alabama distribution: Cherokee[2], DeKalb[1], Lee[1,2,3], Perry[2], Talladega[2], and Tallapoosa[1] counties.

Specimens examined: 22 nymphs, 27 females UMMZ; 4 males AU.

Hebard *(19)* reported a single female taken from beneath the bark of an old pine stump in Opelika. Two of the AU males were taken from light traps. Dates on the specimens range from June 2 to August 25.

Parcoblatta fulvescens (Saussure and Zehntner)

Sexes different in appearance.

Male: Body length 12.5-16.5 mm. General color uniform pale brownish yellow.

Female: Body length 10.8-15.5 mm. Head, pronotum, and tegmina light reddish brown; dorsal surface of abdomen dark brown.

Alabama distribution: DeKalb[1], Jackson[2], Lee[1], Madison[1], and Tallapoosa[1] counties.

Specimens examined: 1 male UMMZ; 30 males, 2 females AU.

Most of the males examined were taken from light traps or at lights. Dates on the specimens range from May 11 to August 4 .

Parcoblatta caudelli Hebard

Body length 10.5-16 mm. Sexes similar in appearance. General coloration pale brownish yellow. Tegmina longer than abdomen.

Alabama distribution: Lee[1] County.

Specimens examined: 1 male AU.

The only known Alabama specimen is a teneral male taken at Auburn on July 2. The collector is not listed on the label, and it is possible that the locality datum is erroneous. The distribution of this species as listed by Hebard *(19)* would indicate that this species may occur in Alabama since it has been taken in both South Carolina and Mississippi. Until further Alabama specimens are collected the occurrence of this species in Alabama should be considered problematical.

Parcoblatta lata (Brunner)

Sexes different in appearance.

Male: Body length 17.5-21.5 mm. General coloration pale yellow brown; legs, margins of thorax, and tegmina yellowish.

Female: Body length 15.5-22 mm, large, robust, broader than male. Pronotum and tegmina reddish brown; dorsal surface of abdomen brownish black. Tegmina covering almost one-half of the abdomen.

Alabama distribution: Butler[3], Cherokee[1,2], Conecuh[3], Covington[1], Dallas[3], DeKalb[1], Escambia[3], Houston[3], Lawrence[1], Lee[1], Madison[1], Mobile[2,3], Montgomery[1,3], Perry[2], Talladega[2], Tallapoosa[1], and Winston[1] counties.

Specimens examined: 2 nymphs, 3 males, 23 females UMMZ; 15 males, 10 females AU.

This is the most common and widespread species of the genus *Parcoblatta* in Alabama. Hebard *(19)* reported taking specimens from beneath pine bark in several areas of the State. Males are attracted to light, and many of the Auburn University specimens were taken from light traps. Dates on the specimens range from June 2 to August 25.

Parcoblatta divisa (Saussure and Zehntner)

Body length 12.7-17.8 mm. Sexes, except for reduction of tegmina in female, rather similar. General coloration dark reddish brown, occasionally very pale brown; lateral margins of disk of pronotum and tegmina light yellow, occasionally a light longitudinal stripe on meson of disk. Usually the tegmina of the female covers only slightly more than one-half of the abdomen, although an occasional Alabama specimen has tegmina longer than the abdomen.

Alabama distribution: Covington[1], Dallas[1], Houston[1], Lee[1,3], Mobile[2], St. Clair[2], Tallapoosa[1], and Walker[1] counties.

Specimens examined: 1 male, 5 females UMMZ; 11 males, 6 females AU.

The Dallas County specimen was taken at the Black Belt Substation, Marion Junction, from beneath the loose bark of a dead oak tree. The Houston County specimens were taken at night from low vegetation in a small woodlot. A copulating pair was collected at this time from a leaf about 3 feet above the ground on a small hickory seedling. The dates on the Alabama specimens range from May 23 to August 16.

Parcoblatta pennsylvanica (DeGeer)

Body length, male 16.8-24.5 mm, female 12.7-18 mm. Sexes similar except for reduction of tegmina in female. General coloration dark reddish brown; lateral margins of pronotum and tegmina light yellow. Tegmina of female covering about two-thirds of the abdomen. This species is quite similar to *P. divisa* differing chiefly in the specialization of the male abdomen. It is also different in its generally larger size and more striking colors.

Alabama distribution: Lee[1] and Morgan[1] counties.

Specimens examined: 2 males AU.

Nothing is known of the ecology of this species in Alabama. The two specimens were taken on July 13 and 14.

Blaberus craniifer Burmeister

Body length, male 42.4-45.1 mm, female 48.7-54.8 mm. Pronotum dull yellow with a large shield-shaped, shining, blackish-brown spot in center.

Alabama distribution: Lee[1] County.

Specimens examined: 1 female AU.

This tropical species probably is not established in the United States north of the southern tip of Florida. Its large size makes it very useful as a laboratory animal and it has been introduced throughout the United States for this purpose. It is likely that occasional specimens will escape from laboratory cultures, but they will probably not become established. This is probably the case with the single Alabama specimen which was taken from the third floor of Funchess Hall on the Auburn University Campus.

Pycnoscelus surinamensis (Linnaeus)

Female: Body length 16-25 mm. Form robust. General coloration shining blackish brown; anterior margin of pronotum light yellow, lateral margins of tegmina light brownish yellow. Pronotum and tegmina with numerous small pits.

Alabama distribution: Lee[1] and Clay[1] counties.

Specimens examined: 2 females AU.

According to Hebard *(19)* this species is circumtropical in distribution but may extend its range into subtropical areas. It is well established in several portions of the United States, including parts of Alabama. In this country it apparently reproduces parthenogenetically since males are never collected.

FAMILY MANTIDAE — MANTIDS

Usually rather large, elongate forms in which the front legs are modified for grasping prey; head short, much wider than long, triangular; antennae slender, usually filiform, shorter than body; tegmina and wings usually present but may be reduced; pronotum usually much longer than broad; both sexes with a pair of short, segmented cerci; male with a pair of short styles near apex of subgenital plate; female without a visible ovipositor.

This family is mostly tropical and is represented by a relatively small number of native species in the United States. All species are predaceous and feed on a variety of insects.

For a discussion of the species found in the United States see Gurney *(13)*. Blatchley *(5)* constructed keys to most of the eastern species.

Key to the Species of the Family Mantidae Known to Occur in Alabama

1. Front tibia one-half as long as front femur 2
   Front tibia not more than one-third as long as front femur 4
2. Length of body less than 60 mm; wings normal or reduced 3
   Length of body 70 mm or more; wings long ..... *Tenodera aridifolia sinensis* Saussure page 19

3. Broadest portion of pronotum distinctly cephalad to middle, hind margin rounded ..... *Stagmomantis carolina* (Johannson) page 19
   Broadest portion of pronotum near middle, hind margin nearly truncate ..... *Gonatista grisea* (Fabricius) *
4. Length of body less than 60 mm; antennae not thickened at base 5
   Length of body more than 60 mm; antennae broad at base, narrowing to fine tips ..... *Brunneria borealis* Scudder page 20
5. Front tibia with an apical spine longer than the tibia ..... *Thesprotia graminis* (Scudder) page 20
   Front tibia with an apical spine shorter than the tibia ..... *Oligonicella scudderi* (Saussure) page 20

Stagmomantis carolina (Johannson)

Body length 48-57 mm. Color variable, some specimens light yellow with greenish yellow tegmina; others with dark grayish or blackish brown tegmina, a dark brown patch on apical third of tegmina. Abdomen of male slender, that of female much broader.

Alabama distribution: Calhoun[2], Clarke[2], Conecuh[2], Dallas[1,2], DeKalb[1], Lee[1,2], Pike[1,2], Talladega[2], Tallapoosa[1], and Tuscaloosa[2] counties.

Specimens examined: 3 nymphs, 3 males, 4 females UMMZ; 1 nymph, 12 males, 2 females AU.

Apparently this is the most common and widespread mantid in Alabama. It may be found in almost any type of vegetation including shrubbery around houses. It is often attracted to light, and several of the specimens in the Auburn collection were taken from light traps. This species is widely distributed over the eastern United States and probably occurs in all areas of Alabama. Like all mantid species in Alabama, this one matures rather late in the year. Dates on the specimens range from September 10 through October 19.

Tenodera aridifolia sinensis Saussure

Body length 77-104 mm; very elongate and robust. Color variable, some individuals green or greenish yellow, others chiefly brown; lateral margins of tegmina usually bright green; tegmina rather hyaline. Antennae filiform, very short. Pronotum relatively short, stout, and slightly enlarged on anterior one-third.

Alabama distribution: DeKalb[1] and Jackson[1] counties.

Specimens examined: 2 females AU.

This species is native to China and Japan and has been introduced into the United States. Apparently it has become established along the East Coast and may possibly become established in Alabama.

---

* No Alabama specimens of this species are known. However, the known distribution of the species indicates that it will be found in at least the southern edge of the State. There are two specimens in the Auburn collection from the extreme northwestern portion of Florida.

Brunneria borealis Scudder

Body length 65-100 mm; rather slender. General coloration varying from light yellow to greenish yellow. Lateral margins of pronotum serrate. The tegmina are minute pads, overlapping on caudal margins.

Alabama distribution: Calhoun[2], Chilton[1], Dallas[1], Lee[1,2], Macon[2], and Mobile[1,2,3] counties.

Specimens examined: 16 nymphs, 14 females UMMZ; 2 nymphs, 5 females AU.

In Alabama this species is found chiefly in grasses and other low vegetation. According to Hebard *(34)* it is a western form which has extended its range eastward into suitable habitats. It appears to be parthenogenetic since no males are known. Adults have been collected in Alabama from September 4 to October 15.

Oligonicella scudderi (Saussure)

Body length 26-37 mm; form slender. General coloration brownish yellow, mottled with dark brown. Tegmina and wings membranous, fully developed in male, greatly reduced in female. Antennae, legs, pronotum, and wing margins pubescent.

Alabama distribution: Tallapoosa[1] County.

Specimens examined: 26 males AU.

All of the Alabama specimens were taken from light traps. All specimens were collected in late September and October.

Thesprotia graminis (Scudder)

Body length, male 44-50 mm, female 52-56 mm; very slender and elongate. General coloration brown to brownish yellow; pronotum and legs dotted with darker brown. Antennae of male more than one-half as long as body, of female much shorter. Pronotum very long and thin, feebly dilated in region of front legs; tegmina and wings of male covering about two-thirds of abdomen, wings longer than tegmina, both absent in female. Antennae, pronotum, wing margins and abdomen pubescent.

Alabama distribution: Baldwin[1] County.

Specimens examined: 1 male AU.

The single Alabama specimen was taken by sweeping the sparse undergrowth of a forest dominated by slash pine (*Pinus elliottii*). It was collected August 11.

FAMILY PHASMIDAE — WALKING STICKS

Long, slender species, small to very large, females usually much larger than males; head nearly horizontal, usually subquadrate; antennae long; eyes small, ocelli often absent; pronotum very short; tegmina and wings (in Alabama specimens) absent; legs very long and slender; ovipositor concealed by subgenital plate; cerci unsegmented.

The Alabama species are all plant feeders and bear a close resemblance to twigs, branches, or other plant parts. Blatchley *(5)* is the best general source of information for the Alabama species. Hebard *(34)* also has additional information on most of the species that occur in Alabama as well as new state records for some species.

Key to the Species of the Family Phasmidae Known to Occur in Alabama

1. Mesothorax four or more times as long as prothorax; hind and middle tibiae not deeply emarginate beneath at apex 2
   Mesothorax not more than three times as long as prothorax; hind and middle tibiae broadly and deeply emarginate beneath at apex ..... *Anisomorpha ferruginea* (Beauvois) page 21
2. Median femur armed beneath; male cercus with apex not trifid 3
   Median femur unarmed; male cercus trifid at apex ..... *Pseudosermyle strigata* (Scudder) page 22
3. Median carina of ventral surface of middle femur armed with a single spine; male cerci not spatulate 4
   Median carina of ventral surface of middle femur armed with many spines; male cerci spatulate ..... *Megaphasma denticrus* (Stal) page 22
4. Seventh abdominal segment of abdomen distinctly longer than eighth; meso- and metanotum without a median black dorsal stripe 5
   Seventh and eighth segments of abdomen subequal in length; male with a broad blackish stripe on meso- and metanotum ..... *Diapheromera carolina* Scudder page 23
5. Cercus of male with a blunt basal tooth; cercus of female about one-half as long as last dorsal abdominal segment ..... *Diapheromera femorata* (Say) page 22
   Cercus of male with an acute and slender basal tooth; cercus of female subequal in length to last dorsal abdominal segment ..... *Diapheromera velii velii* Walsh page 22

Anisomorpha ferruginea (Beauvois)

Body length, male 30-38 mm, female 50-56 mm; form rather broad. General coloration dark brown to brownish yellow; with three longitudinal black stripes, the middle stripe usually rather faintly evident. Legs rather short, unarmed beneath. Cerci of both sexes short, stout, cylindrical, clothed with hair, those of male strongly deflexed, of female horizontal and projecting slightly past tip of abdomen.

Alabama distribution: Baldwin[1], Butler[1], Cleburne[1], Lee[1], and Madison[1] counties.

Specimens examined: 22 males, 18 females AU.

Alabama specimens were taken from low vegetation, from vegetation in a brackish marsh, and from beneath the bark of an oak tree near the top of Cheaha Mountain from June 29 through October 12.

Pseudosermyle strigata (Scudder)

Form very elongate and slender. General coloration varying from light brown to dark brown; legs of male sometimes mottled. Male cercus elongate, trifid, trifid portion about one-third of total length; female cercus straight, nearly as long as last dorsal abdominal segment.

Alabama distribution: Macon[2] and Mobile[3] counties.

Specimens examined: 1 male, 1 female UMMZ.

This species is chiefly western in distribution and is found primarily on grasses. One of the Alabama specimens was taken from the undergrowth of open pine woods in Macon County.

Megaphasma denticrus (Stal)

Body length, male 95-117 mm, female 123-150 mm; form robust. General coloration brownish yellow to dark brown, dorsal surface of pronotum and legs of male often green. Middle and hind femora in both sexes enlarged, each armed beneath with a prominent subapical spine. Cerci stout, tips of those of male spatulate, curving inward, tips meeting but not crossing, those of female very short.

Alabama distribution: Wilcox[1] County.

Specimens examined: 1 male AU.

This species inhabits the foliage of trees and shrubs. It was reported from Alabama by Blatchley *(5);* no specific location was given. The single specimen in the Auburn collection was taken June 19.

Diapheromera femorata (Say)

Body length, male 68-84 mm, female 70-104 mm; form long and slender. Coloration variable, either gray, brown, or greenish brown. Head smooth, subquadrate; antennae very slender, about as long as body. Cerci of male cylindrical, incurved, overlapping, oval at apex, with short stiff hairs; of female short, straight, stout, rather blunt, clothed with hairs.

Alabama distribution: Baldwin[1], Butler[3], Choctaw[1], Cleburne[2], Franklin[1], Houston[1], Lauderdale[1], Lee[1,2], Madison[2], Marion[1], Marshall[1], Perry[2], and Winston[1] counties.

Specimens examined: 11 nymphs, 9 males, 6 females UMMZ; 3 nymphs, 4 males, 4 females AU.

Apparently this is one of the most abundant and widespread species of walking sticks in the State. It inhabits trees and bushes and may be collected by beating suitable vegetation. Dates on the Alabama specimens range from July 16 to October 26.

Diapheromera velii velii Walsh

Differs from *D. femorata* chiefly in the form of the cerci as described in the key.

Alabama distribution: Autauga[1] and Lowndes[1] counties.

Specimens examined: 2 females AU.

This is a grassland species chiefly of western distribution. It is found in tall grasses rather than shrubs or trees. Both of the Alabama specimens

were taken from the undergrowth along the edge of open woods. Dates on the specimens are July 2 and July 17.

Diapheromera carolina Scudder

Body length, male 67-85 mm. General coloration light brownish yellow, legs greenish yellow, pronotum with a narrow dark median stripe, meso- and metanotum with much broader median stripe. Cercus of male strongly incurved, tips broad, compressed, subspatulate. No females have ever been collected.

Alabama distribution: Cleburne[1] County.

Specimens examined: 2 males AU.

The two specimens in the Auburn collection apparently represent about one-half of all the known specimens of this species. The species was originally described from a single male from North Carolina. Blatchley *(5)* noted one other specimen from North Carolina. One of the Auburn specimens has no locality data. The other was collected by the senior author from a wooden sign near the top of Cheaha Mountain on July 29. Both the Auburn specimens are much larger than the other known specimens and may represent atypical populations or a southern subspecies.

FAMILY TRIDACTYLIDAE — PYGMY MOLE CRICKETS

Small insects, body smooth, shining; ocelli very small, antennae 11-segmented; front legs enlarged, fitted for digging; hind legs strongly saltatorial, the hind tibia with 1 or 4 pairs of flattened plates used for swimming; front and middle tarsi with 2 segments, hind tarsi 1-segmented or tarsi absent; cercus slender, tapering, 2-jointed; ovipositior (in our species) not visible externally.

These tiny forms usually burrow in wet sandy soil. They are very good leapers and can also swim quite well. The two Alabama species are discussed and illustrated by Hebard *(29)*.

Key to the Species of the Family Tridactylidae Known to Occur in Alabama

1. Hind tibia with four pairs of swimming plates, hind tarsus one-jointed; pronotum with a weak transverse sulcus; length of body usually more than 5.5 mm ..... *Tridactylus apicalis* Say page 23
   Hind tibia with one pair of swimming plates, hind tarsus absent; pronotum without a transverse sulcus; length of body usually less than 5.5 mm ..... *Tridactylus minuta* Scudder page 24

Tridactylus apicalis Say

Body length 6-9.5 mm. General coloration black or dark brown with yellow markings on tegmina. Tegmina usually reaching to about middle of hind femora, tips broadly rounded; wings slightly surpassing tip of abdomen.

Alabama distribution: Covington[1] and Houston[1] counties.
Specimens examined: 4 adults AU.
The two Covington County specimens were taken from a large sand bar on the edge of a small creek. The Houston County specimens were taken from a sandy road near the edge of a large lake in Chattahoochee State Park. Since this species is widely distributed throughout the United States, it probably occurs throughout Alabama in suitable habitats. Dates on the specimens range from May 23 to June 22.

Tridactylus minutus Scudder

Body length 4-5 mm. General coloration blackish brown, mottled with paler spots and bars. Tegmina short, usually covering less than one-half the abdomen; wings variable, ranging from just longer than abdomen to almost twice as long.
Alabama distribution: Barbour[1], Covington[1], Lee[1], and Macon[1] counties.
Specimens examined: 7 nymphs, 43 adults AU.
This species is common in suitable habitats in the State. Dates on the Alabama specimens range from April 2 to October 10.

FAMILY TETRIGIDAE — GROUSE LOCUSTS

Species of small size, with a marked caudal production of the pronotum (usually covering most of dorsal surface of abdomen); prosternum developed into a chin piece which encircles the caudal portion of the mouth parts; tegmina reduced to small pads or absent, wings usually fully developed, often surpassing tip of abdomen; front and middle tarsi 2-jointed, hind tarsi 3-jointed; cerci unsegmented; male supra-anal plate triangular, subgenital plate conical or triangular; female ovipositor with margins serrate.

Grouse locusts are common throughout Alabama. Their small size and dull coloration make them hard to detect in their natural surroundings. Most of our species are associated with moist environments, but some of them may be found in rather dry situations. Apparently they overwinter as adults and are thus the first adult orthopterans present in the spring. Rehn and Grant *(60)* summarized all of the previously published information about this family in North America.

Key to the Species of the Family Tetrigidae Known to Occur in Alabama

1. Anterior and median femora lacking longitudinal sulcations on dorsal surfaces; antenna with 12-14 segments 2
   Anterior and median femora with longitudinal sulcations on dorsal surfaces; antenna with 20-22 segments 8

2. Fastigium produced in front of eyes, wider than eye as seen from above (Figs. 9, 11, and 12) 4
   Fastigium barely, if at all, produced in front of eyes, narrower than eye as seen from above (Fig. 10) 3

3. Frontal costa in profile decidedly convex between antennae (Fig. 6); median carina of pronotum obsolete or subobsolete just behind cephalic margin; lateral lobes of pronotum with dorsal lobe of caudal margin subrectangular; macropronotal only ..... *Paratettix cucullatus* (Burmeister) page 27
   Frontal costa in profile not markedly convex between antennae (Fig. 7); median carina distinct to cephalic margin; lateral lobes with dorsal lobe more broadly rounded; macropronotal or brachypronotal ..... *Paratettix mexicanus* (Saussure) page 27

4. Head with only a poorly developed interocular emargination of the facial outline as seen in profile (Fig. 8); cephalic margin of pronotum, at most, but weakly subangulately produced cephalad 5
   Head with a decided interocular emargination; pronotum with cephalic margin angulately produced over the occiput ..... *Nomotettix cristatus compressus* Morse page 26

5. Frontal costa with its lateral carinae distinctly divergent ventrad; fastigo-facial angle, in profile, distinctly and broadly arcuate 6
   Frontal costa with its lateral carinae but slightly divergent, fastigo-facial angle, in profile, angulate or subrotundate (Fig. 8) 7

6. Caudal margin of lateral lobes of pronotum bisinuate; tegmina not covered by pronotum; dorsal cephalic margin of pronotum truncate; median carina not strongly arcuate or sublamellate ..... *Neotettix femoratus* (Scudder) page 27
   Caudal margin of lateral lobes of pronotum usually unisinuate or slightly bisinuate; tegmina usually concealed beneath pronotum; dorsal cephalic margin of pronotum obtuse angulate; median carina elevated and arcuate ..... *Neotettix proavus* Rehn and Hebard page 27

7. Fastigium of vertex subarcuate or arcuate in outline; pronotum arcuate or subarcuate ..... *Tetrix ornata ornata* Say page 26
   Fastigium of vertex truncate in outline (Fig. 9); pronotum not arcuate ..... *Tetrix arenosa angusta* (Hancock) page 26

8. Body moderately inflated, more attenuate, less definitely fusiform; dorsal pronotal outline less regularly arcuate and relatively low, its elevation evident only in cephalic one-third or one-fourth; cephalic margin of disk occasionally with a median spine; macropronotal or brachypronotal 9
   Body swollen, distinctly inflated, more fusiform; dorsal pronotal outline strongly and more regularly arcuate, especially in the cephalic one-half; cephalic margin of disk lacking a median spine; brachypronotal only ..... *Paxilla obesa* (Scudder) page 29

9. Tegmina visible; lateral lobe of pronotum with a distinct tegminal sinus 10
   Without visible tegmina; lateral lobe or pronotum without a distinct tegminal sinus ..... *Tettigidea empedonepia* Hubbell page 28

10. Cephalic margin of pronotum with a spinelike projection (Fig. 13)....11
Cephalic margin of pronotum arcuate or obtuse angulate, lacking a spinelike projection....12
11. Median carina of pronotum less cristate, more evenly arcuate, and usually without an emargination over the area of the tegmina; surface of body shining....*Tettigidea acuta* Morse page 29
Median carina of pronotum more distinctly cristate, imperfectly arcuate and usually with an emargination over tegmina; surface of body usually not shining....*Tettigidea armata* Morse page 28
12. Head as seen from above narrowing to the median carina of the fastigium....*Tettigidea prorsa* Scudder page 29
Head as seen from above not narrowing to the median carina of the fastigium....*Tettigidea lateralis lateralis* (Say) page 28

Nomotettix cristatus compressus Morse

Body length 7.5-10 mm. General coloration dark brown with various markings and patterns. Pronotum with median carina strongly arcuate in profile, tegminal sinus obsolete, tegmina covered by pronotum; hind femora robust, only slightly surpassing apex of abdomen. Macro- or brachypronotal.

Alabama distribution: Cleburne[1], DeKalb[3], Escambia[3], Houston[3], Monroe[1], and Winston[1] counties.

Specimens examined: 3 males, 6 females AU.

This species is found in drier habitats than most of the other members of the family in the State. It occurs in old fields, woodland borders, and cut-over timberland. Dates on the Alabama specimens range from April 20 to August 18.

Tetrix ornata ornata Say

Body length 6.5-10 mm. General coloration gray to dark brown with various markings. Fastigium protruding only slightly in front of eyes. Macro- or brachypronotal.

Alabama distribution: DeKalb[2,3] County.

Specimens examined: 3 males UMMZ.

According to Rehn and Grant *(60)* this species prefers moist, grassy habitats, but it may be found in a variety of other situations ranging from dry woodlands to bare rocks. The three Alabama specimens were collected on July 11.

Tetrix arenosa angusta (Hancock)

Body length 7-10.5 mm. General coloration grayish to dark brown with lighter markings. Facial outline distinctly sinuate; fastigium protruding only slightly in front of eyes (Figs. 8 and 9). Chiefly macropronotal but a small number of brachypronotal forms also occur.

Alabama distribution: Baldwin[1], Conecuh[1], Dallas[1], DeKalb[2,3], Escambia[3], Houston[1], Lee[1], Macon[1], Madison[1], Mobile[2,3], and Tuscaloosa[2,3] counties.

Specimens examined: 2 males, 1 female UMMZ; 14 males, 14 females AU.

This species occurs chiefly in moist areas around lakes, ponds, and streams. Dates on adults from Alabama range from March 22 to August 17.

Neotettix femoratus (Scudder)

Body length 6-10.5 mm. General coloration brown or gray with various markings. Vertex only slightly wider than eye in male, about 1½ times as wide in female (Fig. 11); its front margin feebly rounded. Macro- and brachypronotal.

Alabama distribution: Baldwin[2,3], Bibb[3], Butler[2,3], Calhoun[3], Colbert[3], Conecuh[3], Dallas[3], DeKalb[3], Escambia[2,3], Houston[3], Jefferson[3], Lee[1,3], Limestone[1], Lowndes[1], Macon[1], Mobile[3], Pickens[3], St. Clair[3], and Tuscaloosa[3] counties.

Specimens examined: 2 nymphs, 4 males, 5 females UMMZ; 1 nymph, 5 males, 2 females AU.

This species occurs in a wide variety of habitats ranging from wet swampy areas to relatively dry areas in open hardwood or pine forests. Adults have been collected in Alabama from May 8 to August 1.

Neotettix proavus Rehn and Hebard

Body length 7.5-10.5 mm. General coloration brownish or grayish and usually marked with black. Vertex about twice as wide as eye (Fig. 12), its front margin broadly rounded. Usually brachypronotal.

Alabama distribution: Butler[3], Clarke[2,3], Conecuh[3], Covington[1], Houston[1], Lee[1], and Winston[1] counties.

Specimens examined: 1 male UMMZ; 3 nymphs, 3 males, 3 females AU.

This species is found chiefly in the leaf litter of open deciduous forests. It has also been taken in Alabama along the margins of lakes and streams. Dates on the specimens range from May 23 to August 17.

Paratettix cucullatus (Burmeister)

Body length 7-11 mm. General coloration variable but usually rather light gray or gray brown. Middle femur distinctly lobed on ventral margin. Vertex only slightly narrower than eye, reaching nearly to front border of eye.

Alabama distribution: Butler[3], Cleburne[2,3], Colbert[1], Conecuh[3], Dallas[3], Escambia[3], Jefferson[2,3], Lauderdale[3], Lee[1,3], Limestone[3], Macon[1], Marshall[1], and Tuscaloosa[2,3] counties.

Specimens examined: 2 males, 3 females UMMZ; 1 nymph, 34 males, 29 females AU.

This species is found chiefly around the margins of lakes and ponds and on the banks of streams. It is seldom encountered in drier situations. Dates on the Alabama specimens range from April 2 to September 9.

Paratettix mexicanus (Saussure)

Body length 6.5-12.5 mm. Very similar in form and coloration to *P. cucullatus*, differing chiefly in the less convex frontal costa and the more

broadly rounded dorso-lateral lobe of the pronotum as described in the key to species.

Alabama distribution: Baldwin[2,3], Barbour[1], Butler[3], Conecuh[3], Dallas[3], Henry[1], Houston[1], Lee[1,2,3], and Mobile[2,3] counties.

Specimens examined: 8 nymphs, 23 males, 20 females UMMZ; 2 nymphs, 6 males, 11 females AU.

This species occurs in habitats similar to those of *P. cucullatus*. Dates on the Alabama specimens range from March 20 to August 28.

Tettigidea lateralis lateralis (Say)

Body length 8-13 mm. Coloration very variable, ranging from solid black, brown, or gray to dark individuals with light pronotum and legs. Macropronotal forms are more common in Alabama but brachypronotal forms do occur.

Alabama distribution: Baldwin[1,2,3], Barbour[1], Butler[3], Calhoun[2,3], Choctaw[1], Clarke[2], Cleburne[1,2,3], Colbert[3], Conecuh[1,2,3], Covington[1], Dallas[1,3], DeKalb[1,2,3] Escambia[2,3], Greene[3], Henry[1], Houston[1,2,3], Jefferson[2,3], Lee[1,2,3], Limestone[1,3], Lowndes[1], Macon[1], Marion[1], Marshall[1], Mobile[2,3], Monroe[1,2,3], Montgomery[1], Pike[1], St. Clair[1], Tuscaloosa[2,3], and Wilcox[1] counties.

Specimens examined: 13 nymphs, 31 males, 18 females UMMZ; 2 nymphs, 41 males, 45 females AU.

This is probably the most abundant and widespread species of grouse locust found in Alabama. It is found in a wide variety of habitats ranging from rather dry woodlands to very wet situations. Adults have been taken in Alabama from March 22 to November 17.

Tettigidea empedonepia Hubbell

Body length 8.5-12 mm. General coloration yellowish, reddish, or grayish brown, face and ventral margins of pronotal lobes in male lighter than rest of body. Median carina of pronotum moderately elevated, broadly arcuate in prozonal region, slightly sinuate above humeri, and nearly straight caudad. Brachypronotal only.

Alabama distribution: Winston[1] County.

Specimens examined: 6 males, 16 females AU.

The 22 specimens listed above are the only specimens of this species collected outside the type locality (Liberty County, Florida). They were taken from the undergrowth of an open oak-hickory woods on June 26-27.

Tettigidea armata Morse

Body length 9.5-14.5 mm. General coloration ranging from brown to dark blackish brown; tegmina with a white spot on apical one-third; hind femora more or less mottled with white. Macro- or brachypronotal.

Alabama distribution: Dallas[1], Escambia[3], Macon[1], and Montgomery[3] counties.

Specimens examined: 3 males AU.

This species is usually found in wet habitats. Two of the Auburn University specimens were taken from muck and debris in a cypress swamp near Selma. Dates on the specimens range from March 30 to July 17.

Tettigidea acuta Morse

Body length 9.5-14.5 mm. Very similar in appearance to *T. armata*, differing chiefly in the characters mentioned in the key to species.

Alabama distribution: Dallas[1] and Mobile[3] counties.

Specimens examined: 1 female AU.

This species is found in both fresh and salt water marshes and swamps. It occurs along the Atlantic and Gulf Coasts from New York to Louisiana.

Tettigidea prorsa Scudder

Body length 8-12 mm. General coloration light tan or brown, marked with dark brown on lobes of pronotum and legs. Differs from other members of genus chiefly in the acuminate nature of the head as described in the key. Usually brachypronotal.

Alabama distribution: Houston[3] County.

Specimens examined: None.

According to Rehn and Grant *(60)*, this species is found chiefly in low, wet, or boggy areas and wet meadows in pine woods. They also state that in Florida adults have been taken every month of the year.

Paxilla obesa (Scudder)

Body length 9.5-14.5 mm. General coloration dark brown, often with small patches of lighter brown.

Alabama distribution: Houston[3] and Mobile[3] counties.

Specimens examined: None.

According to Rehn and Grant *(60)*, this species is commonly found in wet areas in pine woods and a variety of other wet situations.

FAMILY ACRIDIDAE — SHORT-HORNED GRASSHOPPERS

Species varying in size from small to very large; antennae shorter than body; hind femora enlarged, usually modified for leaping, tarsi 3-jointed; tympana on first abdominal segment; cercus a single segment; ovipositor composed of 4 sclerotized valves.

This is the largest family of Orthoptera in Alabama. The species in this family can be found in almost any terrestrial habitat in the State. The more common species may occur in a variety of habitats, but most of the species in the State are restricted to a specific ecological niche primarily determined by vegetation and moisture. For example, *Melanoplus sanguinipes vulturnus* Gurney and Brooks occurs in many habitats including cultivated fields, pastures, roadsides, forest undergrowth, and grasslands. It is distributed over the entire State. In contrast *Metaleptea brevicornis*

brevicornis (Johannson) and *Leptysma marginicollis* (Serville) also occur throughout the State but only in the vegetation growing in very wet areas such as pond margins or ditches. Others like *Dendrotettix australis* (Morse) and *Melanoplus punctulatus arboreus* (Scudder) usually inhabit pine trees. Most of the "short-winged" species of the genus *Melanoplus* are found only in the undergrowth of woods. Many other examples of this ecological restriction of distribution are discussed in the notes following the descriptions of the species.

A few species in this family are considered of economic importance. In Alabama most of these are usually not abundant enough to cause serious damage. The Alabama species which are usually considered to be of economic importance are *Romalea microptera* (Beauvois), *Schistocerca americana americana* (Drury), *Melanoplus differentialis differentialis* (Thomas), *Melanoplus bivittatus* (Say), *Melanoplus sanguinipes vulturnus* Gurney and Brooks, and *Melanoplus femurrubrum* (DeGeer). All of these species except *M. bivittatus* occur throughout most of the State. *Melanoplus bivittatus* has not been collected from the Coastal Plains area.

Blatchley *(5)* is probably the best single reference for all the Alabama species, but there are many recent papers dealing with special groups. These other works will be mentioned with the discussions of the various species involved.

Key to the Species of the Family Acrididae Known to Occur in Alabama

1. Prosternum with a spine between the front coxae 29
   Prosternum without a spine between the coxae; however, a low broad tubercle is present in the genus *Mermiria* (Subfamily Acridinae) 2
2. Hind wings colored 14
   Hind wings hyaline 3
3. Antennae ensiform, strongly depressed at base (Fig. 16) 4
   Antennae filiform, sometimes slightly depressed at base or apex 7
4. Head not longer than pronotum; apex of hind femur with dorsal angle rounded (Fig. 15); wings fully developed 5
   Head longer than pronotum; apex of hind femur with dorsal angle strongly produced (Fig. 14); tegmina much shorter than abdomen ..... *Radinotatum carinatum carinatum* (Walker) page 39
5. Prosternum with a low tubercle between the front coxae 6
   Prosternum without a tubercle between the front coxae ..... *Metaleptea brevicornis brevicornis* (Johannson) page 39

6. Lateral carinae of pronotum present; head of female as long as pronotum; subgenital plate of male strongly produced and acuminate ..... *Mermiria picta* (Walker) page 39
Lateral carinae of pronotum absent; head of female shorter than pronotum; subgenital plate of male rather short, blunt at tip ..... *Mermiria bivittata* (Serville) page 40

7. Disk of vertex with a median carina 8
Disk of vertex without a median carina 10

8. Hind tibia armed on outer margin with less than 18 spines 9
Hind tibia armed on outer margin with 18 or more spines ..... *Syrbula admirabilis* (Uhler) page 40

9. Disk of pronotum with lateral carinae converging slightly near middle; antenna flattened at apex ..... *Eritettix simplex simplex* (Scudder) page 40
Disk of pronotum with lateral carinae straight throughout or diverging slightly on metazona; antenna not flattened at apex ..... *Amblytropidia occidentalis* (Saussure) page 40

10. Lateral carinae of pronotum parallel or, if slightly diverging, with prozona longer than metazona 13
Lateral carinae of pronotum diverging on metazona 11

11. Dorsal depression of fastigium usually well developed; tegmina of male usually with well developed spurious vein; tegmina of female with anterior ulna vein straight or curving only slightly 12
Dorsal depression of fastigium little developed; spurious vein in ulna area of tegmina of male usually absent; tegmina of female with anterior ulna vein usually relatively short and with lateral carinae little incurved ..... *Orphulella speciosa* (Scudder) page 41

12. Prozona subequal in length to metazona; aedeagus with distinct anterior lip (Fig. 17) ..... *Orphulella pelidna pelidna* (Burmeister) page 41
Prozona longer than metazona; aedeagus without an anterior lip (Fig. 18) ..... *Orphulella olivacea olivacea* (Morse) page 42

13. Lateral carinae of pronotum parallel throughout; lateral lobes of pronotum forming a right angle with the dorsal surface ..... *Dichromorpha viridis* (Scudder) page 42
Lateral carinae of pronotum usually diverging very slightly on metazona; junction between lateral lobes and dorsal surface of pronotum rounded ..... *Clinocephalus elegans* Morse page 42

14. Median carina of pronotum cut by two sulci (Figs. 27-29) 26
Median carina of pronotum entire or cut by only one transverse sulcus (Figs. 19-26) 15

15. Median carina or pronotum raised in a distinct crest which is usually entire, occasionally feebly cut by the principal sulcus (Figs. 20 and 21) 16
Median carina less prominent, always distinctly cut by one sulcus (Figs. 22-26) 18

16. Frontal costa with sides subparallel, only slightly narrowed above antennae 17
Frontal costa distinctly narrowed above antennae, almost meeting at junction with vertex ..... *Arphia sulphurea* (Fabricius) page 43

17. Pronotum with median carina high, arched, strongly cristate (Fig. 21); hind tibia usually dark brown or black except for pale basal ring ..... *Arphia xanthoptera* (Burmeister) page 43
Pronotum with median carina low, not or very slightly arched; hind tibia pale with a fuscous ring at basal one-third and another near apex ..... *Arphia granulata* Saussure page 43

18. Hind wings pale yellow at base, not marked with black 19
Hind wings either black at base or with a distinct black border 20

19. Disk of vertex of male almost as broad as long, of female, slightly broader than long; median dorsal surface of hind femur usually with two dark brown bars ..... *Chortophaga australior* Rehn and Hebard page 44
Disk of vertex of male distinctly longer than broad, of female, width subequal to length; hind femur usually without distinct dark brown bars on median dorsal surface, if bars are present, they are usually pale brown or indistinct ..... *Chortophaga viridifasciata* (DeGeer) page 43

20. Hind wings black at base with a yellow border ..... *Dissosteira carolina* (Linnaeus) page 45
Hind wings not black at base 21

21. Pronotum usually smooth, without tubercles and ridges; principal sulcus distinct on lateral lobes; tegmina with dark markings usually not forming distinct spots 23
Pronotum with disk containing many tubercles and ridges; principal sulcus only faintly indicated on lateral lobes; tegmina with a number of dark spots 22

22. Inner face of hind femora banded with black, dark blue at base; hind wings usually bright reddish orange at base (occasionally yellow) ..... *Pardalophora phoenicoptera* (Burmeister) page 44
Inner face of hind femora not banded with black, not blue at base; hind wings usually bright yellow at base ..... *Hippiscus ocelote* Saussure page 44

23. Median carina of pronotum arched on metazona (Figs. 25 and 26) 25
Median carina of pronotum not arched on metazona 24

24. Hind tibia with both a pale and a fuscous ring near base ..... *Scirtetica marmorata marmorata* (Harris) page 46
Hind tibia without a fuscous ring and with pale ring poorly defined ..... *Scirtetica marmorata picta* (Scudder) page 46

25. Hind tibia with a distinct black ring on basal one-third ..... *Spharagemon bolli bolli* Scudder page 45
Hind tibia almost entirely red, without a basal black ring ..... *Spharagemon collare* (Scudder) page 45

26. Antenna filiform; base of hind wings yellow 27
Antenna subensiform, base of hind wings orange, red, or yellow ..... *Psinidia fenestralis fenestralis* (Serville) page 46

27. Prozona ascending to the elevated occiput, subequal to metazona ..... *Trachyrhachis kiowa fuscifrons* (Stal) page 46
Prozona not ascending, occiput not elevated; metazona distinctly longer than prozona 28

28. Hind tibia in great part red ..... *Trimerotropis citrina* Scudder page 47
Hind tibia greenish yellow tinged with fuscous ..... *Trimerotropis saxatilis* McNeill page 47

29. Hind tibia without an apical spine on the outside; hind wings hyaline (Subfamily Cyrtacanthacridinae) 30
Hind tibia with an apical spine on both inside and outside; hind wings bright red (Subfamily Romaleinae) ..... *Romalea microptera* (Beauvois) page 47

30. Face strongly oblique 31
Face vertical or nearly so 33

31. Fastigium of vertex strongly produced in front of eyes 32
Fastigium of vertex extending only slightly beyond eyes ..... *Aptenopedes sphenarioides appalachee* Hebard page 61

32. Head as long as or longer than pronotum; fastigium with a deep median groove ..... *Leptysma marginicollis* (Serville) page 48
Head shorter than pronotum; fastigium without a median groove ..... *Stenacris vitreipennis vitreipennis* Walker page 48

33. Lobes of mesosternum as wide as or wider than long, their inner margins usually rounded 39
Lobes of mesosternum longer than wide, their inner margins straight 34

34. Tegmina with large, distinct, isolated, reddish-brown spots; cercus of male feebly but distinctly tapering from base to apex (Fig. 30) ..... *Schistocerca americana americana* (Drury) page 49
Tegmina without large distinct spots; cercus of male not distinctly tapering although apex may be narrower than base (Figs. 31-33) 35

35. Head, pronotum, and tegmina with a broad, pale, median dorsal stripe 38
Head, pronotum, and tegmina usually without a broad, pale, median dorsal stripe (if present, very narrow) 36

36. Notch of subgenital plate of male V-shaped, deeper than wide; cercus of male not distinctly notched at apex; antennae of female not exceeding length of head and pronotum 37
Notch of subgenital plate of male U-shaped, almost as wide as deep; cercus of male with a shallow, but distinct, notch at apex; antennae exceeding length of head and pronotum in both sexes ..... *Schistocerca rubiginosa* (Scudder) page 50

37. Form short, stocky; tegmina just reaching (female) or barely surpassing (male) tips of hind femora; tegmina usually immaculate ..... *Schistocerca damnifica damnifica* (Saussure) page 48
Form longer, more slender, tegmina distinctly surpassing tips of hind femora in both sexes; tegmina of female usually with numerous small indistinct fuscous spots ..... *Schistocerca damnifica calidior* Rehn and Hebard page 49

38. Notch of subgenital plate of male U-shaped, cercus of male with a shallow, but distinct, notch at apex; size smaller, length of body of male usually less than 32 mm, length of body of female usually less than 50 mm ..... *Schistocerca alutacea* (Harris) page 49
Notch of subgenital plate of male V-shaped, cercus of male not dis-

tinctly notched; size larger, length of body of male usually more than 32 mm, length of body of female usually more than 50 mm ..... *Schistocerca obscura* (Fabricius) page 50

39. Tegmina present 40
Tegmina and wings absent ..... *Gymnoscirtetes morsei* Hebard page 50

40. Interspace between the mesosternal lobes distinctly longer than broad in male, generally quadrate in females 41
Interspace between the mesosternal lobes in both sexes much wider than long ..... *Dendrotettix australis* (Morse) page 60

41. Dorsal surface of pronotum twice as long as average width 42
Dorsal surface of pronotum not twice as long as average width 43

42. Furcula of male broad, flat, contiguous; postocular dark stripe usually terminating at posterior sulcus of pronotum ..... *Paroxya atlantica atlantica* Scudder page 60
Furcula of male finger-like processes, not flattened, sitting upon the tenth tergite; postocular dark stripe extending to hind margin of pronotum ..... *Paroxya hoosieri* (Blatchley) page 61

43. Vertex between the eyes subequal in width to second antennal joint; purple stripes present on pronotum and tegmina 44
Vertex between the eyes wider than second antennal joint; no purple markings present on pronotum and tegmina 45

44. Tegmina not surpassing tip of abdomen ..... *Hesperotettix viridis brevipennis* (Thomas) page 51
Tegmina surpassing tip of abdomen ..... *Hesperotettix gemmicula* Hebard page 51

45. Pronotum tectiform ..... *Eotettix pusillus* Morse page 51
Pronotum not tectiform 46

46. Body thickly pubescent; side margins of subgenital plate of male straight throughout (Fig. 68); female usually solid olive green ..... *Campylacantha olivacea olivacea* (Scudder) page 50
Body not thickly pubescent; side margin of subgenital plate of male elevated near base (Fig. 69); female never solid olive green 47

47. Males 48
Females 75

48. Tegmina as long as or longer than abdomen 67
Tegmina distinctly shorter than abdomen 49

49. Hind tibia wholly or in part red 61
Hind tibia green, yellow, glaucous, never red 50

50. Prosternal spine conical, apex tapering 51
Prosternal spine broad, flat, very prominent, apex blunt ..... *Melanoplus strumosus* Morse page 55

51. Postocular dark stripe extending entire length of pronotum 53
Postocular dark stripe terminating at metazona on pronotum 52

52. Furcula about one-fifth length of supra-anal plate, narrowly separated at base; supra-anal plate long and narrow ..... *Melanoplus hebardi* (Rehn) page 52
Furcula about one-third the length of supra-anal plate, attingent at base; supra-anal plate shorter and broader ..... *Melanoplus cantralli* Dakin page 53

53. Tegmina narrow oblong pads, their caudal margins widely separated ..... *Melanoplus gracilis* (Bruner) page 51
Tegmina not narrow oblong pads, their caudal margins attingent or overlapping 54
54. Tegmina broadly overlapping along caudal margin; front and median legs bright yellow green in life, sometimes fading to light brown in pinned specimens 55
Tegmina at most only slightly overlapping; front and median legs not yellow green 56
55. Lower apical angle of cercus prolonged into a minute acute tooth; tegmina covering at least one-half of the abdomen ..... *Melanoplus hubbelli* Hebard page 52
Lower apical angle of cercus not prolonged into a minute acute tooth (Fig. 36); tegmina covering less than one-half of abdomen ..... *Melanoplus similis* Morse page 52
56. Subgenital plate without a prominent apical tubercle 57
Subgenital plate with a very prominent apical tubercle ..... *Melanoplus decoratus* Morse page 54
57. Lower apical angle of cercus prolonged 58
Lower apical angle of cercus not prolonged ..... *Melanoplus tepidus* Morse page 53
58. Furcula at least twice as long as average width 60
Furcula not twice as long as average width 59
59. Furcula short pointed projections about as long as segment to which attached ..... *Melanoplus delaware* Hebard page 54
Furcula minute rounded projections, shorter than segment to which attached ..... *Melanoplus primestivus* Dakin page 53
60. Furcula less than one-fourth the length of the supra-anal plate, very slender ..... *Melanoplus tribulus* Morse page 54
Furcula about one-third the length of the supra-anal plate, much wider ..... *Melanoplus tribuloides* Morse page 54
61. Outer face of hind femur with two black patches 63
Outer face of hind femur without two well defined black patches 62
62. Cercus subfalcate, broad flat (Fig. 55) ..... *Melanoplus scudderi scudderi* (Uhler) page 55
Cercus triangular (Fig. 63) ..... *Melanoplus carnegiei* Morse page 55
63. Cercus bent mesad and ventrad so that apex lies parallel with supra-anal plate 66
Cercus bent only mesad, apex perpendicular to supra-anal plate 64
64. Cercus roughly boot-shaped, upper angle of apex expanded to form the "toe" of the boot (Fig. 50) 65
Cercus not boot-shaped, apex broadly rounded, upper angle only slightly expanded (Fig. 38) ..... *Melanoplus querneus* Rehn and Hebard page 56
65. Lower angle of apex of cercus forming roughly a right angle (Fig. 50) ..... *Melanoplus alabamae* Hebard page 56
Lower angle of apex of cercus rounded, obtuse, not forming a right angle ..... *Melanoplus tunicae* Hebard page 57
66. Furcula longer than segment to which attached ..... *Melanoplus walshi* Scudder page 57

Furcula minute, shorter than segment to which attached ..... *Melanoplus nigrescens* (Scudder) page 56

67. Cercus forked (Figs. 42 and 53) 68
Cercus not forked 69

68. Upper fork of cercus distinctly bent mesad (Fig. 53) ..... *Melanoplus keeleri keeleri* (Thomas) page 60
Upper fork of cercus not or only slightly bent mesad ..... *Melanoplus differentialis differentialis* (Thomas) page 57

69. Cercus with upper angle greatly expanded making apex much wider than base (Fig. 41) 70
Cercus with upper angle slightly or not at all expended, apex narrower or subequal to base 71

70. A pale lateral stripe extending from eye along lateral margins of pronotum and edge of tegmina; furcula small but present ..... *Melanoplus bivittatus* (Say) page 57
No pale stripes on pronotum and tegmina; furcula absent ..... *Melanoplus punctulatus arboreus* (Scudder) page 58

71. Apical hind margin of subgenital plate distinctly and narrowly notched at tip (Fig. 70); mesosternum with a distinct tubercle in front of lobes; cercus short, of nearly equal width throughout (Fig. 66) ..... *Melanoplus sanguinipes vulturnus* Gurney and Brooks page 59
Apical hind margin of subgenital plate not notched (Fig. 71); mesosternum without a tubercle, cercus usually at least slightly narrowed (Figs. 47, 48, 54, and 67) 72

72. Cercus distinctly bent mesad ..... *Melanoplus bispinosus* Scudder page 60
Cercus straight, not bent mesad 73

73. Furcula large, one-half, or more, as long as supra-anal plate 74
Furcula smaller, less than one-fourth the length of the supra-anal plate ..... *Melanoplus impudicus* Scudder page 59

74. Furcula not over one-half length of supra-anal plate; upper angle of tip of cercus slightly expanded (Fig. 47) ..... *Melanoplus femurrubrum femurrubrum* (DeGeer) page 58
Furcula surpassing middle of supra-anal plate; tip of cercus broadly rounded (Fig. 48) ..... *Melanoplus femurrubrum propinquus* Scudder page 59

75. Tegmina reduced, covering less than four-fifths of the abdomen 76
Tegmina not reduced, covering at least four-fifths of the abdomen 90

76. Hind tibia red or tinged with red 88
Hind tibia never red 77

77. Prosternal spine prominent, flattened, slightly curved caudad, apex almost as broad as base; postocular dark stripe indistinct ..... *Melanoplus strumosus* Morse page 55
Prosternal spine less prominent, not flattened, apex not as broad as base; postocular dark stripe distinct 78

78. Tegmina narrow oblong pads, widely separated ..... *Melanoplus gracilis* (Bruner) page 51
Tegmina not narrow oblong pads, caudal margins overlapping, attingent, or narrowly separated 79

79. Front legs and hind tibia usually bright green or greenish yellow, sometimes fading to light brown in pinned specimens; tegmina usually longer and more broadly overlapping 80
Front legs and hind tibia not usually bright green or greenish yellow; tegmina usually short pads that are contiguous or slightly separated 81

80. Tegmina distinctly longer than pronotum ..... *Melanoplus hubbelli* Hebard page 52
Tegmina only slightly longer than pronotum ..... *Melanoplus similis* Morse page 52

81. Tegmina distinctly shorter than pronotum; tip of prosternal spine usually subacute; postocular dark stripe usually extending to hind margin of pronotum, sometimes fading just after passing last sulcus 83
Tegmina subequal to length of pronotum; prosternal spine longer, tip broadly rounded; postocular dark stripe not extending onto metazona 82

82. Hind margin of pronotum shallowly but distinctly notched; postocular dark stripe entire; tips of tegmina broadly rounded ..... *Melanoplus hebardi* (Rehn) page 52
Hind margin of pronotum without notch; postocular dark stripe interrupted by a light streak beginning ventrad to eye, extending diagonally across dark stripe and terminating at lateral margin of pronotum; tips of tegmina subtruncate ..... *Melanoplus cantralli* Dakin page 53

83. Postocular dark stripe well defined, continuing to hind margin of pronotum, not fading on metazona; median carina on prozona of pronotum indistinct, lower than on metazona 84
Postocular dark stripe not as well defined, usually fading completely before reaching hind margin of pronotum; median carina on prozona of pronotum more distinct, about as high as on metazona 86

84. Postocular dark stripe sharply defined, broad, covering more than one-half of lateral lobe, dark, shining; dark stripe usually present between ocellus and antenna; valves of ovipositor long, deep ..... *Melanoplus tepidus* Morse page 53
Postocular dark stripe not sharply defined, covering only one-half or less of lateral lobes; dark stripe usually absent between ocellus and antenna, valves of ovipositor short, less deep 85

85. A dark stripe extending along each side of abdomen for two-thirds or more of its length ..... *Melanoplus decoratus* Morse page 54
Abdomen without a dark stripe extending for two-thirds of its length but with small, widely separated dark spots ..... *Melanoplus primestivus* Dakin page 53

86. Size smaller, vertex less strongly projecting in front of eyes; ovipositor valves more shallow; postocular dark stripe usually more sharply defined 87
Larger, heavier in size; vertex more strongly projecting in front of eyes; ovipositor valves deeper; postocular dark stripe less well defined ..... *Melanoplus tribulus* Morse page 54

87. Prosternal spine broad at base, greatly tapering to a sharp point at tip; lateral lobes of pronotum shorter ..... *Melanoplus delaware* Hebard page 54

Prosternal spine not as broad at base, less tapering, tip not sharply pointed; lateral lobes of pronotum deeper ..... *Melanoplus tribuloides* Morse page 54

88. Median carina of pronotum low but distinct throughout 89
Median carina distinct only on metazona ..... *Melanoplus querneus* group (no suitable characters are known at present to differentiate females of *M. nigrescens, M. walshi, M. tunicae, M. querneus,* and *M. alabamae*).

89. Tegmina as long as or longer than pronotum, their tips subacuminate ..... *Melanoplus scudderi scudderi* (Uhler) page 55
Tegmina shorter than pronotum, tips rounded ..... *Melanoplus carnegiei* Morse page 55

90. Lateroposterior projections of eighth sternite well developed (Figs. 78 and 79) 91
Lateroposterior projections of eighth sternite lacking or indicated by only a slight projection (Figs. 72, 73, 74 and 76) 93

91. Lower ovipositor valves bent ventrad; lateral tooth present on lower valves (Figs. 78 and 79); prosternal spine long, tapering, bent caudad 92
Lower valves of ovipositor almost straight, very slightly bent ventrad; lateral tooth on lower valve obsolete; prosternal spine short, stout, not bent caudad ..... *Melanoplus punctulatus aboreus* (Scudder) page 58

92. Lateroposterior projections less than one-half the length of the lateral valve of ovipositor (Fig. 78); pronotal disk bordered by yellow stripes that continue on tegmina ..... *Melanoplus bivittatus* (Say) page 57
Lateroposterior projections almost as long as lateral valve of ovipositor (Fig. 79); pronotal disk and tegmina without yellow stripe ..... *Melanoplus differentialis differentialis* (Thomas) page 57

93. Antennal crescent (light mark above base of antenna) interrupted at middle; hind tibia ranging from red to blue 96
Antennal crescent continuous; hind tibia never blue 94

94. Valves of ovipositor very long and straight, only slightly bent dorsad (Fig. 72); outer face of hind femur covered with fuscous ..... *Melanoplus keeleri keeleri* (Thomas) page 60
Valves of ovipositor shorter, dorsal valve distinctly bent dorsad (Figs. 74 and 76); outer face of hind femur lighter, usually without or with only a slight trace of fuscous 95

95. Ninth sternite slightly emarginate on each side behind lower valves of ovipositor; margins of cercus concave (Fig. 76) ..... *Melanoplus femurrubrum femurrubrum* (DeGeer) page 58
..... *Melanoplus femurrubrum propinquus* Scudder* page 59
Ninth sternite not emarginate on posterior margin behind lower valves of ovipositor; margins of cercus not concave (Fig. 74) ..... *Melanoplus impudicus* Scudder page 59

96. Cercus short and broad, sides about one-half again as long as base, side margins convex (Fig. 73); wings wide, very slightly tapering from base

* Females of these two subspecies are inseparable.

to apex; hind tibia usually pink or greenish yellow, occasionally blue ..... *Melanoplus sanguinipes vulturnus* Gurney and Brooks page 59

Cercus long and slender, sides twice as long as base, side margins straight; wings narrow, distinctly tapering from base; hind tibia blue ..... *Melanoplus bispinosus* Scudder page 60

Radinotatum carinatum carinatum (Walker)

Body length, male 31-36 mm, female 40-48 mm; form very slender. Coloration varies from uniform pale brown to specimens with tegmina and legs green. Subgenital plate of male longer than thorax, tapering to a point.

Alabama distribution: Baldwin[1], Butler[3], Covington[1], Dallas[1,3], Escambia[1,3], Henry[1], Houston[2,3], Lee[1], Macon[1], Mobile[2,3], Montgomery[3], Pickens[1], Pike[1], Russell[1], and Tuscaloosa[1] counties.

Specimens examined: 2 nymphs, 2 males, 1 female UMMZ; 9 nymphs, 29 males, 13 females AU.

This unusual grasshopper is usually found in the low vegetation on the margins of woods, particularly the drier portions. It inhabits wiregrass, broomsedge, and similar grasses. It is incapable of flight and is a rather poor jumper, but its dull color and slender, elongate body allows it to blend rather closely with the grasses it inhabits. Nymphs may be found throughout the year, but adults are common only from early April to late June. See Hebard (23) for more information and some Alabama records.

Metaleptea brevicornis brevicornis (Johannson)

Body length, male 19-25 mm, female 32-35 mm. Color variable, males usually green on dorsal surface of head, pronotum, and tegmina, brown on lateral portion of body; females either green or brown dorsally, the green specimens may also be green on the lateral portion.

Alabama distribution: Butler[1,3], Chilton[1], Conecuh[3], Escambia[3], Lee[1,2,3], Mobile[2,3], Montgomery[3], Tallapoosa[1], and Tuscaloosa[2,3] counties.

Specimens examined: 9 males, 3 females UMMZ; 21 males, 8 females AU.

This species probably occurs throughout the State in suitable habitats. It is found only in low wet areas such as pond margins, ditch banks, and the edges of swamps. Dates on the Alabama specimens range from July 7 to October 20. See Hebard (23) for more information.

Mermiria picta (Walker)

Body length, male 28-40 mm, female 41-55 mm. General coloration largely green with three longitudinal reddish brown stripes on head and pronotum. Face strongly oblique, subequal in length to pronotum.

Alabama distribution: Baldwin[1], Lee[1], Macon[1], Mobile[3], and Russell[1] counties.

Specimens examined: 3 males, 4 females AU.

This species occurs in the undergrowth of pine woods and in dry grasses of open fields and roadsides. The Baldwin County specimens were taken near the Gulf of Mexico in an open pine woods having a turkey oak understory. The other specimens were taken from vegetation along roadsides. Dates on the specimens range from August 24 to September 2.

Mermiria bivittata (Serville)

Body length, male 29-37 mm, female 40-51 mm. Coloration and appearance much as in *picta* but differs in having the median reddish-brown stripe absent or only faintly indicated.

Alabama distribution: Calhoun[2], Cleburne[1,2,3], and Shelby[1] counties.

Specimens examined: 6 males, 3 females UMMZ; 2 males, 1 female AU.

This species is found in habitats similar to those of *M. picta*. It seems likely that this species replaces *M. picta* in the northern half of the State. Collection dates range from July 5 to September 6.

Syrbula admirabilis (Uhler)

Body length, male 22-27 mm, female 35-40 mm. General coloration, male greenish brown, female green with broad brown stripe on head and pronotum (an occasional female with green replaced by light brown). Pronotum with lateral carinae distinct, slightly convergent near middle, cut by principal sulcus slightly behind middle.

Alabama distribution: Baldwin[1], Bibb[1], Bullock[1], Butler[3], Chilton[1], Choctaw[1], Cleburne[1,2,3], Conecuh[2], Coosa[1], Covington[1], DeKalb[1,3], Escambia[1,3], Lauderdale[1], Lee[1,2], Limestone[1], Macon[1], Madison[2], Marion[1], Mobile[1,2], Monroe[1,2], Perry[1], Pickens[1], Russell[1], St. Clair[1], Shelby[1], Talladega[1], Tallapoosa[1], and Tuscaloosa[2] counties.

Specimens examined: 2 males, 13 females UMMZ; 49 males, 21 females AU.

This species is common throughout the State in old fields, homesites, roadsides, and margins of woods. Dates on the specimens range from July 8 to November 15.

Eritettix simplex simplex (Scudder)

Body length, male 16-17 mm, female 22-24 mm. General coloration pale brownish yellow; dorsal surface of head and thorax with a pair of brownish black longitudinal stripes limited mesad by a pair of supplementary carinae; lateral carinae covered with very pale yellowish white stripes.

Alabama distribution: Cleburne[1], Chilton[1], DeKalb[1,3], and Lee[1] counties.

Specimens examined: 4 males, 5 females AU.

This is another form which inhabits the grasses of open fields and pastures. The available records indicate that this form is restricted to the northern half of the State. Dates on the specimens range from April 16 to July 11, indicating that maturation is early in this form, and that it is not present in late summer. It is possible that it is more widespread in the State than existing records indicate.

Amblytropidia occidentalis (Saussure)

Body length, male 19-24 mm, female 27-32 mm. Color variable, ranging from gray brown to blackish brown, dorsal surface of female often dull yellow.

Alabama distribution: Baldwin[1,2], Bibb[1], Calhoun[3], Chilton[1], Clarke[2], Clay[2], Cleburne[1,2], Conecuh[2], Covington[1], Dale[2], DeKalb[1], Escambia[1],

Henry[1], Houston[1,2], Lee[1], Macon[1], Madison[2], Mobile[1,2], Monroe[1,2], Pickens[1], Russell[1], Tuscaloosa[1], and Washington[2] counties.

Specimens examined: 13 nymphs, 3 males, 6 females UMMZ; 2 nymphs, 44 males, 37 females AU.

This common form is found both in old fields and in open woods. It probably occurs throughout the State in suitable habitats. Dates on the specimens range from March 19 to January 30, indicating that some individuals probably survive the winter as adults. Since adult specimens have been taken in all months except February, there is possibly more than one generation per year in Alabama.

Orphulella speciosa (Scudder)

Body length 12.5-22 mm. General coloration brown to green. Lateral carinae of pronotum moderately incurved, about equally separated on both anterior and posterior margins. Tegmina and wings usually not surpassing tips of hind femora (an occasional individual may have longer wings).

Alabama distribution: Autauga[1], Cleburne[1,2,3], Dallas[1], and Lowndes[1] counties.

Specimens examined: 3 males UMMZ; 13 males, 13 females AU.

This species is chiefly associated with grasslands. It is sometimes called the "pasture grasshopper" because it is common in dry pastures and abandoned fields. Gurney *(13)* recorded *O. speciosa* from the top of Cheaha Mountain. Since no other specimens of this species were known from any location closer than extreme northern Tennessee, he postulated that in the southeastern United States this species might be confined to the higher elevations. It now appears that *O. speciosa* occurs in much of the Coastal Plain of Alabama and perhaps throughout Mississippi. Its distribution is probably similar to that of several other species of Orthoptera that are predominantly western in their distribution but have ranges that extend into the southeastern United States in the Coastal Plain. Examples of other species from Alabama with this type of distribution are *Diapheromera velii, Campylacantha olivacea* and *Melanoplus bispinosus.* Dates on the Alabama specimens range from June 20 to August 17. See Gurney *(13)* for more information.

Orphulella pelidna pelidna (Burmeister)

Body length 14.5-24 mm. General coloration the same as *O. speciosa* except green individuals less common. Pronotum with lateral carinae strongly incurved near middle, more divergent on posterior margin than anterior one. Tegmina and wings usually surpassing tips of hind femora.

Alabama distribution: Baldwin[1], Barbour[1], Bibb[1], Butler[1,3], Calhoun[2,3], Chilton[1], Choctaw[1], Cleburne[3], Conecuh[1,2,3], Covington[1], Dale[2], Dallas[1,2,3], DeKalb[3], Escambia[1,3], Geneva[1], Houston[1,2,3], Jefferson[3], Lee[1,2], Macon[1], Mobile[1,2,3], Monroe[2], Montgomery[3], Perry[1], Russell[1], Shelby[1], Talladega[2], Tallapoosa[1], Tuscaloosa[2,3], and Wilcox[1] counties.

Specimens examined: 22 males, 25 females UMMZ; 88 males, 70 females AU.

This species is abundant throughout Alabama. It is found in a variety of habitats ranging from the slopes of Cheaha Mountain to the sparse vege-

tation of the sand dunes on the Gulf Coast. Usually it is found in relatively dry open areas in grasses or other vegetation. It is also found in the undergrowth of open pine woods. Adults are abroad from May until November. See Gurney *(13)* for more information.

Orphulella olivacea olivacea (Morse)

Body length 16.5-28 mm. General coloration olive brown. Pronotum with lateral carinae distinctly diverging on metazona. Tegmina surpassing tips of hind femora.

Alabama distribution: Mobile[1] County.

Specimens examined: 1 male AU.

According to Gurney *(13)* this species is found only in the coastal marshes or in nearby saline or brackish places. The single Alabama specimen was collected on Dauphin Island on July 16. See Gurney *(13)* for more information.

Dichromorpha viridis (Scudder)

Body length, male 15-17 mm, female 23-27 mm. Coloration variable, may be entirely brown, often dorsal half (or occasionally entire body) is bright green. Pronotum with lateral carinae cut by principal sulcus behind the middle; tegmina varying in length from covering about one-half the abdomen to exceeding length of abdomen.

Alabama distribution: Baldwin[1,2], Bullock[1], Chilton[1], Choctaw[1], Cleburne[1], Clarke[2], Clay[1], Coffee[1], Conecuh[1,2], Covington[1], Dallas[1,2], Escambia[1,3], Geneva[1], Houston[1,2], Lee[1,2] Lowndes[1], Macon[1], Marion[1], Mobile[2], Montgomery[1], Pike[1], Talladega[1], Tallapoosa[1], Wilcox[1,2], and Winston[1] counties.

Specimens examined: 5 nymphs, 29 males, 36 females UMMZ; 72 males, 75 females AU.

This species is common throughout Alabama in such places as margins of woods, roadsides, and open fields, but it is most abundant in the vegetation around ponds, lakes, and ditches. Adults have been collected in Alabama from May until October.

Clinocephalus elegans Morse

Body length, male 17-21 mm, female 21-28 mm. General coloration varying from light olive green to dark brown. Tegmina usually covering about three-fourths of the abdomen.

Alabama distribution: Baldwin[1], Cleburne[2], Coneuch[2], Escambia[1,2,3], and Mobile[2] counties.

Specimens examined: 1 nymph, 3 males, 6 females, UMMZ; 13 males, 5 females AU.

This species is reportedly most common in wet areas along the coast of the eastern United States. It does, however, occur inland for a considerable distance in the southern half of its range. The Cleburne County specimens were taken from the top of Cheaha Mountain. In the southern half of the State it is usually found in the undergrowth of open pine woods.

Arphia sulphurea (Fabricius)

Body length, male 17-22 mm, of female 26-30 mm. Color varying from pale to dark brown. Tegmina with a pale band on dorsal margin; wings with basal two-thirds bright yellow, apical one-third with a dusky band. Hind femur often banded on outer surface with three more or less distinct dark stripes; hind tibia black or blue black with pale basal ring.

Alabama distribution: Calhoun[2], Cleburne[1,2,3], Dallas[1], DeKalb[1,3], Houston[1], Lawrence[1], Lee[1], Madison[1], Monroe[1], Shelby[1], Tallapoosa[1], Washington[2], and Winston[1] counties.

Specimens examined: 2 males, 3 females UMMZ; 36 males, 15 females AU.

Like most of the "banded wing" grasshoppers (those with colored wings) this species is commonly found in rather dry habitats with sparse vegetation. Field notes indicate that it was taken chiefly along roadsides and in very open pine woods. Dates on the Alabama specimens range from early April to late July indicating that this form matures rather early in the year.

Arphia xanthoptera (Burmeister)

Body length, male 21-27 mm, female 28-34 mm. Color varies from dark brown to pale reddish brown. Hind wings with basal third either yellow or orange red, the apical one-third with a pale fuscous bar. Hind femur with two or three dark bands that are usually rather faintly indicated; hind tibia dark with a pale ring at base.

Alabama distribution: Barbour[1], Butler[1,3], Calhoun[2,3], Covington[1], Dale[2], DeKalb[3], Escambia[3], Jefferson[3], Lauderdale[1], Lee[1,2], Macon[1], Madison[2], Monroe[2], and Tuscaloosa[1] counties.

Specimens examined: 2 nymphs, 2 males, 2 females UMMZ; 6 males, 5 females AU.

This species occurs in habitats similar to those of *A. sulphurea.* Dates on the Alabama adults range from mid-August to mid-October indicating that this form matures later than *A. sulphurea.*

Arphia granulata Saussure

Body length, male 19-21 mm, female 27-30 mm. Form and coloration much the same as *A. sulphurea.* Basal two-thirds of wings yellow, apical third with a fuscous band.

Alabama distribution: Baldwin[1] County.

Specimens examined: 1 male AU.

The single Alabama specimen was taken from the undergrowth of an open pine woods near Fairhope on June 17.

Chortophaga viridifasciata (DeGeer)

Body length, male 17-24 mm, female 22-32 mm. Color highly variable, usually either largely green marked with brown or wholly brown, but all possible intergrades between these two occur (also some specimens have a decidedly reddish tinge). Hind wings pale yellow at base, apical two-thirds tinged with fuscous. Hind tibia dark bluish black with a pale ring near base.

Alabama distribution: Autauga[1], Baldwin[1], Butler[1,2,3], Bullock[1], Calhoun[2,3], Chilton[1], Choctaw[1], Cleburne[1,2], Covington[1], Cullman[1], Dallas[1], DeKalb[1,2,3], Escambia[1,2,3], Jefferson[3], Lauderdale[1], Lawrence[1], Lee[1,2], Limestone[1], Lowndes[1], Madison[1], Marshall[1], Monroe[1,2], Pickens[1], Tallapoosa[1], Tuscaloosa[2,3], Wilcox[1], and Winston[1] counties.

Specimens examined: 1 nymph, 17 males, 18 females UMMZ; 72 males, 54 females AU.

This is one of the most abundant and widespread species of Orthoptera in the State. It is commonly found along roadsides, in pastures, abandoned fields, and similar situations. It is one of the first species of grasshoppers to mature in the spring. Adults may be taken in Alabama as late as October.

Chortophaga australior Rehn and Hebard

Identical to *C. viridifasciatus* except for differences given in key and in the less acute angle of hind margin of pronotum.

Alabama distribution: Escambia[1] and Houston[1] counties.

Specimens examined: 3 males, 1 female AU.

This species occurs in habitats similar to those of *C. viridifasciatus* and probably replaces it in the southeastern corner of the State.

Hippiscus ocelote Saussure

Body length, male 28-36 mm, female 37-42 mm. General coloration light to dark brown, marked with distinct fuscous bars and spots. Antenna yellow at base, apical one-half dark reddish brown. Tegmina grayish brown with numerous fuscous spots; wings with basal one-half varying from pale yellow to deep orange, bounded on apical one-half by a distinct black band.

Alabama distribution: Bullock[1], Butler[3], Calhoun[2,3], Cleburne[1], Colbert[1], Coosa[1], Dallas[1], DeKalb[3], Jefferson[3], Lauderdale[1], Lee[1,2], Mobile[3], Monroe[2], Russell[1], and St. Clair[1] counties.

Specimens examined: 2 nymphs, 11 males, 15 females UMMZ; 19 males, 5 females AU.

This species is usually found in dry pastures, short grass along roadsides, and similar habitats of dry, well-drained soil and low vegetation. Dates on adults from Alabama range from July 16 to October 17.

Pardalophora phoenicoptera (Burmeister)

Body length, male 31-33 mm, female 42-45 mm. General coloration grayish brown, occasionally with head, pronotum, and femora dark green. Antenna dark reddish brown throughout. Tegmina grayish brown, fuscous spots usually a little less distinct than in *H. ocelote;* wings deep reddish orange (rarely yellow) at base, bounded by a distinct black band apically.

Alabama distribution: Bibb[1], Bullock[1], Calhoun[2], Chilton[1], Cleburne[1,2,3], DeKalb[1,2,3], Lauderdale[1], Lee[1,2], Limestone[1], Macon[2], Monroe[1,2], Talladega[2], Washington[2], and Winston[1] counties.

Specimens examined: 4 males, 8 females UMMZ; 14 males, 11 females AU.

This species is found in the same habitats as *H. ocelote.* Dates on the Alabama specimens range from May 18 to October 4. The single specimen

taken in October is the only one from the State that has been taken later than August. This indicates that this species matures earlier than *H. ocelote.*

Dissosteira carolina (Linnaeus)

Body length, male 24-33 mm, female 33-44 mm. General coloration varying from light grayish yellow to dark brown, many specimens a bright reddish brown, most specimens sprinkled with indistinct dusky spots. Antenna brown, slightly flattened at base, about as long as head and pronotum combined. Hind tibia light yellow to dusky.

Alabama distribution: Baldwin[1], Barbour[1], Bullock[1], Butler[1], Calhoun[2,3], Chilton[1], Cleburne[2,3], Colbert[1], Covington[1], Dallas[1], DeKalb[2,3], Escambia[3], Houston[1], Lee[1,2], Macon[1], Wilcox[1], and Winston[1] counties.

Specimens examined: 9 males, 4 females UMMZ; 21 males, 18 females AU.

This widespread species apparently prefers bare patches of ground. It is often seen on the bare dirt of old logging roads or other unpaved seldom-traveled roads. If flushed in the middle of an open pasture or other grassy area, it will fly for a considerable distance and then alight on a spot of bare soil. The agility and wariness of this species make it difficult to collect. Since its hind wings are distinctively black in color, its presence in an area is readily detectable and distributional data could be based on sight records. Dates on the Alabama specimens range from May 24 to October 5.

Spharagemon bolli bolli Scudder

Body length, male 20-28 mm, female 27-36 mm. Color variable but usually either grayish or rusty brown marked with fuscous. Tegmina marked with three bars of fuscous (may be indistinct in female), hind wings yellow at base with a dark, curved median band.

Alabama distribution: Baldwin[1], Bibb[1], Calhoun[2], Chilton[1], Clay[1], Cleburne[1,2,3], Conecuh[2], Coosa[1], DeKalb[1,2,3], Escambia[2], Lawrence[1], Lee[1,2], Madison[1,2], Monroe[2], Pike[2], Shelby[1], St. Clair[1], Talladega[2], and Winston[1] counties.

Specimens examined: 16 males, 15 females UMMZ; 16 males, 9 females AU.

This species is usually found in old fields, wood margins, roadsides, and similar dry, grassy areas. Dates on the Alabama specimens range from June 23 to September 14.

Spharagemon collare (Scudder)

Body length, male 19-25 mm, female 24-30 mm. General color pale yellowish to reddish brown, heavily sprinkled with fuscous. Median carina of pronotum raised into a crest. Hind wings similar to *S. bolli.*

Alabama distribution: Chilton[1], Dallas[1], and Lee[1] counties.

Specimens examined: 6 males, 3 females AU.

It appears that this species prefers sandier habitats than *S. bolli,* otherwise their habitat requirements appear to be similar. All Alabama specimens were taken in late June or early July.

Scirtetica marmorata marmorata (Harris)

Body length, male 20-22 mm, females 25-27 mm. General coloration variable, usually ash gray or reddish brown, barred with fuscous. Tegmina with caudal portions more or less completely fuscous or brown, this dark coloration extending to the cephalic portion in three or four more or less distinct bars. Hind wings yellow at base.

Alabama distribution: Cleburne[2] County.

Specimens examined: 2 nymphs, 1 male UMMZ.

The single adult known from Alabama was taken from the summit of Cheaha Mountain on July 4. If this actually represents a typical specimen of this form, it seems likely that it may also be found on the taller mountains throughout the northern half of the State.

Scirtetica marmorata picta (Scudder)

Identical to typical *S. marmorata* except for differences given in key and the occasional orange hind wings of this form.

Alabama distribution: Baldwin[1], Dale[2], Lee[1], Mobile[1], and Russell[1] counties.

Specimens examined: 1 female UMMZ; 4 males, 2 females AU.

This form is found in sandy areas throughout southern Alabama. It has been taken from the Gulf beaches in both Baldwin and Mobile counties. The Russell County specimens were taken from an area of deep sand with longleaf pine and various scrub oaks. Dates on the Alabama specimens range from June 24 to November 15.

Psinidia fenestralis fenestralis (Serville)

Body length, male 15-18 mm, female 19-25 mm. General coloration varying from pale clay yellow to reddish brown, spotted with fuscous. Tegmina rather narrow, with numerous alternating light and dark spots. Hind tibia greenish yellow with a dark ring at each end and one near middle.

Alabama distribution: Baldwin[1], Covington[1], Dallas[1], Escambia[3], Lee[1], and Russell[1] counties.

Specimens examined: 4 males, 11 females AU.

In Alabama this form is found in sandy habitats similar to those of *S. marmorata picta.* Dates on the specimens range from July 7 to November 15.

Trachyrachis kiowa fuscifrons (Stal)

Body length, male 14-18 mm, female 17-25 mm. General coloration light reddish brown, only slightly marked with fuscous. Head appearing slightly swollen. Tegmina with two vague fuscous spots, apical one-third hyaline. Hind tibia brownish yellow, darker at apex.

Alabama distribution: Cleburne[1], Lee[1], and Madison[2] counties.

Specimens examined: 3 males, 2 females UMMZ; 1 male, 1 female AU.

Little is known of the ecology of this form in Alabama. It has been collected from along roadsides and in pastures. Dates on Alabama specimens range from July 2 to August 19.

Trimerotropis citrina Scudder

Body length, male 20-23 mm, female 28-32 mm. General coloration ash gray or yellow brown, sprinkled with fuscous. Tegmina with three dark crossbars which are often indistinct. Lower sulcus of hind femur yellow with two dark bands.

Alabama distribution: Baldwin[1], Barbour[1], Butler[3], Calhoun[2,3], Cleburne[3], Elmore[1], Escambia[1,2,3], Lee[1], Macon[1], Mobile[1], and Tuscaloosa[2,3] counties.

Specimens examined: 10 males, 7 females UMMZ; 13 males, 10 females AU.

This species is found in a variety of habitats ranging from coastal beaches to mountaintops. It probably occurs throughout the State in areas of sparse vegetation. Dates on the Alabama specimens range from June 16 to November 13.

Trimerotropis saxatilis McNeill

Body length, male 18-22 mm, females 23-28 mm. General coloration usually gray, bluish green or brown; strongly marked with fuscous. Tegmina usually with three distinct dark crossbars. Lower sulcus of hind femur largely black with two yellow crossbars.

Alabama distribution: Jackson[1], Lee[1], Randolph[1], Shelby[1], and Winston[1] counties.

Specimens examined: 1 nymph, 9 males, 3 females AU.

This species is found only in areas of rock outcrops. Its coloration is remarkably similar to the lichen-covered surfaces of such rocks. It is probable that this species occurs throughout the higher elevations of Alabama in areas of suitable outcroppings. Alabama specimens were collected during the period of June through October.

Romalea microptera (Beauvois)

Body length, male 50-54 mm, female 62-70 mm. General body form very robust. Coloration exceedingly variable. The most common coloration in Alabama is dark blackish brown with only carinae of pronotum and hind margins of abdominal segments yellow. The other extreme in coloration is a general dull yellow color with scattered fuscous markings. Apparently any coloration between these extremes may occur. Tegmina and wings not more than two-thirds as long as abdomen.

Alabama distribution: Baldwin[1], Blount[2,3], Butler[2,3], Calhoun[2,3], Conecuh[1], Covington[1], DeKalb[1], Houston[2,3], Jackson[1], Lee[1,2,3], Madison[1], Marion[1], Marshall[2,3], Mobile[1,2], Shelby[1], Tuscaloosa[3], Wilcox[1,2,3], and Winston[1] counties.

Specimens examined: 1 nymph, 5 males, 6 females UMMZ; 9 males, 7 females AU.

The "eastern lubber grasshopper," as this species is commonly known, is found in a variety of habitats throughout Alabama. It has been collected in both fresh and brackish marshes as well as very dry open pine woods. It also occurs along roadsides and in fields. The heavy body of these individuals makes leaping difficult and specimens are often seen slowly walking across highways. When captured they make a hissing noise and extrude a

disagreeable brown liquid from the spiracles. Dates on the adults range from July 15 to September 16. For a general review of information on this species in North America see Rehn and Grant *(60).*

Leptysma marginicollis (Serville)

Body length, male 28-31 mm, females 31-38 mm. Form slender, subcylindrical. Color light yellowish brown. Antenna flattened, ensiform. A dark brown stripe extending from hind margin of eye to end of pronotum; this bordered below by a yellow or white stripe. Tegmina and wings fully developed. Cercus of male slender, tapering, bent abruptly upward and forward near base (Fig. 58); subgenital plate narrow, upturned, tapering to a point. Valves of female ovipositor short, very stout, prominent teeth on outer edges.

Alabama distribution: Baldwin[1,2], Covington[1], Escambia[3], Lee[1,3], Mobile[2,3], Montgomery[3], Monroe[1], Tuscaloosa[3], and Winston[1] counties.

Specimens examined: 3 nymphs, 3 males UMMZ; 9 males, 7 females AU.

This species inhabits sedges, cattails, and other aquatic or semi-aquatic plants. Individuals never alight on the ground. They always remain on vegetation, and when they are disturbed they will fly considerable distances to other suitable plants. Once they alight they quickly move to the side of the plant away from the disturbance. Since this is a widely distributed species it probably occurs statewide in suitable wet environments. Specimens have been collected in the State from April 17 to September 13. See Rehn and Eades *(51)* for North American records.

Stenacris vitreipennis vitreipennis Walker

Body length, male 24-26 mm, female 27-31 mm. Body form and antenna much the same as *L. marginicollis.* Color pale green, fading in dried specimens to dull yellow. Both dark and light postocular stripes occur as in *L. marginicollis,* but usually fade in dried material. Cercus of male as in *L. marginicollis* (Fig. 57), subgenital plate with three elongate projections.

Alabama distribution: Houston[1,2] and Mobile[3] counties.

Specimens examined: 4 males, 4 females UMMZ; 3 males, 2 females AU.

This species occurs in habitats similar to those of *Leptysma.* It is probably confined to the southern portion of the State. Specimens have been collected from May 24 to June 3 in the State, see Rehn and Eades *(51)* for further information.

Schistocerca damnifica damnifica (Saussure)

Body length, male 25-27 mm, female 37-42 mm. Color rusty or reddish brown. Tegmina barely surpassing tip of hind femur, female occasionally with small dim dusky spots on tegmina. Cercus of male broad, quadrate, apex only slightly narrower than base (Fig. 31).

Alabama distribution: Chilton[1], Cleburne[2], DeKalb[1], and St. Clair[2] counties.

Specimens examined: 1 male, 1 female UMMZ; 3 males AU.

This form is found in fields, roadsides, and grassy areas in woods. Males are active and fly long distances if disturbed. Females are clumsy and usu-

ally attempt to escape by leaping into a patch of grass and remaining motionless. The State seems to be entirely within the zone of intergradation between S. *d. damnifica* and S. *d. calidior,* the southern race. None of the specimens from the State represent typical examples of either subspecies. However, those listed above are closer to S. *d. damnifica* than the specimens taken from the southern half of the State, which are listed under S. *d calidior.* Collection dates range from June to September.

Schistocerca damnifica calidior Rehn and Hebard

Differs from typical *damnifica* only by differences given in key.

Alabama distribution: Baldwin[1,2], Clarke[2], Conecuh[1,2], Dale[2], Escambia[1], Houston[1,2], Lee[1,2], Mobile[1,2,3], and Russell[1] counties.

Specimens examined: 1 nymph, 10 males, 9 females UMMZ; 5 males, 6 females AU.

See S. *damnifica damnifica* for ecological and taxonomic notes. Specimens have been collected in the State from March 12 to November 15.

Schistocerca americana americana (Drury)

Body length, male 39-42 mm, female 48-55 mm. General coloration reddish brown with dark brown and light yellow markings; head, pronotum, and tegmina with a mid-dorsal yellow stripe; a dark brown line extending from lower side of eye down cheek. Tegmina well developed, surpassing tips of hind femora. Subgenital plate of male very deeply and narrowly notched at tip.

Alabama distribution: Autauga[1], Butler[2], Calhoun[2], Clay[2], Cleburne[1,2], Conecuh[1], Dallas[1,2], Escambia[3], Lee[1], Macon[1], Madison[1], Mobile[2], St. Clair[2], Tuscaloosa[2], and Wilcox[1] counties.

Specimens examined: 11 males, 7 females UMMZ; 10 males, 5 females AU.

This species is abundant throughout the State. It is found in a variety of situations including fields, roadsides, and grassy patches along edges of woods. The strong flight of both sexes makes specimens difficult to collect. The ecology of this economically important species has been described in detail by Kuitert and Connin *(41).* Adults may be taken in the State throughout the year.

Schistocerca alutacea (Harris)

Body length, male 28-32 mm, female 42-50 mm. Color purplish brown with mid-dorsal pale stripe. Tegmina well developed and surpassing tips of hind femora. Cercus of male short, quadrate, only slightly tapering toward apex (Fig. 32).

Alabama distribution: Baldwin[2,3], Cleburne[2,3], Houston[2,3], Lee[1,3], and Mobile[2,3] counties.

Specimens examined: 6 males, 1 female UMMZ; 1 male AU.

This species is usually found in vegetation near the edge of streams, lakes, or ponds. Specimens have been collected in Alabama from July 20 to September 9. Hubbell *(40)* summarized all the information known about this and two other closely related species.

Schistocerca rubiginosa (Scudder)

Body length, male 30-36 mm, female 43-54 mm. Much the same as *S. alutacea* except for its slightly larger size, rusty-brown color, lack of mid-dorsal stripe, and differences in male genitalia.

Alabama distribution; Baldwin[1], Bibb[1], Calhoun[2,3], Mobile[2,3], Monroe[1,3], and Talladega[2,3] counties.

Specimens examined: 5 males, 1 female UMMZ; 5 males, 4 females AU.

This form is found in dry habitats throughout the State. It frequents well-drained fields, pastures, and woodlands. Specimens have been collected from July 21 to August 24. See Hubbell *(40)* for further information.

Schistocerca obscura (Fabricius)

Body length, male 34-40 mm, female 50-61 mm; body form, especially in female, robust. Color dark olive green, with pale mid-dorsal stripe. Cercus of male rectangular, not tapered (Fig. 34).

Alabama distribution: Clarke[2], Covington[1], Dallas[1], Houston[2], Lee[1,2], Monroe[2], and Montgomery[1] counties.

Specimens examined: 3 males, 10 females UMMZ; 3 males, 3 females AU.

Alabama records support the view of Rehn and Hebard *(66)* that in the southeastern United States this species is confined chiefly to the Coastal Plain. This species occurs in fields, woodlands, and along roadsides. All Alabama specimens were collected in September and October.

Gymnoscirtetes morsei Hebard

Body length, male 14-16 mm, female 19.5-21.5 mm. Color ochraceous tawny to gray; postocular dark stripe extending to distal one-third of abdomen. Cercus of male long, subfalcate (Fig. 40); apex of subgenital plate elevated into a large projection which is twice as long as broad.

Alabama distribution: Baldwin[1,2] and Houston[2] counties.

Specimens examined: 24 males, 7 females UMMZ; 5 males, 2 females AU.

This species is found only in wet, boggy areas. The Baldwin County specimens were collected from an extensive pitcher plant bog. Specimens have been collected in the State from June 28 to September 13.

Campylacantha olivacea olivacea (Scudder)

Body length, male 21-23 mm, female 24-31 mm. General coloration olive green, sometimes brown, or almost black. Tegmina ovatelanceolate, usually about one-half as long as abdomen, their margins feebly overlapping. Cercus of male, straight, suberect, short, triangular, tapering from base to an acute point at apex (Fig. 61). Valves of ovipositor short, upper valves bent sharply upwards, margin not toothed.

Alabama distribution: Marengo[2] County.

Specimens examined: 1 male, 1 female UMMZ.

This species is basically western in distribution, but it has been reported from Macon, Georgia, by Rehn and Hebard *(66)*. It is found in fields, along roadsides, margins of woods, and is sometimes very abundant in the large ragweeds (*Ambrosia* spp.) that are found in such situations. The two Alabama specimens were taken September 14.

Hesperotettix viridis brevipennis (Thomas)

Body length, male 15.5-19 mm, female 20-25 mm. Color green or dark greenish brown, marked with purplish red stripes on pronotum and tegmina. Postocular dark stripe indicated on pronotum by an indistinct blotch of black mixed with yellow and purplish red. Tegmina usually reaching almost to tip of abdomen, cercus of male short, conical, tip blunt (Fig. 59); subgenital plate with an apical tubercle projecting dorsoventrally. Valves of ovipositor short, upper valve bent sharply upward and deeply toothed along margin.

Alabama distribution: Baldwin[1], Chilton[1], Cleburne[1,2], and Talladega[2] counties.

Specimens examined: 2 nymphs, 9 males, 8 females UMMZ; 6 males, 9 females AU.

Most of the specimens examined came from patches of grass along the edge of woodlands near the summit of Cheaha Mountain. A single specimen (female) was taken in the undergrowth of pine woods on the Gulf Coast Substation near Fairhope in Baldwin County. The coloration of this species blends well with the patches of grass that it usually inhabits. Specimens have been collected from June 17 to August 9.

Hesperotettix gemmicula Hebard

Body length, male 14.5-15.5 mm, female 16.8-23.3 mm. Slightly smaller and more slender than *H. v. brevipennis*. Coloration much the same as *brevipennis*. Cercus of male moderately incurved at tip.

Alabama distribution: Baldwin[1] County.

Specimens examined: 4 males, 6 females AU.

All of the Alabama specimens were taken near the coast from the undergrowth of open pine woods on sandy soil. Specimens were collected from June 17 to August 9. See Hebard *(21)* for further descriptions and notes.

Eotettix pusillus Morse

Body length, male 10-12 mm, female 15.5-20 mm. Color varies from reddish brown to chestnut, head greenish yellow. Tegmina broadly ovate, less than one-half as long as abdomen, margins attingent or subattingent, not overlapping. Cercus of male styliform (Fig. 60); subgenital plate with a small tubercle at apex. Valves of ovipositor with tips only slightly curved, margins of upper valve with shallow teeth.

Alabama distribution: Baldwin[1,2], Bibb[1], Covington[1], Escambia[1], Lee[1], and Monroe[1] counties.

Specimens examined: 1 male, 3 females UMMZ; 1 nymph, 39 males, 23 females AU.

This species is common in the undergrowth of dry pine woods. It is probably limited to the southern half of the State. Collection dates range from June 17 to October 6.

Melanoplus gracilis (Bruner)

Body length, male 14-16 mm, females 18.5 to 20 mm. Color ash brown above, greenish yellow beneath. Cercus of male broad at base, narrowed at

middle, apical one-third slightly expanded (Fig. 56). Ovipositor valves long, thin, tips bent only slightly, margin of upper valve with short teeth.

Alabama distribution: Cleburne[1], Dallas[1,3], DeKalb[1], Lowndes[1], Madison[1], and Winston[1] counties.

Specimens examined: 25 males, 7 females AU.

This species is usually found in tall grass and weeds along the edges of woods. The specimens from Dallas County were taken from thick patches of grass in a pasture along the edge of a small woods. The specimens from DeKalb and Cleburne counties were taken on the slopes of mountains in the undergrowth of open woods. Specimens have been collected from July to September. Hebard *(30)* described the genitalia of the male and gave some distributional records for this species.

Melanoplus similis Morse

Body length, male 15-19 mm, female 21-23 mm. General coloration light yellowish brown; all femora of male bright shining green, of female a duller green. Cercus of male variable, but usually tapering gradually from base to middle, apical one-half feebly decurved with tip subtruncate or lower angle slightly prolonged (Fig. 36); furcula very short, minute lobes.

Alabama distribution: DeKalb[1] and Winston[1] counties.

Specimens examined: 5 males, 12 females AU.

In Winston County this species was collected from the leaf litter of an open oak-hickory forest. It appeared to be more abundant in the lower, wetter portions of the forest than on the drier slopes. Dates on the specimens range from May 18 to August 17. See Hebard *(30)* for further information.

Melanoplus hubbelli Hebard

Body length, male 17-20 mm, female 23-26 mm. General coloration and markings much the same as *M. similis*. Cercus of male of same general form as *M. similis* except the lower angle is prolonged into a sharply pointed triangle; furcula represented by only the most minute projections.

Alabama distribution: Cleburne[1] and DeKalb[1] counties.

Specimens examined: 4 males, 1 female AU.

This species has been collected in the State from vegetation near the edge of a small stream and near the edge of a lake. In addition, two specimens were collected from blueberry bushes near the summit of Cheaha Mountain. Dates on the specimens range from May 18 to August 18. See Hebard *(30)* for more information.

Melanoplus hebardi (Rehn)

Body length, male 21-22 mm, female 29-30 mm. Color brown above, greenish yellow beneath. Tegmina reduced, oval, tips broadly rounded, margins not touching. Hind tibia greenish yellow tinged with brown. Cercus of male tapering from base to middle, tip expanded, distinctly curving mesad, ventral margin with a triangular projection (Fig. 43); furcula small, knob-like plates with divergent, angulate tips.

Alabama distribution: Monroe[1] County.

Specimens examined: 2 males, 2 females AU.

The four specimens listed were collected about 7.5 miles southeast of Monroeville in thick undergrowth in open pine woods. The species was fairly abundant in the area but thick undergrowth made collecting difficult. The collection date was October 1.

Melanoplus cantralli Dakin

Body length, male 21.2-26.5 mm, female 22.5-28.3 mm. General appearance and coloration similar to *M. hebardi*. Tegmina with tips truncate. Hind tibia glaucous. Cercus of male tapering slightly from base to middle then expanding to the rounded apex (Fig. 35).

Alabama distribution: Baldwin[1,3] and Escambia[1,3] counties.

Specimens examined: 1 nymph, 27 males, 13 females AU.

This species is locally abundant in the low vegetation and leaf litter of open pine woods in extreme southern Alabama. Dates on the specimens range from August to October. Dakin *(9)* gave a complete description of this species along with the known distributional data.

Melanoplus tepidus Morse

Body length, male 15-17 mm, female 24-29 mm. Color dull grayish brown above, yellowish brown below. Tegmina broadly oval, tips subacuminate, dorsal margins narrowly separated, covering one-fourth or less of abdomen. Cercus of male narrowed near middle on upper margin, lower margin straight throughout, tip subequal in width to base, broadly rounded, outer face sulcate (Fig. 65); furcula very short, slightly tapering, finger-like processes.

Alabama distribution: Butler[1], Conecuh[1], Madison[1,2], Pike[2], and Winston[1] counties.

Specimens examined: 3 males, 9 females UMMZ; 47 males, 25 females AU.

This species is usually found in vegetation along the edges of woods and in leaf litter and vegetation from open areas within the woods. It is widely distributed within the State and often abundant in suitable habitats. The males are active and wary. When approached they often make a series of leaps and then attempt to hide in leaf litter. Specimens have been collected in Alabama from June 26 to August 23.

Melanoplus primestivus Dakin

Body length, male 16-19 mm, females 22-25 mm. General coloration light yellow brown heavily sprinkled with dark brown on dorsal surface. Tegmina oval, tips rounded, dorsal margins not attingent. Cercus of male broad at base, narrowing towards middle, apex only slightly expanded, tip subtruncate with lower angle moderately prolonged (Fig. 64).

Alabama distribution: Lawrence[1,3] and Winston[1,3] counties.

Specimens examined: 36 males, 22 females AU.

This species has been collected from but two localities, both in Bankhead National Forest. It was very abundant locally in the leaf litter of open oak-hickory woods. Dates on the specimens range from June 26 to August 17. See Dakin *(9)* for a complete description.

Melanoplus delaware Hebard

Body length, male 17-19 mm, female 20-26 mm. Color dark grayish brown above, light yellowish brown beneath. Tegmina covering less than one-third of abdomen, ovate, tips broadly rounded, dorsal margins not attingent. Cercus of male long, strongly narrowed at middle, tip subequal in width to base, lower angle slightly prolonged (Fig. 49); furcula short, triangular projections.

Alabama distribution: Coosa[1] and Washington[2] counties.

Specimens examined: 1 male, 2 females UMMZ; 1 male AU.

This species inhabits the leaf litter of open deciduous forests. Dates on the specimens range from June 13 to August 13. See Hebard *(30)* for more information.

Melanoplus tribuloides Morse

Body length, male 18-20 mm, female 22-26 mm. Dark brown above, light yellowish brown beneath. Tegmina covering less than one-third of abdomen, broadly oval, tips broadly rounded, dorsal margins not attingent. Cercus of male only slightly narrowed at middle, tip as broad or broader than base, ventral angle prolonged (Fig. 45).

Alabama distribution: Cleburne[1,2,3], Clay[1], Etowah[1], and Talladega[1,2] counties.

Specimens examined: 12 males, 20 females UMMZ; 9 males, 16 females AU.

This species is known only from Alabama, the type locality being Cheaha Mountain in Cleburne County. It can be found at every elevation on the mountain from the summit to the base. It is also found in the valleys around the base of the mountain and on neighboring mountains. It inhabits the sparse vegetation growing along the edges of roads, trails, and open areas within woods. Specimens have been collected from June 29 to September 9. See Hebard *(30)* for more information.

Melanoplus tribulus Morse

Body length, male 18.5-20 mm, female 23-26 mm. Very similar in appearance to *M. tribuloides*. Differs mainly by characters given in key, a slight difference in male cercus (Fig. 44) and the distinctly different concealed genitalia of males, see Hebard *(30)*.

Alabama distribution: DeKalb[1] County.

Specimens examined: 1 male, 1 female AU.

Habits are much the same as *M. tribuloides*, which it probably replaces in the northeastern portion of the State. The specimens were collected on September 5. See Hebard *(30)* for more information.

Melanoplus decoratus Morse

Body length, male 15-18 mm, female 20-25 mm. Color above dark brown, greenish yellow beneath. Tegmina short, broadly oval, covering less than one-third of abdomen, dorsal margins not attingent. Cercus of male narrowed at middle, lower apical angle prolonged (Fig. 46).

Alabama distribution: Lee[1] County.

Specimens examined: 15 males, 5 females AU.

This species has been collected in the State only from Chewacla State Park near Auburn. It was locally abundant in the short grass and leaf litter along the margins of the woods near the creek which runs through the park. This form, like *M. delaware* and *M. primestivus,* matures slightly earlier in the year than other members of the *tribulus* group. Adults have been collected from May to July.

Melanoplus strumosus Morse

Body length, male 15-17 mm, female 17.5-26 mm. Dark brown above, light yellow beneath. Tegmina small, ovate, tips broadly rounded, covering less than one-third of abdomen, dorsal margins not attingent. Cercus of male short, slender, tapering evenly from base to middle, width of middle one-fourth that of base, apical one-half slightly expanded, bent dorsomesad, lower angle slightly expanded (Fig. 62); furcula broad, flattened, finger-like projections extending about one-half the length of supra-anal plate.

Alabama distribution: Baldwin[1], Calhoun[2,3], Covington[1], Lee[1], and Mobile[2,3] counties.

Specimens examined: 1 male, 1 female UMMZ; 9 males, 7 females AU.

This species is found in the undergrowth of oak or pine forests. It is found in a variety of habitats ranging from the mountain slopes to the sandy areas near the coast. The Baldwin County specimens were taken from vegetation in open pine woods near the coast. The Lee County specimens were taken from short grass growing in a clearing in a pine woods in Chewacla State Park. Specimens have been collected from June 23 to September 6. See Hubbell *(36)* for further information.

Melanoplus carnegiei (Morse)

Body length, male 14-17 mm, female 23-24 mm. General color reddish brown, face usually lighter than pronotum or abdomen; postocular dark stripe usually present, narrow, terminating at metazona, less distinct in female than male. Tegmina elongate, oval, covering about one-third or less of abdomen, tip subacuminate, dorsal margins attingent or slightly overlapping. Furcula of male minute, subcylindrical; subgenital plate scoop-shaped.

Alabama distribution: Lee[1] and Macon[1] counties.

Specimens examined: 2 males AU.

This species is found on the ground in the undergrowth of open pine and oak woods. The specimens were collected September 16 and November 22.

Melanoplus scudderi scudderi (Uhler)

Body length, male 16-18 mm, females 22-24 mm. Color variable, ash brown to dark brown; postocular dark stripe usually present, narrow, terminating at metazona, less distinct or absent in female. Tegmina elongate, oval, covering about one-third or less of abdomen, tip subacuminate or broadly rounded, dorsal margins attingent or slightly overlapping. Furcula of male minute, triangular; subgenital plate small, conical.

Alabama distribution: Autauga[1], Choctaw[1], Clay[1], Cleburne[1], Dallas[1], Geneva[1], Greene[1], Hale[1], Lee[1], Mobile[1], Monroe[1], Pickens[1], Russell[1], Tallapoosa[1], and Wilcox[1] counties.

Specimens examined: 83 males, 48 females AU.

This is probably the most abundant and widely distributed short-winged species of *Melanoplus* in Alabama. It is found along roadsides, edges of woods, and other similar areas. It is often found in tangles of honeysuckle or blackberry vines and also in various grasses. Unlike most of the other short-winged forms of *Melanoplus,* this species can often be found a good distance away from wooded areas. Specimens have been collected in Alabama from August 18 to November 22.

Melanoplus querneus Rehn and Hebard

Body length, male 22.5-27 mm, female 28-40 mm. Color grayish brown above, greenish yellow beneath; postocular dark stripe indistinct or absent. Tegmina covering one-half or more of abdomen, dorsal margins broadly overlapping and lighter than rest of tegmina. Furcula of male absent.

Alabama distribution: Lee[1] County.

Specimens examined: 1 male, 1 female AU.

This species along with *M. nigrescens, M. alabamae, M. walshi,* and, in the authors' opinion, *M. tunicae* constitute the *querneus* group in Alabama. This group is a taxonomic enigma in the Southeast. There is good evidence of intergradation in Alabama between some or all of the species mentioned above. Until the complex can be studied intensively, the exact relationship of these forms cannot be accurately determined. Thus all records given here for the members of this group are only for the "typical" forms. All of these species are found primarily in the undergrowth of pine or deciduous woods. Adults usually occur from late June to November.

Melanoplus nigrescens (Scudder)

Differs from other members of the *querneus* group chiefly by characters given in the key to species.

Alabama distribution: Calhoun[2], Clay[1], Cleburne[1,2,3], Madison[2], and Pike[2] counties.

Specimens examined: 13 nymphs, 19 males, 25 females, UMMZ; 3 nymphs, 26 males, 22 females AU.

See notes under *M. querneus.*

Melanoplus alabamae Hebard

Differs from other members of the *querneus* group chiefly by characters given in the key to species.

Alabama distribution: Butler[3], Conecuh[1,3], and Escambia[1] counties.

Specimens examined: 5 males, 6 females AU.

This form was originally described from Greenville and Evergreen, Alabama, by Hebard (22). See the discussion under *M. querneus* for more information.

Melanoplus tunicae Hebard

Differs from other members of the *querneus* group by characters given in the key to species.

Alabama distribution: Shelby[1] County.

Specimens examined: 9 males, 10 females AU.

See the discussion under *M. querneus.*

Melanoplus walshi Scudder

Differs from other members of the *querneus* group chiefly by characters given in the key to species.

Alabama distribution: Madison[1] County.

Specimens examined: 5 males, 1 female AU.

See the discussion under *M. querneus.*

Melanoplus differentialis differentialis (Thomas)

Body length, male 28-34 mm, female 34-44 mm. General color dull brownish green above, yellow beneath; postocular dark stripe represented by a vague black splotch on prozona. Hind femur with chevrons on outer face black, hind tibia yellow. Cercus of male broad, roughly boot shaped, the apical "toe" as long as the basal "leg," "heel" short, triangular (Fig. 42); furcula absent.

Alabama distribution: Calhoun[2], Chilton[1], Cleburne[1], Dallas[1,2], DeKalb[1], Lauderdale[1], Lee[1], Limestone[1], Madison[1], Marengo[2], Montgomery[1], and Winston[1] counties.

Specimens examined: 15 nymphs, 9 males, 4 females UMMZ; 13 males, 11 females AU.

This economically important grasshopper is often very abundant locally where conditions are favorable. It inhabits pastures, old fields, roadsides, and similar areas. In the northern part of the State (Limestone and Madison counties), it is common in johnsongrass along the sides of roads and in the edges of cotton and corn fields. At Marion Junction the fourth and fifth instars were very common in pastures in late June. Adults have been collected in Alabama from July 22 to September 14. See Roberts *(71)* for more information.

Melanoplus bivittatus Say

Body length, male 23-29 mm, female 31-40 mm. Coloration much the same as in *M. differentialis;* a narrow yellowish stripe extending back from upper angle of each eye along sides of disk of pronotum nearly to tips of tegmina. Hind femur dull yellow, usually with a dull fuscous stripe on upper half of outer face; hind tibia bright red. Cercus of male broad, flat, upper angle of apex expanded into a broad toe-like structure, lower angle not expanded, broadly rounded; furcula short, much swollen, triangular, widely separated.

Alabama distribution: Calhoun[2], Cleburne[1,2], and Coosa[1] counties.

Specimens examined: 4 males, 7 females UMMZ; 4 males, 2 females AU.

All of the Alabama specimens were taken from the northern portion of the State. It is found in habitats similar to those of *M. differentialis.* This

species is common and widely distributed in the states north of Alabama. From present information it appears that this species does not occur in the southern half of the State. Dates on the specimens range from July 6 to September 9.

Melanoplus punctulatus arboreus (Scudder)

Body length, male 27-30 mm, female 36-44 mm. General coloration dark brownish gray, mottled with blackish brown; postocular dark stripe absent. Hind femur with fuscous bars on outer face; hind tibia dull red. Cercus of male roughly boot shaped, apical half expanded to nearly twice the width of base (Fig. 41); furcula very small, triangular.

Alabama distribution: Cleburne[2], Dale[2], Lee[2], and Tallapoosa[1] counties.

Specimens examined: 4 nymphs, 6 males, 3 females UMMZ; 1 male AU.

The members of this species inhabit the terminal twigs of pine trees. During the day they move from place to place on the tree to remain in the sunlight. Occasionally males are attracted to lights at night. Collection dates range from August 19 to October 9. See Rehn *(50)* for more information.

Melanoplus femurrubrum femurrubrum (DeGeer)

Body length, 17-27 mm. Reddish brown to greenish brown above, dull greenish yellow beneath; postocular dark stripe represented by a broad, indistinct bar on prozona. Hind tibia usually bright red. Valves of ovipositor long, thin, tips strongly curved (Fig. 76).

Alabama distribution: Calhoun[2], Cleburne[2], Dallas[1,2], Escambia[2,3], Jackson[1], Marengo[2], Marion[1], Montgomery[1], Perry[1], Tallapoosa[1], and Wilcox[1,2] counties.

Specimens examined: 10 males, 7 females UMMZ; 15 males, 12 females AU.

According to records at Auburn this subspecies is common throughout the northern half of the State. In the eastern portion of the State it apparently does not extend south of the Piedmont. In the western portion it ranges southward at least as far as Camden in Wilcox County. Morse *(45)* recorded typical *M. f. femurrubrum* from Escambia County on the southern edge of the State. The authors have seen a male, in the University of Michigan collection, collected by Morse labeled "Flomaton." It is typical *M. f. femurrubrum* but it is felt that the locality datum is in error. These collections indicate that typical *femurrubrum* does not occur this far south. All of the specimens seen by the authors from Escambia and surrounding counties (Baldwin, Clarke, Conecuh, and Covington) are typical of *M. f. propinquus*. As the authors understand it, the distributional relationship of *M. f. femurrubrum* and *M. f. propinquus* in Alabama appears to be very similar to that of at least one other pair of Orthoptera, *Orchelimum vulgare* and *O. glaberrimum*. The authors have seen no evidence of intergradation between *femurrubrum* and *propinquus* in Alabama, and it is possible that the two are good species.

Melanoplus femurrubrum propinquus Scudder

Differs from typical *femurrubrum* chiefly in the nature of male terminal structures as described in key. No good characters have been found to separate the females.

Alabama distribution: Baldwin[1], Butler[2], Chilton[1], Clarke[2], Conecuh[1], Covington[1], Dale[2], Escambia[2], Houston[1,2], Lee[1], Mobile[1], and Tallapoosa[1] counties.

Specimens examined: 7 males, 10 females UMMZ; 11 males, 2 females AU.

See the notes under *M. f. femurrubrum* for more information. Dates on specimens range from June 7 to October 18.

Melanoplus impudicus Scudder

Body length, male 18-20.5 mm, females 22-23 mm. Color dark, grayish brown above, greenish yellow beneath; postocular dark stripe absent in female, pale, indistinct, terminating at hind margin of prozona of male. Upper outer face of hind femur with three black bars; hind tibia bright red. Cercus of male short, apex acute (Fig. 54). Ovipositor valves short, stubby, tips only slightly bent (Fig. 74).

Alabama distribution: Calhoun[2], Chilton[1], Cleburne[1,2], DeKalb[1], Houston[3], Perry[1], Shelby[1], Talladega[1], and Washington[2] counties.

Specimens examined: 17 males, 23 females UMMZ; 21 males, 14 females AU.

Unlike most members of the genus *Melanoplus*, this form is found chiefly in areas of sparse vegetation. It occurs most frequently on bare rocky or sandy areas. Specimens have been collected from June 7 to September 9. See Gurney *(14)* for descriptions and more information on ecology and distribution.

Melanoplus sanquinipes vulturnus Gurney and Brooks

Body length, 17-27 mm. Color very variable, usually a light brown; postocular dark stripe indistinct, terminating at hind margins of prozona. Hind femur tinged with fuscous on upper outer face; hind tibia varying from light red to gray blue. Cercus of male a broad flat plate, lower margin curving dorsad, upper margin almost straight (Fig. 66).

Alabama distribution: Baldwin[1], Bibb[1], Butler[1,3], Calhoun[2], Chilton[1], Clarke[2], Cleburne[1,2], Conecuh[1,2], Cullman[1], Dallas[2,3], DeKalb[1], Escambia[2,3], Greene[1], Jackson[1,2], Lee[1,2,3], Madison[1], Mobile[1,2], Monroe[2], Montgomery[1], Russell[1], Tallapoosa[1], Tuscaloosa[1], and Wilcox[1,2] counties.

Specimens examined: 24 males, 32 females UMMZ; 43 males, 48 females AU.

This is the most abundant species of *Melanoplus* in Alabama. It occupies many different habitats, but is primarily a grassland species and may be found in great numbers in pastures, along roadsides, and in similar areas. Its attacks on crops make it of some economic importance. Specimens have been collected from May 12 to November 22. See Gurney and Brooks *(17)* where it is listed under the name *M. bilituratus vulturnus* for more information.

Melanoplus keeleri keeleri (Thomas)

Body length, male 17.5-27 mm, female 26-35 mm. Color dark brown above, dull greenish brown beneath; postocular dark stripe indistinct, terminating at hind margin of prozona. Upper outer face of hind femur with two black bars; hind tibia bright red. Furcula minute, triangular.

Alabama distribution: Baldwin[1], Butler[1], Cleburne[1,2], Conecuh[2], Covington[1], Dale[2], DeKalb[1], Escambia[1], Geneva[1], Houston[2], Lee[1,2], Mobile[1,2], Pike[2], Russell[1], and Talladega[1] counties.

Specimens examined: 15 nymphs, 30 males, 27 females UMMZ; 25 males, 15 females AU.

This species inhabits the grasses and low shrubs of open woodlands. It is not usually found in open grasslands. Specimens have been collected from August 21 to November 14.

Melanoplus bispinosus Scudder

Body length 22-32 mm. Color yellowish brown, sprinkled with fuscous; postocular dark stripe indistinct, terminating at hind margin of prozona. Upper outer face of hind femur with two dark bars; hind tibia gray blue. Male cercus short, slightly narrowed at middle, apical third with outer surface sulcate, tip broadly rounded (Fig. 67); furcula, long, tapering, extending one-half or more the length of the supra-anal plate.

Alabama distribution: Covington[1], Dallas[1], Russell[1], and Wilcox[1] counties.

Specimens examined: 11 males, 6 females AU.

This species, like *Campylacantha olivacea,* is chiefly western in distribution. As best that can be determined, the 17 specimens listed are the only ones known from east of the Mississippi River. It is an inhabitant of grasslands, field margins, pastures, and other open grassy areas. Dates on the specimens range from June 14 to November 15.

Dendrotettix australis (Morse)

Body length 20-25 mm. Color buff to olive gray. Tegmina reduced, covering first two abdominal segments, elongate-ovate in shape. Legs bright yellow green; outer face of hind femur cherry red; hind tibia glaucous. Cercus of male broad, flat, strongly tapering on apical one-third; furcula short, triangular, very broad at base.

Alabama distribution: Cleburne[1,2,3] County.

Specimens examined: 1 male, 6 females UMMZ; 3 males AU.

This species has been collected in Alabama only from the summit of Cheaha Mountain. It occurs on foliage of *Pinus virginiana,* a common tree in the higher elevations of northeastern Alabama. Dates on the specimens range from June 30 to September 9. Friauf *(10)* has a complete summary of all known information for this species.

Paroxya atlantica atlantica Scudder

Body length, male 16-24 mm, female 22-28 mm. Color brown above, light yellow or olive green below. Tegmina and wings fully developed, extending to tip of abdomen. Cercus of male long, slender, strongly incurved,

narrowed at middle, apical one-third flattened, apex broadly rounded (Fig. 52).

Alabama distribution: Baldwin[1,2], Conecuh[1], Houston[2], and Mobile[1,2,3] counties.

Specimens examined: 20 males, 12 females UMMZ; 4 males, 4 females AU.

This species is found in vegetation bordering lakes and streams and in ditches. Specimens have been collected from June 23 to November 15.

Paroxya hoosieri (Blatchley)

Body length, male 20-24 mm, female 29-34 mm; female much broader and heavier in form. Color brown above, olive green below. Tegmina semi-reduced, usually covering about three-fourths of abdomen. Cercus of male long, slender, incurved, narrowed at middle, apical one-fourth flattened, apex truncate (Fig. 37).

Alabama distribution: Bullock[1], Butler[1], Conecuh[1,2], Covington[1], Houston[1], Lee[1], and Marshall[1] counties.

Specimens examined: 2 males, 6 females UMMZ; 26 males, 23 females AU.

This species is also found in wet situations similar to the habitats of *P. atlantica*. Specimens have been collected from May 24 to November 16.

Aptenopedes sphenariodes appalachee Hebard

Body length, male 16-21 mm, female 22-28 mm. Color green. Antenna subensiform, light brown, darker at tips. Tegmina reduced, linear, widely separated. Legs reddish yellow, hind tibia dull bluish green. Cercus of male short, stout, simple, tip truncate (Fig. 51).

Alabama distribution: Houston[3] County.

Specimens examined: None.

Hebard *(31)*, in his original description of this subspecies, recorded 11 nymphs and 2 males from Dothan. He stated that these specimens were taken from the undergrowth of a longleaf pine forest on September 6.

FAMILY TETTIGONIIDAE — LONG-HORNED GRASSHOPPERS, KATYDIDS, OR MEADOW GRASSHOPPERS

Species varying in size from small to very large; body color often green; antennae filiform, composed of many segments, usually longer than body; hind femur enlarged, usually fitted for leaping; tarsi 4-segmented; tympanum on base of front tibia; ovipositor laterally flattened, sword-like, composed of 4 valves.

Most of the members of this family are found on vegetation and the usual green color presumably serves as protective coloration. Many of the species are nocturnal, but the common "meadow grasshoppers" are diurnal. Most of the males have well developed

stridulating organs on the tegmina and each species has a distinctive calling song by which it can be identified.

Blatchley (5) is the latest general work on the eastern forms; there are quite a few more recent papers on special groups. These will be mentioned in the discussions following the species descriptions.

Key to the Species of the Family Tettigoniidae Known to Occur in Alabama

1. Dorsal surface of first tarsal segment with lateral grooves; prosternal spines present or absent 14
   Dorsal surface of first tarsal segment not laterally grooved; prosternal spines absent 2
2. Hind legs nearly four times as long as body; hind margin of pronotum obtuse angled; eyes nearly twice as long as wide ..... *Arethaea phalangium* (Scudder) page 67
   Hind legs not more than three times as long as body; hind margin of pronotum broadly rounded; eyes not more than one-half longer 3
3. Fastigium little, if any, wider than basal antennal segment 4
   Fastigium much wider than basal antennal segment 9
4. General coloration green, strikingly marked with black and brown ..... *Inscudderia walkeri* Hebard page 68
   General coloration green, not marked with black and brown 5
5. Front and middle femora armed beneath with strong teeth; eyes oblong-oval, longer than wide ..... *Montezumina modesta* (Brunner) page 69
   Front and middle femora with ventral margins unarmed; eyes subglobose 6
6. Male with last dorsal abdominal segment prolonged caudally into a prominent process which is distinctly and deeply forked (Fig. 82); female usually less than 23 mm; ovipositor usually not more than 7 mm long 8
   Male with last dorsal abdominal segment prolonged caudally into a prominent process which is forked, but with either a very wide and shallow or a narrow median notch (Figs. 80 and 81); female usually 23 or more mm; ovipositor usually at least 7 mm long 7
7. Notch of dorsal abdominal process of male subquadrate with a small median tooth, the notch as wide as middle of supra-anal plate; ovipositor of female bent strongly upward near base, wider at base than at middle ..... *Scudderia texensis* Saussure and Pictet page 68
   Notch of dorsal abdominal process of male without a median tooth, much narrower than subgenital plate; ovipositor of female curving upwards only moderately, base and middle subequal in size ..... *Scudderia curvicauda laticauda* Brunner page 68
8. Lobes of fork of dorsal abdominal process of male subcylindrical, rounded above, widely separated at tips; ovipositor with tip of lower valve not reaching tip of upper valve ..... *Scudderia furcata furcata* Brunner page 68

Lobes of fork of dorsal abdominal process of male obliquely compressed, their inner edges subacute, more narrowly separated at tips; ovipositor with tip of lower valve reaching tip of upper valve ..... *Scudderia cuneata* Morse page 69

9. Front and middle tibiae flat or sulcate dorsad, with lateral margins raised 10
Front and middle tibiae convex dorsad 13

10. Lobes of metasternum as long as or longer than wide 11
Lobes of metasternum wider than long ..... *Amblycorypha rotundifolia* (Scudder) page 70

11. Hind femur not surpassing tips of tegmina; length of tegmina more than 30 mm; apex of subgenital plate of male with a deep, V-shaped notch 12
Hind femur surpassing tips of tegmina; length of tegmina less than 30 mm; apex of subgenital plate without a deep notch ..... *Amblycorypha uhleri* Stal page 70

12. Stridulating field of male much longer than pronotum; ovipositor evenly and regularly curved, margin with heavy teeth; lateral carinae of pronotum usually obsolete on anterior one-third ..... *Amblycorypha oblongifolia* (DeGeer) page 69
Stridulating field of male but little longer than pronotum; ovipositor less evenly and regularly curved, margin with smaller teeth; lateral carinae of pronotum distinct throughout ..... *Amblycorypha floridana carinata* Rehn and Hebard page 69

13. Anterior margin of pronotum sinuate, with a more or less distinct median tooth; general color dark green ..... *Microcentrum rhombifolium* (Saussure) page 70
Anterior margin of pronotum truncate; general color pale green, the head and ventral surface tinged with yellow ..... *Microcentrum retinerve* (Burmeister) page 70

14. Pronotum longer than wide, with one transverse sulcus or none; tegmina usually not broadly oval and convex; mesal margins of antennal sockets not ridgelike 15
Pronotum about as long as wide, with two transverse sulci; tegmina broadly oval and convex; mesal margins of antennal sockets elevated and ridgelike, extending nearly to dorsal surface of vertex ..... *Pterophylla camellifolia* (Fabricius) page 71

15. Anterior portion of vertex conical, sometimes acuminate, extending well beyond basal antennal segment 16
Anterior portion of vertex usually not conical or acuminate, not extending beyond basal antennal segment 25

16. Tegmina lobiform, covering less than one-half the abdomen; wings absent or rudimentary 17
Tegmina covering more than one-half of abdomen; wings present 18

17. Subgenital plate of female with lateral projections that reach nearly to dorsal margin of ovipositor; ovipositor usually 17.7 mm or less; male cercus with the two incurved "claws" longer and decidedly decurved; last abdominal tergite of male with a deep V-shaped notch ..... *Belocephalus hesperus* Hebard page 71

Subgenital plate of female with short lateral projections which do not extend to near dorsal margin of ovipositor; ovipositor 16.6-20 mm; male cercus with the two incurved "claws" rather short and only slightly decurved; V-shaped notch of last dorsal abdominal segment of male shallow ..... *Belocephalus subapterus subapterus* Scudder page 71

18. Fastigium ending in a short, strongly decurved spine (Fig. 83) ..... *Pyrgocorypha uncinata* (Harris) page 71
Fastigium not ending in a short strongly decurved spine (Fig. 84-85) 19

19. Fastigium with a tooth beneath, its lower face well separated from the median facial ridge (Fig. 84) 20
Fastigium without a tooth beneath, its lower face only slightly separated from the median facial ridge (Fig. 85) ..... *Bucrates malivolans* (Scudder) page 73

20. Fastigium distinctly longer than wide, its tip not broadly and evenly rounded 21
Fastigium not or but slightly longer than wide, its apex broadly and evenly rounded 24

21. Ventral surface of fastigium marked with black 22
Ventral surface of fastigium immaculate 23

22. Fastigium narrowing rapidly from base to apex, apex narrowly rounded ..... *Neoconocephalus exiliscanorus* (Davis) page 72
Fastigium narrowing only slightly from base to apex, apex subtruncate ..... *Neoconocephalus caudellianus* (Davis) page 72

23. Body form very robust, ovipositor subequal in length to hind femur ..... *Neoconocephalus robustus crepitans* (Scudder) page 72
Body form very slender, ovipositor shorter than hind femur ..... *Neoconocephalus velox* Rehn and Hebard page 73

24. Vertex slightly longer than wide, convex above; ovipositor much longer than hind femur; tegmina surpassing hind femora less than 11 mm ..... *Neoconocephalus retusus* (Scudder) page 73
Vertex usually wider than long, almost flat above; ovipositor but slightly longer than hind femur; tegmina surpassing hind femora 15 mm or more ..... *Neoconocephalus triops* (Linnaeus) page 73

25. Dorsal surface of front tibia without spines 26
Dorsal surface of front tibia with one or more spines 55

26. Cercus of male with a single tooth; tegmina of female visible 27
Cercus of male with two teeth (Fig. 89); tegmina of female not visible ..... *Odontoxiphidium apterum* Morse page 78

27. Tegmina surpassing abdomen; prosternal spines long; ovipositor stout, usually distinctly upcurved; body usually more than 18 mm in length 28
Tegmina shorter than abdomen in most species; prosternal spines usually short or absent; ovipositor narrow, straight or nearly so; length of body usually less than 17 mm 45

28. Males 29
Females 37

29. Cercus of moderate length, median tooth attached more than one-third of total length of cercus from the base 30

Cercus elongate, median tooth attached not more than one-third of total length of cercus from the base 35

30. Tooth of cercus not longer than apical portion of shaft and not strongly aciculate 31
Tooth of cercus longer than apical portion of shaft and strongly aciculate ..... *Orchelimum sylvaticum* McNeill page 75

31. Upper surface of cercus without a sinuate carina 32
Upper surface of cercus with a sinuate carina 34

32. Cercus not depressed, its tooth more or less thickened at base 33
Cercus depressed, its tooth flattened at base and set at right angles to shaft ..... *Orchelimum agile* (DeGeer) page 74

33. Cercus without a rounded dorsal tubercle or node on apical half; face reddish* ..... *Orchelimum glaberrimum* (Burmeister) page 74
Cercus with a rounded dorsal tubercle or node on apical one-half; face rarely reddish ..... *Orchelimum vulgare* Harris page 74

34. Tibiae not blackish; notch of supra-anal plate U-shaped, as broad or broader than deep; tooth of cercus with its apical one-half straight or nearly so ..... *Orchelimum pulchellum* Davis page 75
Tibiae blackish; notch of supra-anal plate V-shaped, deeper than broad; tooth of cercus with apical one-half curved ..... *Orchelimum nigripes* Scudder page 75

35. Apical portion of cercus tapering to a subacute apex, tooth directed strongly toward base ..... *Orchelimum militare* Rehn and Hebard page 76
Apical portion of cercus not tapering to a subacute apex, tooth not strongly directed toward base 36

36. Lateral lobes of pronotum slightly longer than deep ..... *Orchelimum minor* Brunner page 76
Lateral lobes of pronotum deeper than long ..... *Orchelimum concinnum* Scudder page 76

37. Upper margin of ovipositor more or less curved 38
Upper margin of ovipositor straight or nearly so ..... *Orchelimum militare* Rehn and Hebard page 76

38. Ovipositor not more than one-half the length of the hind femur 39
Ovipositor more than one-half the length of the hind femur 43

39. Hind femur usually not armed on outer lower carina (occasionally with one or two spines) 40
Hind femur armed on outer lower carina with three or four spines ..... *Orchelimum sylvaticum* McNeill page 75

40. Face red or marked with red 41
Face usually not red or marked with red 42

41. Entire head and face red or reddish brown ..... *Orchelimum glaberrimum* (Burmeister) page 74
With only a mid-facial red stripe ..... *Orchelimum concinnum* Scudder page 76

---

* Some specimens from central Alabama appear to be intermediate between *O. glaberrimum* and *O. vulgare* and will not completely fit either couplet under number 33.

42. Ovipositor wider at base than at any other point ..... *Orchelimum agile* (DeGeer) page 74
Ovipositor wider at some point beyond the base ..... *Orchelimum vulgare* Harris page 74

43. Tibiae not blackish 44
Tibiae blackish ..... *Orchelimum nigripes* Scudder page 75

44. Face yellow ..... *Orchelimum pulchellum* Davis page 75
Face green ..... *Orchelimum minor* Brunner page 76

45. Hind tibia armed at apex with three pairs of spurs, prosternum bispinose 46
Hind tibia armed at apex with one pair of spurs, prosternum without spines ..... *Conocephalus saltans* (Scudder) page 78

46. Males 47
Females 51

47. Apex of subgenital plate not emarginate, unarmed, styles present 48
Apex of subgenital plate emarginate, armed with two strong, straight spines, styles absent ..... *Conocephalus allardi* (Caudell) page 76

48. Cercus armed on inner margin with a stout tooth, the base of which is visible from above (Figs. 86, 87, and 88) 49
Cercus armed on ventral side with a small tooth, its base not visible from above ..... *Conocephalus spartinae* (Fox) page 78

49. Apex of cercus more or less flattened, its apex broad and rounded (Figs. 87 and 88) 50
Apex of cercus not at all or only weakly flattened, its apical portion very elongate, slender, tip subacuminate (Fig. 86) ..... *Conocephalus strictus* Scudder page 77

50. Cercus strongly flattened on the mesal side; tegmina and wings usually shorter than abdomen (Fig. 88) ..... *Conocephalus brevipennis* (Scudder) page 77
Cercus not strongly flattened on mesal side; tegmina longer than abdomen (Fig. 89) ..... *Conocephalus fasciatus fasciatus* (DeGeer) page 77

51. Ovipositor distinctly longer than hind femur 52
Ovipositor shorter than or subequal in length to hind femur 53

52. Tegmina covering about one-half of abdomen; ovipositor only slightly longer than length of body ..... *Conocephalus allardi* (Caudell) page 76
Tegmina very short, pad-like, covering about one-third of abdomen (very rarely with tegmina fully developed and exceeding tip of abdomen). Ovipositor much longer than body ..... *Conocephalus strictus* (Scudder) page 77

53. Tegmina usually shorter than abdomen, rarely fully developed; ovipositor subequal in length to hind femur 54
Tegmina always fully developed, longer than abdomen; ovipositor about two-thirds length of hind femur ..... *Conocephalus fasciatus fasciatus* (DeGeer) page 77

54. Ovipositor curved very slightly at tip; hind femur with more or less distinct red dots ..... *Conocephalus spartinae* (Fox) page 78
Ovipositor straight throughout; hind femur without red dots ..... *Conocephalus brevipennis* (Scudder) page 77

55. Tegmina reduced, not covering entire abdomen, usually brown or gray in color 56
Tegmina covering entire abdomen, color green ..... *Hubbellia marginifera* (Walker)*.

56. Lateral carinae of pronotum distinct throughout; tegmina of male never completely hidden by pronotum 57
Lateral carinae of pronotum obtusely rounded, distinct only on posterior lobe; tegmina of male almost or completely hidden by pronotum 59

57. Prosternal spines elongate; hind femur usually decidedly longer than body; male cercus relatively elongate 58
Prosternal spines short; hind femur about as long as body; male cercus relatively short and robust ..... *Atlanticus monticola monticola* Davis page 78

58. Male subgenital plate with a narrow notch, followed by a longitudinal carina; female subgenital plate with a narrow cleft which extends more than one-half the distance to the base of the plate ..... *Atlanticus americanus americanus* (Saussure) page 79
Male subgenital plate with a broad U- or V-shaped notch, longitudinal carina following this notch absent or faintly indicated; female subgenital plate with a broad V-shaped notch extending less than one-half the distance to the base of the plate ..... *Atlanticus americanus hesperus* Hebard page 79

59. Disk of pronotum narrower at apical one-fourth than at front margin; body length of males usually more than 26 mm, of females usually more than 27 mm; cercus of male elongate, tapering and with a long, slender, curved sub-basal tooth ..... *Atlanticus gibbosus* Scudder page 79
Disk of pronotum not narrower at apical one-fourth than at front margin; males usually less than 26 mm, females usually less than 27 mm, cercus of male short, robust, its tooth stout ..... *Atlanticus dorsalis* (Burmeister) page 80

Arethaea phalangium (Scudder)

Body length 16-24 mm. General coloration green; head with a narrow pinkish-purple stripe behind each eye, extending back and converging on prozona of pronotum. Tegmina one-third to one-half longer than body, narrow, tips rounded. Ovipositor short, broad, upturned, margins finely toothed.

Alabama distribution: Bullock[1] County.

Specimens examined: 1 male AU.

This species is usually found in the undergrowth of open pine woods. It is apparently rare. The single Alabama specimen is from Union Springs

* No actual specimens of this species are known from Alabama. This is perhaps because of the habitat (the tops of pine trees) and the difficulty in pinpointing the location of the stridulating males. There seems to be little doubt that this species occurs at least throughout the southern half of the State and is probably rather abundant.

and is without a definite collection date. Hebard *(32)* has more information on this species.

Inscudderia walkeri Hebard

Body length, male 18-19 mm, female 19-25 mm. General coloration green; tegmina with median vein, stripe along juncture of discoidal and anal fields, and veins running to anal margin blackish brown. Vertex compressed, narrow. Cercus of male elongate, tapering, distal portion bent inward as a heavy tooth-like structure; subgenital plate of male elongate, narrow, curved upward, dorsal surface sulcate, apex with V-shaped notch; ovipositor long, broad, weakly curved.

Alabama distribution: Baldwin[1] and Mobile[1] counties.

Specimens examined: 11 nymphs, 1 male, 4 females AU.

This species has been taken only from the foliage of bald cypress. The specimens were collected in July and August. See Hebard *(24)* for further information.

Scudderia texensis Saussure and Pictet

Body length 21-28 mm. Tegmina, wings and legs bright green, body and head fading to yellow in dried specimens. Pronotum much longer than broad, lateral margins diverging posteriorly.

Alabama distribution: Baldwin[2], Bibb[1], Conecuh[2], Cullman[1], Dallas[1], DeKalb[1], Escambia[1], Lee[1], Madison[2], and Mobile[2] counties.

Specimens examined: 10 males, 2 females UMMZ; 9 males, 9 females AU.

This species can be found on tall grasses and weeds in a variety of situations. It is a good flier and when flushed usually flies for a considerable distance and lands either on other grasses or the low branches of trees. Dates on the specimens range from June 7 to November 1.

Scudderia curvicauda laticauda Brunner

Body length 21-27 mm. General color pale green, head, pronotum, and abdomen yellow in dried specimens. Pronotum with lateral margins subparallel.

Alabama distribution: Baldwin[1], Choctaw[1], Cleburne[1,2], DeKalb[3], Escambia[1], Lawrence[1], Lee[1], Limestone[1], Mobile[3], and Tallapoosa[1] counties.

Specimens examined: 3 females UMMZ; 3 males, 8 females AU.

This species is found in the undergrowth of open pine woods. Dates on the specimens range from June 26 to August 26.

Scudderia furcata furcata Brunner

Body length 15-21 mm. General coloration dark green. Disk of pronotum short with sides parallel.

Alabama distribution: Chilton[1], Cleburne[1], Dallas[1,3], Lee[1], Macon[1], and Tallapoosa[1] counties.

Specimens examined: 17 males, 7 females AU.

This species inhabits vegetation in a variety of habitats. However, it seems to occur most frequently in wet areas such as roadside ditches. It has been collected in the State from June 14 to October 12.

Scudderia cuneata Morse

Body length 18-22 mm. Very similar to *S. furcata* in general appearance.

Alabama distribution: Bullock[1], Chilton[1], Escambia[1], and Lee[1] counties.

Specimens examined: 6 males, 6 females AU.

This species can be found in the undergrowth of pine woods and in tall grasses along roadsides. Morse's type was simply listed from Alabama without any definite locality. Dates on the Alabama specimens range from August 25 to October 4.

Montezumina modesta (Brunner)

Body length, male 15-16 mm, female 18-20 mm. General coloration pale green. Supra-anal plate of male triangular, deflexed between cerci; male subgenital plate short, broad, broadly emarginate at apex; ovipositor abruptly bent upward near base, longer than pronotum.

Alabama distribution: Baldwin[1], Cleburne[1,2], and Lee[1] counties.

Specimens examined: 1 female UMMZ; 2 males, 1 female AU.

Apparently little is known about this species. It has never been collected in large numbers. One specimen in the Auburn collection was taken in a light trap near Fairhope. It has also been collected on bushes at Cheaha Mountain and Auburn. Dates on the specimens range from July 4 to September 9.

Amblycorypha oblongifolia (DeGeer)

Body length 21-25 mm. General color bright green, abdomen yellow, stridulating field of male brown with a heavy green cross vein. Supra-anal plate of male short, truncate; cerci of male long, tapering, bent mesad and crossed; ovipositor broad, curving upwards gradually from middle.

Alabama distribution: Baldwin[1], Lawrence[1], and Lee[1] counties.

Specimens examined: 6 males, 1 female AU.

This species can be found on grasses and other vegetation along roadsides. It often occurs on vegetation in very wet habitats such as the margins of ponds and streams. Collection dates range from June 12 to July 7. Blatchley *(5)* recorded this species from the State but did not give a definite location.

Amblycorypha floridana carinata Rehn and Hebard

Differs from *A. oblongifolia* chiefly by the characters given in the key.

Alabama distribution: Bibb[1], Cleburne[1,2], Dallas[1], Jackson[2], Lee[1], Macon[1], Marshall[1], Pike[1], Talladega[1], and Winston[1] counties.

Specimens examined: 1 nymph, 1 male UMMZ; 11 males, 3 females AU.

This species can be found in similar habitats to those described for *A. oblongifolia*. Collection dates range from June 28 to August 18.

Amblycorypha uhleri Stal

Body length, male 14-15 mm, females 16-18 mm. General coloration grass green, fading in dried specimens to greenish yellow Differs from *A. oblongifolia* chiefly in much smaller size and by other characters given in key.

Alabama distribution: Baldwin[1], Bibb[1], Calhoun[2], Chilton[1], Cleburne[1,2], Conecuh[1], Dallas[1], Lauderdale[1], Lee[1], Madison[1,2], Mobile[2], St. Clair[1], Walker[1] and Winston[1] counties.

Specimens examined: 9 males, 3 females UMMZ; 17 males, 6 females AU.

This seems to be the most frequently encountered member of the genus *Amblycorypha* in the State. It is common in grasses and other vegetation on roadsides, fields, and wood margins. It can be found on much lower vegetation than can other members of the genus. Dates on the specimens range from June 20 to September 11.

Amblycorypha rotundifolia rotundifolia (Scudder)

Body length 19-20 mm. General coloration bright green, abdomen yellow. Tegmina ovate. Ovipositor more distinctly curved and more strongly toothed than the other three species of the genus.

Alabama distribution: Calhoun[2], Cleburne[1,2,3], DeKalb[3], Lawrence[1], Lee[1], Madison[1], Walker[1], and Winston[1] counties.

Specimens examined: 11 males, 5 females UMMZ; 3 males, 8 females AU.

This species also inhabits the weeds and grasses of roadsides and other similar situations. Dates on the specimens range from June 20 to September 9.

Microcentrum rhombifolium (Saussure)

Body length, male 25-28 mm, female 28-30 mm. Hind femur much shorter than tegmina. Cercus of male slender, subcylindrical, strongly incurved, tip very acute; subgenital plate of male with a deep rounded notch in apex; ovipositor with apex subtruncate or broadly rounded.

Alabama distribution: Cleburne[1], Lee[1,2], Pike[2], and Wilcox[2] counties.

Specimens examined: 1 nymph, 1 male, 2 females UMMZ; 5 males, 1 female AU.

This species is commonly found in shrubs and small bushes. It is often found in the shrubs around houses, even in cities. It is also attracted to lights at night. The Cleburne County specimens were taken at night from Cheaha Mountain in young oaks growing along the roadside. Dates on the specimens range from July 28 to September 15.

Microcentrum retinerve (Burmeister)

Body length, male 20-22 mm, female 24-26 mm. Male cercus only slightly incurved, tip not sharply acute as in *M. rhombifolium.* Apex of ovipositor tapering, narrowly rounded.

Alabama distribution: Lee[1] and Pike[2] counties.

Specimens examined: 1 nymph UMMZ; 8 males AU.

This species also inhabits low shrubs and other vegetation. Dates on adult specimens range from August 18 to October 4.

Pterophylla camellifolia camellifolia (Fabricius)

Body length 25-34 mm. Tegmina dark green, remainder of body pale green, often fading to brownish yellow on drying. Fastigium narrow, triangular, sulcate. Subgenital plate of male produced into a long spear-like process; ovipositor twice as long as pronotum, strongly bent upward, tip acute.

Alabama distribution: Calhoun[2], Cleburne[1,2], Conecuh[3], Lee[1], Madison[1,2], Walker[1], Washington[2], and Winston[1] counties.

Specimens examined: 2 nymphs, 12 males, 6 females UMMZ; 7 males, 1 female AU.

This large species is usually found in the crowns of deciduous trees. The males have well-developed stridulating organs and at night produce the very loud characteristic call which is responsible for the common name of katydid. It is common and widespread throughout Alabama but is not often collected because of its lofty habitat. Dates on the Alabama specimens range from June 26 to September 9. Hebard *(33)* has more information on this species and other related forms.

Belocephalus subapterus subapterus Scudder

Body length 28-38 mm. General coloration usually pale green, or brown, tinged with yellow, with two dark stripes extending from middle of fastigium to hind margin of pronotum, tip of fastigium shining black. Subgenital plate of male feebly emarginate and with a pair of styles; ovipositor stout, almost straight, slightly longer than hind femur.

Alabama distribution: Baldwin[2], Conecuh[2], Houston[3], and Monroe[2] counties.

Specimens examined: 4 nymphs, 2 males, 3 females UMMZ.

This species inhabits the undergrowth of open fields. According to Rehn and Hebard *(66)* adults are most abundant in December. Adults have been collected in Alabama as early as September 13. See Hebard *(26)* for more information.

Belocephalus hesperus Hebard

Body length 23-31 mm. Quite similar in appearance to *B. subapterus*. It differs mainly in characters given in key and in slightly smaller size.

Alabama distribution: Mobile[3] County.

Specimens examined: None.

Hebard's types of this species were taken from short grasses of longleaf pine flatwoods at St. Elmo, Alabama. See Hebard *(26)* for the original description, illustrations, and other notes.

Pyrgocorypha uncinata (Harris)

Body length, male 32-34 mm, female 34-42 mm. General coloration green or reddish brown; tegmina with numerous scattered, minute black

dots. Hind femur short, reaching only slightly beyond middle of tegmina. Ovipositor slender, straight, tip acute, not reaching tips of tegmina.

Alabama distribution: DeKalb[1], Lee[1], and Tallapoosa[1] counties.

Specimens examined: 1 nymph, 8 males, 6 females AU.

Although originally described from Alabama by Harris, this species is not often collected in the State. Little concerning its ecology in the State has been recorded. Most of the specimens in the Auburn collection were taken from a light trap near Dadeville. Dates on the specimens range from August 8 to November 10.

Neoconocephalus exiliscanorus (Davis)

Body length, male 33-37 mm, female 38-44 mm; form moderately robust. General coloration green, tinged with yellow or brown spotted with fuscous. Fastigium very prominent, extending a considerable distance in front of eyes. Lateral lobes of pronotum flaring outward rather than being perpendicular as in other species. Ovipositor long and slender, greatly exceeding the tips of the tegmina.

Alabama distribution: Tallapoosa[1] County.

Specimens examined: 1 female AU.

The single Alabama specimen was taken from vegetation along the bank of the Tallapoosa River in Horseshoe Bend National Park on July 29, 1964. This species normally inhabits coastal marshes, but according to Blatchley *(5)*, it ranges inland as far as Indiana and Tennessee.

Neoconocephalus robustus crepitans (Scudder)

Body length, male 36-38 mm, female 38-40 mm; size large and form robust for genus. General coloration pale green or brown. Fastigium feebly tapering on apical one-third, tip bluntly rounded. Lateral margins of pronotum subparallel. Tegmina very long and rather broad for genus. Ovipositor not exceeding tips of tegmina.

Alabama distribution: Calhoun[2], Dallas[1], DeKalb[1], and Lee[1] counties.

Specimens examined: 1 male UMMZ; 2 males, 3 females AU.

Little is known of the habits of this species in Alabama. It probably is an inhabitant of thick grasses and weeds, like most others of this genus. Three of the five specimens in the Auburn collection were taken from light traps in Crossville and Auburn. Specimens have been collected from August 14 to September 10.

Neoconocephalus caudellianus (Davis)

Very similar in appearance to *N. robustus crepitans*, but slightly smaller and less robust. The most conspicuous difference between the two is the dark stripe on the ventral surface of the fastigium of *N. caudellianus*.

Alabama distribution: Butler[1], Escambia[3], and Lee[1] counties.

Specimens examined: 1 nymph, 1 male AU.

This species is reportedly confined to the wetter areas of the coastal regions. The Lee County specimen is perhaps mislabeled having been collected by a student in general entomology. Blatchley *(5)* records this species from Atmore. The single adult examined is dated June 28.

Neoconocephalus velox Rehn and Hebard

Body length 33-40 mm. General coloration green or brown; head with a median stripe of dark brown which divides and extends posteriorly along the lateral carinae of pronotum. Fastigium constricted at base, wider near middle, feebly narrowed at apex. Tegmina elongate, greatly surpassing the tips of the hind femora. Ovipositor not surpassing tips of hind femora.

Alabama distribution: Calhoun[2] and Lee[1] counties.

Specimens examined: 1 male UMMZ; 2 males AU.

Not much is known of the ecology of this species in the State. One of the Lee County specimens was taken at night from a clump of tall grass near the edge of a wooded area. Collection dates range from June 27 to October 2.

Neoconocephalus triops (Linnaeus)

Body length, male 27.5-32 mm, female 32-36 mm. General coloration green or brown. Ventral surface of tip of fastigium with a black bar.

Alabama distribution: Baldwin[1,2], Conecuh[1,2], Cleburne[1,2], Dallas[2], Houston[1,2], Lee[1,2], Mobile[2,3], and Tallapoosa[1] counties.

Specimens examined: 1 nymph, 7 males, 13 females UMMZ; 15 males, 23 females AU.

This is the most commonly encountered species of *Neoconocephalus* in the State. It may be found in the undergrowth of woods and in clumps of grass in fields and along roadsides. It is commonly attracted to lights at night. Many of the specimens in the Auburn collection were taken from light traps. Adults may be found throughout the year since overwintering occurs both in the adult and nymphal stages. Males may be heard stridulating at twilight on the first warm days of early spring. Singing males have been collected as early as March 11 in Auburn. Walker *(80)* discusses the calling songs and the relationships of the overwintering adult populations to the overwintering nymphal populations.

Neoconocephalus retusus (Scudder)

Body length, male 26-28 mm, female 29-31 mm. General coloration green or pale brown; lateral carinae of pronotum often yellow. Fastigium short, apex with a curved black line on ventral surface. Tegmina short, tips broadly rounded. Ovipositor long, greatly surpassing tips of tegmina.

Alabama distribution: Baldwin[1], Bullock[1], Chilton[1], Cleburne[3], Conecuh[2], Lee[1], Limestone[1], Shelby[1], and Walker[1] counties.

Specimens examined: 7 males, 1 female UMMZ; 11 males, 4 females AU.

This species inhabits the vegetation of open woods. Three males were collected at night from weeds and low bushes in an oak-hickory woods in Oak Mountain State Park. It may also be found in tall vegetation in fields and along roadsides. Dates on the specimens range from July 19 to September 26.

Bucrates malivolans (Scudder)

Body length, male 27-29 mm, female 39-43 mm. General coloration pale to dark brown; disk of pronotum with a narrow dark brown stripe on each

side. Tegmina either just reaching to tip of abdomen or extending far beyond tip. Hind femora short, slightly surpassing tip of abdomen. Ovipositor more than one-half longer than hind femur, slightly decurved past middle, apex very acute.

Alabama distribution: Baldwin[1] County.

Specimens examined: 5 males AU.

This species is found in the vegetation of salt marshes. Four of the five Alabama specimens were taken at night from a marsh in Gulf State Park. The other specimen was taken from a light trap near Fairhope. The specimens were collected on June 24 and July 2.

Orchelimum agile (DeGeer)

Body length 21-23 mm. Color variable; usually dull reddish brown with greenish tinge, occasionally uniform pale green with dorsal surface tinged with yellow; pronotum often with a pair of dark brown diverging stripes. Fastigium broader at apex than at base.

Alabama distribution: Bullock[1], Chilton[1], Cleburne[2], Conecuh[2], Covington[1], Dallas[1,2], Houston[1,2], Lee[1], Limestone[1], Macon[1], and Winston[1] counties.

Specimens examined: 10 males, 9 females UMMZ; 13 males, 8 females AU.

This species is commonly found on vegetation in low, wet areas. However, specimens have also been collected in drier areas in fields and along roadsides. Dates on the specimens range from August 30 to November 16. It was reported from Alabama (no specific location) by Rehn and Hebard *(64)*.

Orchelimum glaberrimum (Burmeister)

Body length 20-27 mm. General coloration green or greenish yellow, occiput and prozona with a broad, median, dark brown stripe; entire face and head usually red or reddish brown.

Alabama distribution: Bullock[1], Butler[1], Calhoun[2], Chilton[1], Conecuh[2], Escambia[3], Houston[2], Lee[1,2], Macon[1], and Mobile[2,3] counties.

Specimens examined: 4 nymphs, 14 males, 22 females UMMZ; 11 males, 2 females AU.

This species is a common inhabitant of tall grasses along roadsides and ditches. It is a loud diurnal singer. The singing males are often found near the tops of tall stalks of johnsongrass or similar coarse grasses. They sit with the head pointing towards the ground and, when approached, stop singing and walk down the stalk into the tangled vegetation at the bottom. Dates on the Alabama specimens range from August 18 to October 4. This species was recorded from Mobile by Blatchley *(5)* under the name *O. erythrocephalum* Davis.

Orchelimum vulgare Harris

Body length 18-23 mm. Very similar in appearance to *O. glaberrimum* differing chiefly in having the face usually pale green or light brown and in the other characters given in the key to the species.

Alabama distribution: Chilton[1], Cleburne[1,2], Lauderdale[1], and Limestone[1] counties.

Specimens examined: 3 nymphs, 1 male, 1 female UMMZ; 4 males AU.

This species is found in the same habitats as *O. glaberrimum.* Specimens have been collected from August 23 to October 1. Two males, 4 females UMMZ and 7 males, 2 females AU from Conecuh, Chilton, Butler, and Monroe counties appear to be intermediate between *O. glaberrimum* and *O. vulgare.* Thus, a subspecific relationship between these two forms is indicated. *O. glaberrimum* would represent the southern (and nominate) form and *vulgare* a northern race of *glaberrimum.* However, Rehn and Hebard *(64)* stated that the two are distinct species and have been collected side by side in the same locality with no evidence of intergradation. Before these forms are relegated to subspecies, a complete study of the complex should be made including a comparison of the calls of each form.

Orchelimum sylvaticum McNeill

Body length 17-23 mm. General coloration pale green, occiput and disk of prozona with a median pale brown stripe. Fastigium but slightly wider than basal joint of antenna.

Alabama distribution: Dallas[3] and Mobile[2] counties.

Specimens examined: 1 male UMMZ.

Nothing is known about the ecology of this species in Alabama. It has been reported from a variety of types of vegetation in other states. The single specimen examined was collected in Mobile on July 15.

Orchelimum pulchellum Davis

Body length 18-23 mm. General coloration pale green, head often reddish, face yellow; ventral surface of body yellow. Fastigium narrow, apical half but slightly wider than basal half.

Alabama distribution: Barbour[1], Butler[1], Conecuh[2], Covington[1], Dallas[1], Lee[1], Macon[1], St. Clair[1], and Walker[1] counties.

Specimens examined: 1 male UMMZ; 11 males, 2 females AU.

Unlike most of the members of this genus in Alabama, this species is commonly found in wooded areas. Most of the specimens in the Auburn collection were taken from trees and bushes in low, wet woods. It may also be taken from the tall vegetation on the margins of ponds and streams. Dates on Alabama specimens range from July 14 to November 16.

Orchelimum nigripes Scudder

Body length 18-21 mm. General coloration green or reddish brown; antennae, tibiae, and tarsi black or dark brown above. Fastigium narrow, its sides subparallel.

Alabama distribution: Walker[1] County.

Specimens examined: 1 male AU.

This is a common species in the southwestern and midwestern portions of the United States. It is probably restricted to the western half of Alabama.

It is usually found near water. The single Alabama specimen was taken from a bush on the banks of the Warrior River on August 16.

Orchelimum minor Brunner

Body length 15-19 mm. General coloration pale reddish brown; face, lateral lobes of pronotum, and all femora green; pronotum with a dark brown stripe bordered on each side by a narrow yellow one. Fastigium narrow, strongly ascending. Tegmina short, scarcely reaching tips of hind femora.

Alabama distribution: Cleburne[1] and Lee[1] counties.

Specimens examined: 3 males, 1 female AU.

This species is found only in the crowns of pine trees. It was taken from Virginia pine on top of Cheaha Mountain and from loblolly pine near Auburn. It probably is more widely distributed in Alabama than the above records indicate. Its habitat and small size make it difficult to collect. All Alabama specimens were taken in August.

Orchelimum concinnum Scudder

Body length 16-18 mm. General coloration usually pale green with tegmina and wings pale brown; face yellow white with a dark reddish brown stripe extending from the mouth to the vertex; vertex, occiput, and pronotum also marked with reddish brown.

Alabama distribution: Baldwin[1,3] and Mobile[3] counties.

Specimens examined: 1 male, 1 female AU.

This species should occur in both salt- and fresh-water marshes in Alabama. The specimens in the Auburn collection were taken from vegetation in a salt marsh in Gulf State Park on July 2. Thomas and Alexander *(2)* discuss the taxonomy, morphology, call, ecology, and distribution of this and closely related species. They record this form from Mobile and Baldwin counties on their distributional maps.

Orchelimum militare Rehn and Hebard

Body length 18-22 mm. General coloration green, fading on drying to yellow; occiput and prozona with two divergent reddish-brown lines. Fastigium longer than broad, wider at base than at apex.

Alabama distribution: Baldwin[1,2] County.

Specimens examined: 1 female UMMZ; 1 male AU.

The single specimen in the Auburn collection was taken from vegetation in a low sandy area along the roadside near Bay Minette. The Alabama specimens were collected September 13 and October 6.

Conocephalus allardi (Caudell)

Body length 12-15 mm. General coloration green, head and pronotum with a darker mid-dorsal stripe; dorsal surface of abdomen dark brown. Tegmina covering three-fourths of abdomen of male, one-half of abdomen of female, tips broadly rounded. Cercus of male stout, the tooth triangular, flat and broad at base.

Alabama distribution: Winston[1] County.

Specimens examined: 1 male AU.

The single Alabama specimen was taken from a blueberry patch in a pine woods on August 17. This represents a considerable range extension, the closest published record being from Towns and Raburn counties in extreme northeastern Georgia.

Conocephalus brevipennis (Scudder)

Body length 11-14 mm. General coloration pale, reddish brown, face and sides of pronotum usually green; mid-dorsal stripe of head and pronotum dark brown, with a narrow yellow line on each side. Tegmina of male reaching tip of abdomen, covering two-thirds of abdomen or (rarely) fully developed in female.

Alabama distribution: Barbour[1], Bullock[1], Butler[1], Chilton[1], Conecuh[1,2], Covington[1], Escambia[1,3], Houston[2], Jackson[2], Lee[1], Mobile[2], Montgomery[1], and Winston[1] counties.

Specimens examined: 2 nymphs, 9 males, 4 females UMMZ; 16 males, 8 females AU.

Field notes indicate that this species may be found in a variety of habitats. For example, at Florala it was abundant in the rank vegetation near the margin of a large lake. Near Brewton it was found in the undergrowth of open pine woods. It also occurs in the vegetation along wood margins and roadsides. Collection dates range from August 17 to November 16.

Conocephalus fasciatus fasciatus (DeGeer)

Body length 12-15 mm. General coloration green, dark brown mid-dorsal stripe on head and pronotum; tegmina and tip of ovipositor reddish brown. Tegmina fully developed, surpassing tips of hind femora.

Alabama distribution: Baldwin[1,2], Bullock[1], Butler[3], Calhoun[2,3], Chilton[1], Cleburne[1], Colbert[1], Coosa[1], Covington[1], Dallas[1], DeKalb[1], Escambia[1,3], Houston[1], Jackson[2], Lauderdale[1], Lee[1,2], Limestone[1], Lowndes[1], Macon[1], Montgomery[1], Pike[1], Tuscaloosa[3], and Wilcox[1] counties.

Specimens examined: 14 males, 14 females UMMZ; 55 males, 44 females AU.

This is a common and widespread species in Alabama. It is generally found in open grassy areas. It is often common in low vegetation in pastures, lawns, roadsides, and other open areas. Specimens have been collected in Alabama from April 23 to November 7.

Conocephalus strictus (Scudder)

Body length, male 14-15 mm, female 17-18 mm. General coloration green, mid-dorsal stripe of head and pronotum reddish brown bordered by white; tegmina reddish brown. Tegmina usually reduced, of male about one-half as long as abdomen, of female about one-third as long, fully developed in an occasional specimen.

Alabama distribution: Conecuh[2], Dallas[1], Lauderdale[1], and Limestone[1] counties.

Specimens examined: 1 male, 4 females UMMZ; 13 males, 1 female AU.

This species occurs in the grasses of relatively dry pastures, roadsides, and wood margins. Dates on the specimens range from August 17 to September 13.

Conocephalus saltans (Scudder)

Body length 11-15.5 mm. General coloration dull reddish brown; mid-dorsal stripe dark brown, bordered with pale yellow; sides of abdomen with pale yellow stripe. Tegmina usually covering only one-fourth of abdomen, occasionally fully developed and exceeding abdomen. Cercus of male with apical portion longer than basal portion; distinctly incurved, tip bent mesad and ventrad. Ovipositor as long as body or longer, curving very slightly.

Alabama distribution: Clay[2], Covington[1], Escambia[1], Houston[1], and Lee[1] counties.

Specimens examined: 1 male UMMZ; 4 males, 3 females AU.

This species occurs in very dry habitats. It has been taken from the undergrowth of open pine woods and from areas of very sandy soil. Dates on the specimens range from October 5 to November 16.

Conocephalus spartinae (Fox)

Body length 10.5-15 mm. General coloration grass green or pale brown; occiput and disk of pronotum with a dark brown mid-dorsal stripe bordered on each side by yellow; femora green with numerous small reddish brown spots.

Alabama distribution: Baldwin[1] County.

Specimens examined: 1 male, 2 females AU.

This species inhabits the vegetation of coastal marshes. The Alabama specimens were collected from Gulf State Park on July 2.

Odontoxiphidium apterum Morse

Body length 11-18 mm. General coloration reddish brown, face and sides of body green. Pronotum prolonged caudad to cover dorsal and lateral portions of base of abdomen. Tegmina of male very short, oval, of female completely covered by pronotum. Cercus of male straight, very slender, a stout straight spine on inner side of apical one-third, a second smaller spine on basal one-third (Fig. 89). Ovipositor slender, straight, varying in length but usually about as long as hind femora.

Alabama distribution: Baldwin[1,2], Barbour[1], Cherokee[2], Chilton[1], Choctaw[1], Clay[1], Cleburne[1,2], Conecuh[2], Covington[1], Escambia[1], Houston[1], Lee[1,2], Mobile[2], Monroe[2], Pike[2], and Talladega[2] counties.

Specimens examined: 14 nymphs, 17 males, 30 females UMMZ; 2 nymphs, 31 males, 18 females AU.

This species is a common inhabitant of the undergrowth of open dry woods in the southern half of the State. It has also been taken from low vegetation along roadsides. Dates on the Alabama specimens range from July 2 to November 15.

Atlanticus monticola monticola Davis

Body length 16.5-26.5 mm. General coloration of male, dark brown sprinkled with gray, of female, reddish or yellowish brown. Disk of pronotum feebly diverging on basal two-thirds. Rounded tips of male tegmina project from beneath pronotum. Male cercus feebly curved, basal portion

stout, tooth short, slightly curved inward. Subgenital plate of male with a triangular notch, styles short, stout. Ovipositor slightly longer than hind femora, tapering on both dorsal and ventral margins at apex.

Alabama distribution: Madison[1] County.

Specimens examined: 3 males AU.

The three specimens listed above were collected from the undergrowth of oak-hickory woods in Monte Sano State Park on June 29 and 30.

Atlanticus americanus americanus (Saussure)

Body length 20-30 mm. General coloration brownish yellow to dark reddish brown. Pronotum diverging slightly on basal two-thirds. Tips of male tegmina project from beneath pronotum, less broadly rounded than in *A. m. monticola.* Male cercus with apical portion feebly tapering, tooth small, sharp. Ovipositor as long as hind femora, tapering at tip on dorsal margin only.

Alabama distribution: Cleburne[2] and Talladega[3] counties.

Specimens examined: 6 males UMMZ.

This species inhabits leaf litter of deciduous forests. The relationship of the two described subspecies *A. americanus americanus* and *A. a. hesperus* create a taxonomic problem in the Cleburne and Talladega county area. When Hebard *(28)* described the subspecies *A. a. hesperus,* he indicated that in a series of specimens from near Talladega all of the males were apparently typical *A. a. americanus* and all of the females *A. a. hesperus.* The six males examined were taken from Cheaha Mountain and have all the characteristics of typical *A. a. americanus.* Female specimens taken from the same location tend to be more like *A. a. hesperus* and have been listed under that subspecies. All the Alabama specimens were collected in July.

Atlanticus americanus hesperus Hebard

Differs from typical *A. a. americanus* only by the characters given in the key and by having legs slightly longer in proportion to rest of body.

Alabama distribution: Baldwin[2], Cherokee[2], Cleburne[2], Conecuh[1], Escambia[1], Houston[1], Lee[1], Madison[1], Mobile[2], Monroe[2], Perry[2], Pike [1,3], and Talladega[2,3] counties.

Specimens examined: 12 nymphs, 14 males, 28 females UMMZ; 2 nymphs, 5 males, 6 females AU.

This subspecies is found in habitats similar to those described for typical *A. a. americanus.* Dates on adults range from June 23 to September 13. The Opelika specimens listed by Rehn and Hebard *(67)* as *A. americanus* probably represent this subspecies.

Atlanticus gibbosus Scudder

Body length 26-34.5 mm. General coloration pale brownish yellow to light brown, sprinkled with fine fuscous markings. Pronotum with disk large, strongly produced posteriorly, hind margin broadly rounded. Tegmina usually completely concealed in both sexes. Hind femur very stout and about two and one-half times length of pronotum. Subgenital plate of male with a deep narrow notch. Ovipositor with only dorsal margin tapering at apex.

Alabama distribution: Baldwin[1], Pike[2], and Talladega[2] counties.

Specimens examined: 8 females UMMZ; 1 female AU.

This species inhabits the undergrowth and leaf litter of deciduous and pine woods. Dates on Alabama specimens range from July 18 to August 24.

Atlanticus dorsalis (Burmeister)

Body length 25-26 mm. General coloration brownish yellow to reddish brown. Disk of pronotum with lateral margins only feebly diverging, hind margin subtruncate. Tegmina of male projecting slightly from beneath pronotum. Subgenital plate of male slightly emarginate. Ovipositor of female shorter than hind femora, tapering on dorsal margin only.

Alabama distribution: Escambia[2] County.

Specimens examined: 1 male UMMZ.

The single Alabama specimen was collected at Brewton on June 7.

FAMILY GRYLLACRIDIDAE — CAVE OR CAMEL CRICKETS

Hind legs enlarged for jumping, tarsi 4-segmented; wings absent in all Alabama species; ovipositor compressed and of the tettigoniid type; cerci elongate, flexible, covered with long hairs.

Hubbell *(37)* states that the members of this family are related to both the Tettigoniidae and the Gryllidae, but that they are more primitive than either of these families.

Since Dr. Hubbell is presently at work on revisionary studies of this family, all specimens collected during this survey are on loan to him. The few species listed are primarily those from previously published records. The keys and the descriptions are modified from Hubbell *(37)*. It is quite likely that this family is represented by many more species in Alabama than those listed.

Key to the Species of the Family Gryllacrididae Known to Occur in Alabama

1. Antennal bases separated by a space less than the width of one of them 2
   Antennal bases separated by a space wider than the width of one of them ..... *Camptonotus carolinensis* (Gerstaecker) page 81
2. Male with cephalic lobe of pseudosternite deeply emarginate or cleft; female smaller, ovipositor less than 11 mm in length and less than 1.7 times as long as pronotum; coloration not as below 3
   Male with cephalic lobe of pseudosternite entire; female large, ovipositor 11.5 mm or more in length, more than 1.7 times as long as pronotum; dorsal surface polished, subglabrous, with contrasting pattern ..... *Ceuthophilus gracilipes gracilipes* (Haldeman) page 81

3. Dorsal surface of thorax polished 4
   Dorsal surface of thorax dull, not polished ..... *Ceuthophilus uhleri* Scudder page 81
4. Male with dorsum of pseudosternite broadly flanged; female with ovipositor valves armed on distal one-third ..... *Ceuthophilus rogersi* Hubbell page 82
   Male with pseudosternite not broadly flanged; female with distal one-fourth of ovipositor armed ..... *Ceuthophilus divergens* Scudder page 82

Camptonotus carolinensis (Gerstaecker)

Body length 12-15 mm. General coloration reddish brown above, yellowish white beneath; face and all tibiae and tarsi yellowish; femora mottled with dark brown. Head large, oval, broader than pronotum; antennae at least five times as long as body. Pronotum covering only prothorax. Legs short, hind femur armed beneath with 4 to 12 short spines. Ovipositor slightly longer than hind femur.

Alabama distribution: Clay[1] and Lee[1] counties.

Specimens examined: 1 nymph, 1 male, 2 females AU.

This unusual species spends most of the day inside rolled leaves of deciduous trees. One pair from Lee County was taken by sweeping sweetgum trees. The three adults from Alabama were taken in July. The nymph was collected on June 17.

Ceuthophilus gracilipes gracilipes (Haldeman)

Body length 19-23 mm. Size very large for genus. General coloration shining brownish yellow, heavily marked above with dark brown; abdomen sprinkled with small yellow spots. Antennae three or more times longer than body. Hind femur armed on ventral surface with 6 to 14 spines.

Alabama distribution: Bibb[3], Blount[3], Cherokee[2,3], Cleburne[3], Lee[2,3], Madison[2], Perry[2,3], and Talladega[2,3] counties.

Specimens examined: 267 nymphs, 4 males, 5 females UMMZ.

This is a rather common and widespread species in the northern half of Alabama. Like all the other Alabama species of this genus, it is chiefly nocturnal. It spends the day in dark, moist places. Such places are offered by leaf litter in wooded areas, hollow trees, rotting tree stumps and logs, the basements of houses, cracks in rocks, and caves. According to Hubbell *(37)*, adults should be found from early April until extremely cold winter temperatures occur. Adults have been taken in other states as late as January.

Ceuthophilus uhleri Scudder

Body length 13-16 mm. General coloration reddish brown to light yellow, irregularly flecked with dark brown (these markings often indistinct because of slight contrast with ground color). Antennae relatively short. Hind femur relatively short, armed beneath with 2 to 15 minute spines.

Alabama distribution: Cherokee[1,2,3], Lee[2,3], Perry[2,3], and Talladega[2,3] counties.

Specimens examined: 204 nymphs, 221 males, 241 females UMMZ; 2 nymphs, 1 male, 1 female AU.

This species occurs probably throughout the State with the possible exception of the Gulf Coast area. According to Hubbell *(37)*, it has been taken in Alabama from a variety of habitats including scrubby oak-pine woods, dry clay hillsides, and sweetgum-water oak woods along stream borders. It is reported to mature late in the season and all adults recorded from Alabama were taken in late August.

Ceuthophilus divergens Scudder

Body length 10-14.5 mm. General coloration dark reddish brown with narrow median pale stripe extending length of body. Interocular distance usually less than length of eye. Legs short and moderately slender.

Alabama distribution: Perry[3] and Talladega[3] counties.

Specimens examined: None.

Hubbell *(37)* reported this species in Alabama from oak-hickory-pine woods near Talladega and from second growth woods along a creek bottom in central Alabama. All Alabama specimens were taken in late August.

Ceuthophilus rogersi Hubbell

Body length 13-16 mm, size slightly larger than *C. divergens* which this species closely resembles; general coloration reddish brown, dark markings less striking; pale dorsal median stripe only weakly indicated. Also differs from *divergens* in terminal abdominal structures as indicated in key.

Alabama distribution: Mobile[2,3] County.

Specimens examined: 1 male UMMZ.

Nothing is known of the ecology of this species in Alabama. The single specimen from Alabama was taken in Mobile on September 14.

Other Possible Alabama Gryllacrididae:

The following is a list of other species in this family which possibly occur in Alabama and the area in which they are most likely to be found.

1. *Hadenoecus puteanus* Scudder – Caves of northern portion.
2. *Ceuthophilus ensifer* Packard – Northeastern.
3. *C. lapidicola* (Burmeister) – Piedmont.
4. *C. armatipes* Hubbell – Gulf Coast.
5. *C. walkeri* Hubbell – Southeastern.
6. *C. abditus* Hubbell – Tennessee River Valley.
7. *C. virgatipes* Rehn and Hebard – Southeastern.
8. *C. umbrosus* Hubbell – Southeastern.
9. *C. occultus* Scudder – Northeastern.

Keys for the identification of all of the species listed above except *H. puteanus* can be found in Hubbell *(37)*.

FAMILY GRYLLIDAE — CRICKETS

Antennae filiform, usually relatively long; ocelli present or absent; tegmina flat above, usually bent ventrally at sides, occasionally very rudimentary or absent; wings when present folded like a fan; hind femur enlarged, more or less fitted for jumping; fore tibia usually with a hearing organ on both outer and inner margins; ovipositor of female usually long, cylindrical.

The crickets inhabit a great variety of habitats in the State ranging from burrows in the ground to the tops of trees. Most of the species are hard to collect in the daytime. The stridulations of the males during the night make them easier to locate. No single work more recent than Blatchley *(5)* is available for our forms. There are, however, some important recent papers covering small groups in this family. These will be mentioned under the species involved. Also of note is Alexander's *(2)* work on the role of behavior in the classification of this family.

Key to the Species of the Family Gryllidae Known to Occur in Alabama

1. Front legs enlarged, fitted for digging 2
   Front legs not enlarged, not fitted for digging 3
2. Front tibia with four dactyls; hind femur shorter than pronotum ..... *Gryllotalpa hexadactyla* Perty page 87
   Front tibia with two dactyls; hind femur usually longer than pronotum ..... *Scapteriscus vicinus* Scudder page 87
3. Second tarsal segment compressed, minute 4
   Second tarsal segment depressed, heartshaped 31
4. Hind tibia armed dorsally on both lateral margins with minute teeth, but without spines; body covered with translucent scales; pronotum of males usually prolonged posteriorly; tegmina absent or almost completely covered by pronotum 5
   Hind tibia armed dorsally with two rows of spines (or lacking both minute teeth and spines in *Neoxabea bipunctata*); body not covered with scales; pronotum not prolonged posteriorly; tegmina present 7
5. Male tegmina completely concealed by pronotum; female subgenital plate without projections 6
   Male tegmina projecting from beneath pronotum; female subgenital plate with very minute sharp projections on distolateral margin ..... *Cycloptilum bidens* Hebard page 87
6. Terminal maxillary palpal joint elongate, evenly and weakly expanding distally so that ventral margin is decidedly greater than apical diameter ..... *Cycloptilum antillarium* (Redtenbacher) page 88
   Terminal maxillary joint shorter, evenly and strongly expanding distad

so that ventral margin is equal to apical diameter ..... *Cycloptilum trigonipalpum* Rehn and Hebard page 88

7. Head hypognathous or nearly so; hind tibia armed with stout spines or spurs without teeth between them 8
   Head prognathous; hind tibia armed with delicate spines with minute teeth between them or completely unarmed 23
8. Hind tibia armed with long, movable, pilose spurs; last joint of maxillary palpus at least twice the length of the preceding one; basal joint of hind tarsi unarmed above 9
   Hind tibia armed with short, stout, immovable spurs; last joint of maxillary palpus not more than one-third longer than the preceding one; basal joint of hind tarsi serrate above on both margins 16
9. Lower pair of apical spurs of hind tibia unequal in length, the inner one much the longer, apex of ovipositor with only the upper margin toothed 10
   Lower pair of apical spurs of hind tibia equal in length; apex of ovipositor toothed on both dorsal and ventral margins 15
10. Face with hair; head without crossbars as described below 11
    Face without hair; head with a white crossbar between the eyes, bordered above by a wider shining black one ..... *Nemobius ambitiosus* Scudder page 90
11. Body with scattered dark markings giving a distinct mottled appearance ..... *Nemobius maculatus* Blatchley page 89
    Body not distinctly mottled 12
12. Length of body usually more than 7.5 mm; ovipositor straight or nearly so, as long as or longer than hind femur 13
    Length of body usually less than 7.5 mm; ovipositor decidedly curving upwards, about two-thirds the length of hind femur ..... *Nemobius cubensis* Saussure page 89
13. Head and pronotal coloration either sandy reddish or dark reddish brown on black; dorsal head striping faint or absent 14
    Head and pronotal coloration usually a strong patterning of dark brown or black with light yellowish; dorsal head striping usually intense and obvious ..... *Nemobius fasciatus* (DeGeer) page 88
14. General coloration pale and reddish, especially dorsal surface of head ..... *Nemobius tinnulus* Fulton page 89
    General coloration reddish brown to black; dorsal head striping usually faintly visible ..... *Nemobius allardi* Alexander and Thomas page 89
15. Last two joints of maxillary palpi pure white; general coloration very dark brown ..... *Nemobius confusus* Blatchley page 90
    Last two joints of maxillary palpi not wholly white; general coloration pale brown ..... *Nemobius carolinus carolinus* Scudder page 90
16. Ocelli forming triangle; upper inner spur of hind tibia shorter than middle one; ovipositor at least one-half as long as hind femur 17
    Ocelli arranged in a nearly transverse row; upper inner spur of hind tibia as long as middle inner one; ovipositor very short, usually invisible externally ..... *Anurogryllus muticus* (DeGeer) page 90
17. Head with four longitudinal pale ragged stripes, a narrow, pale, transverse stripe above the antennae between the eyes; the palpi white .....

Velarifictorus micado (Saussure) page 92

Head not marked as above; palpi not entirely white 18

18. Hind tibia three-fourths or more the length of the hind femur, armed above with five to eight spines on each margin; fore tibia with a tympanum on both outer and inner sides 19

Hind tibia not more than two-thirds the length of hind femur, armed above with four or five spines on each margin; fore tibia of short-winged forms with a tympanum on outer side only .....

Miogryllus verticalis (Serville) page 91

19. Straw colored; head with distinct brownish or blackish crossbars; first joint of antenna projecting slightly beyond front of head .....

Acheta domesticus (Linnaeus) page 91

Black; head never marked with blackish crossbars; first joint of antenna never projecting beyond front of head 20

20. Pronotum of male widest near posterior border; head of male narrower than pronotum, presenting a retracted appearance; width not over 4.7 mm; body length 9.5-15.5 mm; always micropterous 21

Pronotum of male usually widest near or anterior to its middle; head of male often wider than pronotum, head width almost always more than 4.7 mm; body length 15-29 mm or more; macropterous or micropterous 22

21. Coloration solid black, rarely a dash of reddish on the inside or outside of base of hind femur ..... *Gryllus vernalis* Blatchley page 92

Tegmina always brown, hind femur usually reddish or pale brown, at least on basal third; tibia pale brown .....

Gryllus fultoni (Alexander) page 92

22. Length of body usually more than 18 mm; ovipositor 19-23 mm or more, and often longer than body ..... *Gryllus firmus* Scudder page 91

Body length usually not more than 18 mm; ovipositor rarely over 18 mm, always shorter than body ..... *Gryllus rubens* Scudder page 92

23. Distal portion of hind tibia armed with several long spines and many shorter ones; first antennal segment frequently marked with black ventrally and without a prominent tubercle on distal border 24

Hind tibia armed with terminal spurs only; first antennal segment not marked with black ventrally and with a small prominent tubercle on distal border ..... *Neoxabea bipunctata* (DeGeer) page 93

24. Inner edge of ventral face of first antennal segment with a pale swelling marked with black; stridulatory file with fewer than 30 teeth per mm of length 25

Inner edge of ventral face of first antennal segment without a pale swelling; stridulatory file frequently with more than 30 teeth per mm of length 27

25. Black mark on first antennal segment round .....

Oecanthus fultoni Walker page 93

Black mark on first antennal segment not round 26

26. Mark on first antennal segment straight (rarely slightly curved); no prominent orange markings on vertex; length of male tegmina 12-15 mm ..... *Oecanthus exclamationis* Davis page 93

Mark on first antennal segment strongly curved toward the inner side or J-shaped, vertex yellow or orange (in fresh specimens); length of male tegmina 9.0-12.2 mm ..... *Oecanthus niveus* (DeGeer) page 93

27. First antennal segment often marked with more than a single black line; head and antennae not tinged with red; width of dorsal field of male tegmen rarely over two-fifths of length; subgenital plate of female with a narrow notch posteriorly, not more than one-fifth as broad as widest part of plate 28
First antennal segment not marked with black, or with a narrow dark line along inner edge; frons and basal segments of antennae usually tinged with red; width of dorsal field of male tegmen about one-half of length; subgenital plate of female with a broad notch posteriorly, one-fourth to one-half as broad as widest part of plate ..... *Oecanthus latipennis* Riley page 93

28. Head, pronotum, and legs without brown pigment and not contrasting in color with tegmina, seldom found in conifers 29
Head, pronotum, and legs largely brown; tegmina a contrasting green or dusky green in fresh specimens; found only in or rarely beneath conifers ..... *Oecanthus pini* Beutenmuller page 94

29. Black marks on second antennal segment separated by more than one-third the width of the inside mark 30
Black marks on second antennal segment confluent, contiguous or separated by no more than one-third the width of the inside mark ..... *Oecanthus argentinus* Saussure page 94

30. Outside marks on first and second antennal segments usually less heavily pigmented than inside marks, outside mark on first segment often round; tibiae and apex of hind femur usually without conspicuous dark markings ..... *Oecanthus quadripunctatus* Beutenmuller page 94
Outside marks on first and second antennal segments as heavily pigmented as inside ones; outside mark on first segment never round; tibiae and apex of hind femur with conspicuous dark markings ..... *Oecanthus celerinictus* Walker page 94

31. Hind tibia armed dorsally with two rows of spines without teeth between them and with two apical spurs on inner side 32
Hind tibia armed dorsally with two rows of spines with small teeth between them and with three apical spurs on inner side 36

32. Last joint of maxillary palpus club-shaped; basal joint of antenna wider than long; pronotum subquadrate, as wide as or wider than long 33
Last joint of maxillary palpus lobate, deeply concave; basal joint of antenna longer than wide; pronotum subcylindrical, longer than wide ..... *Phylloscyrtus pulchellus* Uhler page 96

33. Interocular area convex; eyes subrotund, deeper than long 34
Interocular area strongly flattened; eyes compressed, longer than deep ..... *Cyrtoxipha columbiana* Caudell page 95

34. Front tibia with tympana on one or both faces; males usually more than 4 mm, females usually more than 5 mm 35
Front tibia without tympana, males usually 5 mm or less, females usually 6 mm or less ..... *Falcicula hebardi* Rehn page 95

35. Ovipositor one-half length of hind femur; hind femur of male longer than tegmina; hind femora of both sexes with a dark stripe along the ventral one-half (fading in preserved specimens) ..... *Anaxipha exigua* (Say) page 95
Ovipositor less than one-half length of hind femur; hind femur of male shorter than tegmina and without a dark stripe ..... *Anaxipha delicatula* (Scudder) page 95

36. Fore tibia with a tympanum on inner face only; tegmina usually shorter than abdomen 37
Fore tibia with a tympanum on both outer and inner faces; tegmina surpassing tip of abdomen ..... *Orocharis saltator* Uhler page 96

37. Form robust; tegmina covering three-fourth or more of abdomen ..... *Hapithus agitator* Uhler page 96
Form rather slender; tegmina covering less than two-thirds of abdomen ..... *Hapithus brevipennis* Saussure page 96

Gryllotalpa hexadactyla Perty

Body length 21-30 mm. General coloration brown or reddish brown. Body covered with soft hair. Tegmina covering from one-half to three-fourths of abdomen; wings slightly longer than tegmina in short-winged form, extending beyond tip of abdomen in long-winged form.

Alabama distribution: Lee[1] and Macon[1] counties.

Specimens examined: 9 adults AU.

This mole cricket lives in burrows in moist sandy soils. Their burrows are most abundant in sandy areas along the edges of lakes and streams. Dates of specimens range from April 18 to October 13.

Scapteriscus vicinus Scudder

Body length 26-29 mm. General coloration pale brownish yellow. Body covered with soft hair. Tegmina covering three-fourths of abdomen; wings usually fully developed and surpassing tip of abdomen.

Alabama distribution: Baldwin[1], Chilton[1], Lee[1], Macon[2], and Montgomery[2] counties.

Specimens examined: 2 males UMMZ; 11 males AU.

The habits of this species are similar to those described for *Gryllotalpa hexadactyla*. The long-winged forms are often attracted to lights at night and most of the specimens recorded above were taken at lights. Adults have been taken from May 9 to October 15.

Cycloptilum bidens Hebard

Body length 5-7 mm. General coloration reddish brown, thinly clothed with silvery scales. Male with caudal margin of pronotum broadly rounded; tegmina projecting beyond this margin for short distance and marked with blackish brown. Female with pronotum subquadrate, slightly narrowed in front.

Alabama distribution: Choctaw[1], Conecuh[1], Dallas[3], Escambia[1], Houston[3], Lee[1], Mobile[3], and Perry[2] counties.

Specimens examined: 6 females UMMZ; 1 male, 3 females AU.

This small cricket inhabits the shrubs and bushes of open woods. All of the Alabama adults were collected during August. Hebard *(27)* revised the genus *Cycloptilum* and recorded several species from Alabama.

Cycloptilum antillarum (Redtenbacker)

Body length 7-9.5 mm. General coloration reddish brown with silvery scales; abdomen chiefly dull black. Pronotum of male with caudal margin less rounded than *C. bidens,* completely covering tegmina. Disk of pronotum of female with sides subparallel, distinctly longer than broad.

Alabama distribution: Mobile[3] County.

Specimens examined: None.

According to Hebard *(27)* the single Alabama specimen was collected from bushes at Spring Hill on August 25.

Cycloptilum trigonipalpum (Rehn and Hebard)

Body length 7-8.5 mm. Differs from *C. antillarum* chiefly by characters given in key and by slightly smaller size.

Alabama distribution: Baldwin[1], Barbour[1], Butler[3], Chilton[1], Conecuh[2], Covington[1], Dallas[3], Escambia[3], Houston[3], Lee[1], Montgomery[3], and Perry[2] counties.

Specimens examined: 2 females UMMZ; 2 males, 9 females AU.

This species also inhabits low bushes and shrubs. Adults have been collected from July 2 to October 4.

Nemobius fasciatus (DeGeer)

Body length 7.5-11.5 mm. General coloration as given in key. Head broad and rounded; pronotum in micropterous specimens barrel-shaped, so that head and front edge of pronotum are usually as wide as or wider than rear edge of pronotum. Tegmina variable in length; wings either shorter than tegmina or extending beyond tips of tegmina (and abdomen) in macropterous forms.

Alabama distribution: Baldwin[1,2,3], Bullock[1], Calhoun[2], Chilton[1], Cleburne[1,3], Covington[1], Dallas[1], DeKalb[1], Houston[1,2], Lee[1], Lowndes[1], Macon[1], Mobile[2], Perry[3], Pike[1], and Tallapoosa[1] counties.

Specimens examined: 3 males, 4 females UMMZ; 30 males, 28 females AU.

This is perhaps the most common and widespread ground cricket (as the members of this genus are commonly known) in the State. It is found in grasses in lawns, pastures, fields, and similar places. It is often common in low wet areas such as the margins of ponds. Alexander and Thomas *(3)* discussed the ecology, taxonomy, and distribution of this and the closely related species *N. tinnulus* and *N. allardi.* Macropterous forms are common and are often attracted to lights at night. Adults have been collected from May 15 to November 16.

Nemobius tinnulus Fulton

Body length 8-11 mm. Coloration as given in key. Head narrow and retracted into pronotum at front so that head and front of pronotum are noticeably narrower than rear edge of pronotum.

Alabama distribution: Choctaw[1], Cleburne[2,3], Montgomery[1], Perry[3], and Winston[1] counties.

Specimens examined: 1 male, 1 female UMMZ; 1 male, 2 females AU.

This species inhabits the leaf litter of rather dry open woodlands. It has been collected in the State from August 1 to November 17.

Nemobius allardi Alexander and Thomas

Differing from *N. tinnulus* only in characters given in key and calling songs of males.

Alabama distribution: Jefferson[3] County.

Specimens examined: None.

The record listed above was from a tape recording of the song of a male and was mentioned in a footnote by Alexander and Thomas *(3)*. They state that this species inhabits grassy and weedy areas such as lawns, pastures, and roadsides.

Nemobius cubensis Saussure

Body length 6.5-9.5 mm. General coloration dull clay yellow, mottled with blackish brown. Pronotum nearly one-third wider than long. Tegmina of male as long as hind femur and reaching tip of abdomen, tegmina of female covering about one-half of abdomen; wings absent. Ovipositor dark brown, slightly upcurved.

Alabama distribution: Bibb[1], Henry[1], Lee[1], Monroe[1], Perry[2], and Winston[1] counties.

Specimens examined: 1 male UMMZ; 10 males, 10 females AU.

This species inhabits grasses and other low vegetation along the edges of ponds, ditch banks, and other rather damp areas. It has been collected occasionally in drier situations such as lawns and roadside vegetation. There is a possibility that some or all of the specimens listed above may represent *Nemobius mormonius* Scudder instead of *N. cubensis*. Perhaps a careful study of the calling songs of males would clarify the taxonomic and distributional status of these species in the State. Fulton *(11)* illustrated the male genitalia and discussed the distribution of all the North American species of *Nemobius*. Dates on the Alabama specimens range from March 20 to August 22.

Nemobius maculatus Blatchley

Body length 6.5-9 mm. General coloration dark brown with a yellowish tinge, dotted with fuscous. Disk of pronotum about two-fifths wider than long. Tegmina of male covering about two-thirds of abdomen, tegmina of female covering about one-third of abdomen.

Alabama distribution: Barbour[1], Chilton[1], Conecuh[1], Perry[2], and Talladega[2] counties.

Specimens examined: 70 nymphs, 79 males, 59 females UMMZ; 3 nymphs, 12 males, 7 females AU.

This species is an inhabitant of dry open woodlands. It has been collected in the State from August 17 to September 15. See Fulton *(11)* for more information.

Nemobius ambitious Scudder

Body length 5.5-8.5 mm. General coloration dark reddish brown with a yellowish (males) or grayish (females) tinge. Disk of pronotum subquadrate. Tegmina of male covering at least three-fourths of abdomen, tegmina of female covering about one-half of abdomen.

Alabama distribution: Covington[1], Escambia[1,2], Geneva[1], Houston[1], and Lee[1] counties.

Specimens examined: 1 male, 1 female UMMZ; 20 males, 33 females AU.

This species is common in the leaf litter of deciduous woods in the southern half of the State. Dates on the specimens range from April 27 to November 16. See Fulton *(11)* for more information.

Nemobius carolinus carolinus Scudder

Body length 6.5-8.5 mm. General coloration brownish yellow. Pronotum about one-third wider than long, front margin slightly narrower than hind one. Tegmina of male covering three-fourths or more of abdomen, broad, translucent; tegmina of female covering about two-thirds of abdomen. Ovipositor distinctly curved, teeth on lower margin widely separated.

Alabama distribution: Cherokee[2], Cleburne[1], Lee[1,2], and Talladega[2] counties.

Specimens examined: 4 nymphs, 2 males, 3 females UMMZ; 2 males, 1 female AU.

This species inhabits the lower, wetter, areas of deciduous woods. Dates on adults range from May 18 to August 25. See Fulton *(11)* for more information.

Nemobius confusus Blatchley

Body length 5.5-7.5 mm. Coloration as given in key. Tegmina of male reaching tip of abdomen, tegmina of female covering about two-thirds of abdomen. Ovipositor slightly more than one-half as long as hind femur, curved slightly at apex, teeth on lower margin minute, widely spaced.

Alabama distribution: Barbour[1], Conecuh[1], and Lee[2] counties.

Specimens examined: 1 female UMMZ; 2 females AU.

The Conecuh County specimen was taken from leaf litter in an open woods near the edge of a creek. In Barbour County a specimen was taken from an oatmeal trail [Hubbell *(39)*] in an open wooded area. All three specimens were collected in August.

Anurogryllus muticus (DeGeer)

Body length 12-17 mm. General coloration a uniform pale brownish yellow. Eyes and ocelli rather small. Disk of pronotum wider than long. Front tibia with an oblong-oval tympanum on outer face; hind femur longer

than combined length of tibia and tarsus. Tegmina of male about as long as abdomen, of female covering one-half to two-thirds of abdomen.

Alabama distribution: Lee[1] and Perry[2] counties.

Specimens examined: 1 nymph UMMZ; 1 male AU.

This cricket lives in shallow burrows in the soil. It is probably more widespread and abundant than the above records indicate. Its habits make it more difficult to collect than most of the other crickets. West and Alexander *(81)* discussed some of the habits of this species. The single adult from Alabama was collected during May.

Miogryllus verticalis (Serville)

Body length 10-17 mm. Coloration variable, ranging from brown to almost black. Head usually shining black with a narrow yellow stripe above each eye and two shorter ones on occiput. Head large, strongly convex, wider than front margin of pronotum. Pronotum wider than long. Tegmina of male usually covering three-fourths or more of abdomen, of female usually covering about one-third of abdomen and with anal margins scarcely touching. Ovipositor straight, as long as hind femora.

Alabama distribution: Bibb[1], Cherokee[2], Covington[1], DeKalb[1], Houston[1], Lee[1], Madison[1], Mobile[2], Perry[2], and Winston[1] counties.

Specimens examined: 14 nymphs, 1 female UMMZ; 7 males, 1 female AU.

This species is often found in areas of low, scanty vegetation. One male was taken from DeKalb County in very short grass growing in shallow soil on the edge of a large outcropping of rock. In Winston County a specimen was collected from short grass growing along the side of a road. A female was collected in Bibb County from short, freshly mowed grass in a church yard. Dates on the adult specimens range from May 18 to July 21.

Acheta domesticus (Linnaeus)

Body length 15-17 mm. General coloration pale brownish yellow marked with reddish brown. Tegmina as long as or longer than abdomen. Hind femur relatively short, rather slender. Ovipositor longer than hind femora, pale brown with a dark brown tip.

Alabama distribution: Lee[1] County.

Specimens examined: 4 males, 5 females AU.

This species is commonly known as the house cricket. It is cultured and sold for fish bait throughout the State. Escaped specimens could probably become established in houses anywhere in the State. Adults probably occur throughout the entire year.

Gryllus firmus Scudder

Body length 17-29 mm. General coloration brownish black, tegmina brown, hind femora reddish, sides of pronotum marked with reddish. Both macro- and micropterous forms are known.

Alabama distribution: Baldwin[1] and Mobile[1] counties.

Specimens examined: 2 nymphs, 4 males, 2 females AU.

This species and the three other species of *Gryllus* (commonly called field crickets) recorded here were for many years considered variations of the

one species usually called *G. assimilis* (Fabricius). Alexander *(1)* separated these forms as distinct species primarily on the basis of the calling songs of the males. The morphological differences between these species are not always distinct. Thus, it is often difficult or impossible to separate museum specimens. *Gryllus firmus* is found only in sandy areas. In Alabama it may be confined to the coastal areas or may possibly occur inland in sandy areas. All of the Baldwin County specimens were taken from beneath a newspaper lying on the beach near Fort Morgan. The Alabama specimens were collected from July 2 to August 24.

Gryllus rubens Scudder

Body length 15.5-21.5 mm. Coloration and markings much as in *G. firmus.*

Alabama distribution: Baldwin[1], Barbour[1], Choctaw[1], DeKalb[1], Escambia[1], Henry[1], Houston[1], Lee[1,3], Madison[1], Monroe[1], Tallapoosa[1], and Wilcox[1] counties.

Specimens examined: 3 nymphs, 26 males, 21 females AU.

This is the most common and widespread species of field cricket in Alabama. It occurs in all kinds of grassy situations, such as fields, pastures, roadsides, and lawns. According to Blatchley *(5)*, Scudder's type specimen was from Auburn. Dates on the specimens range from March 20 to September 30.

Gryllus vernalis Blatchley

Body length 12.8-18.5 mm. General coloration solid black. Head narrower than pronotum. Hind wings shorter than tegmina.

Alabama distribution: Madison[1] County.

Specimens examined: 1 male AU.

This species is an inhabitant of the leaf litter in deciduous forests. According to Alexander *(1)*, this is an early-maturing form. The Alabama specimen was collected June 29.

Gryllus fultoni (Alexander)

Body length 14-19 mm. General coloration black, tegmina brown, hind femora reddish. Hind wings shorter than tegmina.

Alabama distribution: Choctaw[1], Houston[1], Lee[1] Madison[1], Mobile[2], Talladega[2], and Winston[1] counties.

Specimens examined: 3 males UMMZ; 3 males, 3 females AU.

This species inhabits leaf litter of deciduous forests and dry open fields. One male from Houston County was collected at night from a tree branch about 4 feet above the ground. It was located by the loud calling song. Dates on the Alabama specimens range from May 23 to August 5.

Velarifictous micado (Saussure)

Body length 17-20 mm. General coloration dark brown with light gray markings.

Alabama distribution: Madison[3] County.

Specimens examined: None.

According to Alexander and Walker *(4)*, this species was collected along

the side of a highway in Huntsville. It inhabits shallow burrows which it digs in the ground. Randell *(48)* erected the genus *Velarifictorus* to include this species which was removed from the genus *Scapsipedus.*

Neoxabea bipunctata (DeGeer)

Body length 13-16 mm. General coloration pale pinkish brown, tegmina with light yellow markings.

Alabama distribution: Baldwin[1], Lee[1], and Madison[3] counties.

Specimens examined: 6 females AU.

This species occurs on deciduous trees and in tangled undergrowth. One Lee County specimen was collected by sweeping sweetgum. All of the Baldwin County specimens were taken from light traps. Walker *(78,79)* has discussed the taxonomy, ecology, distribution, and calling songs of all the United States tree crickets including this one and the members of the genus *Oecanthus.* Dates on the Alabama specimens range from June 28 to August 4.

Oecanthus niveus (DeGeer)

Form slender, general coloration pale greenish white, vertex and base of antenna often yellowish.

Alabama distribution: Baldwin[1,3], Cleburne[2,3], Coosa[1], Lee[1], Pike[3], and Winston[1] counties.

Specimens examined: 1 nymph, 4 males UMMZ; 4 males, 4 females AU.

This species, according to Walker *(78),* usually inhabits the crowns of deciduous trees. It has been taken in Alabama from oak trees and from light traps. Dates on the specimens range from June 14 to September 9.

Oecanthus exclamationis Davis

General coloration pale greenish white. Vertex pale yellow or orange.

Alabama distribution: Cleburne[1] and Tallapoosa[1] counties.

Specimens examined: 1 male, 1 female AU.

Like *O. neveus,* this species is also found in deciduous trees. One of the specimens was taken from small oaks growing on the side of a road on Cheaha Mountain. The other was taken from a light trap. Dates on the specimens are August 18 and August 31.

Oecanthus fultoni Walker

General coloration pale white, normally tinged with light green. Head and antennal segments pale orange yellow.

Alabama distribution: Cleburne[2,3] County.

Specimens examined: 1 male, 4 females UMMZ.

According to Walker *(78),* this species occurs on both deciduous trees and low shrubby bushes and vines. The specimens were collected September 9.

Oecanthus latipennis Riley

Size slightly larger than other members of the genus. General coloration, male, light greenish white, female, pale yellowish green. Head and 8 to 10 basal joints of antennae pinkish.

Alabama distribution: Cleburne[2,3] and Lee[1] counties.

Specimens examined: 2 males UMMZ; 1 male AU.

According to Walker *(79)*, this species occurs in a variety of habitats including scrubby oaks, thickets of vines, brambles, or coarse weeds, and in abandoned fields. The single Auburn specimen was collected from honeysuckle about 4 to 5 inches above the ground. Dates on the Alabama specimens are August 13 and September 9.

Oecanthus celerinictus Walker

General coloration pale greenish brown; antennae usually brown.

Alabama distribution: Butler[3], Calhoun[2,3], Chilton[1], Colbert[3], Covington[3], Crenshaw[3], Cullman[1], Dallas[1,3], DeKalb[1], Houston[2,3], Lee[1,2,3], and Mobile[1,2,3] counties.

Specimens examined: 5 males, 4 females UMMZ; 17 males, 14 females AU.

This species occurs chiefly in small vegetation such as the weeds growing in old fields. Occasionally it is found on the lower branches of small trees surrounding such situations. It is perhaps the most commonly encountered species of this genus in Alabama. See Walker *(79)* for the original description and discussion of this species. Dates on the Alabama specimens range from June 15 through November 10.

Oecanthus argentinis Saussure

General coloration light greenish yellow. Vertex with a reddish tinge.

Alabama distribution: Lee[1,3] County.

Specimens examined: 1 male, 1 female AU.

According to Walker *(79)*, this species is a prairie-inhabiting form. It is known from Alabama from only two specimens collected in Auburn. It seems likely, however, that this species would occur in other areas of the State, particularly in the Black Belt. Dates on the two specimens are June 2 and June 4.

Oecanthus quadripunctatus Beutenmuller

Very similar to *O. celerinictus,* differing only in characters given in key and in the calling song of the males.

Alabama distribution: Calhoun[2,3], Cleburne[1], Covington[1], Elmore[1], Houston[2,3], Lee[1,3], Macon[1], Montgomery[3], Tallapoosa[1], and Winston[1] counties.

Specimens examined: 1 male, 1 female UMMZ; 24 males, 10 females AU.

This species, like *O. celerinictus,* is found in vegetation in old fields and along the edges of roadways. It is also a common species in the State, and often the two species are found together in the same field. Dates on the specimens range from June 22 to October 17.

Oecanthus pini Beutenmuller

Head and pronotum nearly uniform dull reddish brown. Tegmina bright yellow green; antenna brown, the first segment with an elongate black spot along inner ridge and a small oblique one near apex, second segment with two oblong parallel black spots.

Alabama distribution: Cleburne[2,3] County.

Specimens examined: 3 males UMMZ.

This species inhabits the crowns of pine trees. The three Alabama specimens were taken from the summit of Cheaha Mountain in August.

Anaxipha exigua (Say)

Body length 5-7 mm. General coloration dull yellowish brown or clay yellow; spines of hind tibia with bases and tips dusky. Pronotum about one-fourth longer than wide.

Alabama distribution: Barbour[1], Conecuh[1], Etowah[1], Houston[2], Mobile[2], Walker[1], and Winston[1] counties.

Specimens examined: 2 females UMMZ; 6 males, 2 females AU.

This species inhabits bushes and tall vegetation along the edges of ponds and streams. In Walker County it was very abundant in vegetation along the banks of the Warrior River. Fulton *(12)* discussed the genus *Anaxipha* in the United States. Dates on the Alabama specimens range from June 26 to October 6.

Anaxipha delicatula Scudder

Body length 4.5-6.5 mm. General coloration pale brownish yellow. Pronotum more than one-half wider than long.

Alabama distribution: Baldwin[2], Covington[1], Lee[1], and Lowndes[1] counties.

Specimens examined: 1 nymph, 9 males, 5 females UMMZ; 1 nymph, 3 females AU.

This species is usually found in drier habitats than *A. exigua,* but it has also been collected from rather low wet areas. See Fulton *(12)* for more information. Adults have been collected from March 12 to November 16.

Falcicula hebardi Rehn

Body length 4-5 mm. General coloration a uniform pale yellowish brown. Antennae about twice as long as body. Pronotum about one-half wider than long. Tegmina longer than abdomen in male, reaching tip of abdomen in female. Wings absent. Ovipositor stout, strongly curved.

Alabama distribution: Chilton[1], Choctaw[1], Monroe[1], and Tallapoosa[1] counties.

Specimens examined: 3 males, 7 females AU.

This species is found chiefly in the undergrowth of open pine woods. However, in Monroe County it was found to be abundant in the short grass near the margin of a small lake. Adults have been collected from April 20 to August 1.

Cyrtoxipha columbiana Caudall

Body length 5.5-7 mm. General coloration pale green fading to brownish yellow. Pronotum wider than long, wider at posterior than anterior end. Tegmina 2-3 mm longer than abdomen; wings 2-3 mm longer than tegmina. Ovipositor distinctly surpassing tips of hind femora.

Alabama distribution: Barbour[1], Dallas[1], Escambia[1], Franklin[1], Lee[1], and Macon[1] counties.

Specimens examined: 11 males, 10 females AU.

This species is an inhabitant of the foliage of deciduous trees and shrubs. It has been collected in some numbers by beating the foliage of sweetgum. It is attracted to lights at night, and several specimens have been taken from homes in Auburn. Dates on the specimens range from July 17 to September 17.

Phylloscyrtus pulchellus Uhler

Body length 6-7 mm. Head and pronotum usually bright red, lateral lobes of pronotum yellow; tegmina reddish or chocolate brown; abdomen shining black. Antennae twice length of body.

Alabama distribution: Butler[1], Choctaw[1], Coffee[1], Conecuh[2], Dallas[1], Lee[1], Macon[1], Pike[2], Russell[1], Tallapoosa[1], and Wilcox[1] counties.

Specimens examined: 14 males, 6 females UMMZ; 5 nymphs, 17 males, 18 females AU.

This species is an inhabitant of low bushes and vines. Specimens have been collected by sweeping wild grape and honeysuckle in Lee County. It is a common species but is not often seen because of its habitat. Dates on the adults range from July 27 to October 4.

Hapithus agitator Uhler

Body length, male 9-10 mm, female 10-14 mm. General coloration pale brownish yellow or dull reddish brown. Occiput, pronotum, and all femora thickly clothed with brownish yellow hairs. Ovipositor slightly shorter than hind femur, very slender, feebly curved, its tip black, slightly enlarged.

Alabama distribution: Baldwin[1], Butler[1], Cherokee[2], Cleburne[2], Conecuh[2], Dallas[1], DeKalb[1], Escambia[1], Lee[1,2], Lowndes[1], Monroe[1], Perry[2], and Shelby[1] counties.

Specimens examined: 34 nymphs, 19 males, 21 females UMMZ; 6 nymphs, 5 males, 8 females AU.

This species normally inhabits the undergrowth and leaf litter of open woods. Dates on the specimens range from July 2 to October 18. The specimens probably represent more than one subspecies, but further study will be necessary to establish which forms occur in the State.

Hapithus brevipennis Saussure

Body length, male 11-16 mm, female 15-19 mm. General coloration pale reddish brown; dorsal field of tegmina of male yellow. Tips of tegmina broadly rounded. Ovipositor straight, slender.

Alabama distribution: Covington[1] County.

Specimens examined: 1 female AU.

The single Alabama specimen was collected from very thick grasses growing along the edge of a large lake. It was taken November 16.

Orocharis saltator Uhler

Body length 14-16 mm. Coloration variable, usually a uniform pale reddish brown, occasionally grayish, more or less maculate with fuscous. Pro-

notum about one-half wider than long, hind margin feebly bisinuate. Ovipositor straight, slender, tip toothed beneath, about one-third longer than hind femur.

Alabama distribution: Escambia[2] County.

Specimens examined: 1 male UMMZ.

According to Blatchley *(5)*, this species is found in the undergrowth of dense woods, thickets, along stream borders, and shrubbery in yards. The single Alabama specimen was collected June 7.

LITERATURE CITED

(1) ALEXANDER, R. D. 1957. The taxonomy of the field crickets of the eastern United States. Ann. Entomol. Soc. Amer. 50:584-602.

(2) ———. 1962. The role of behavioral study in cricket classification. Syst. Zool. 11:53-72.

(3) ———, AND E. S. THOMAS. 1959. Systematic and behavioral studies on the crickets of the *Nemobius fasciatus* group. Ann. Entomol. Soc. Amer. 52:591-605.

(4) ———, AND T. J. WALKER. 1962. Two introduced field crickets new to eastern United States. Ann. Entomol. Soc. Amer. 55:90-94.

(5) BLATCHLEY, W. S. 1920. Orthoptera of Northeastern America. Nature Pub. Co., Indianapolis. 784 pp.

(6) CANTRALL, I. J. 1943. The ecology of the Orthoptera and Dermaptera of the George Reserve, Michigan. Univ. Michigan Mus. Zool. Misc. Pub. No. 54, 182 pp.

(7) CLEVELAND, L. R., S. R. HALL, E. P. SANDERS, AND J. COLLIER. 1934. The wood feeding roach *Cryptocercus*, its protozoa, and the symbiosis between protozoa and roach. Amer. Acad. Sci. Mem. 17:185-342.

(8) DAKIN, M. E. 1960. The Cyrtacanthacrinae of Alabama. Unpublished Master's Thesis. Auburn University. 130 pp.

(9) ———. 1966. Two new species of *Melanoplus* from Alabama, Entomol. News. 77:29-36.

(10) FRIAUF, JAMES J. 1957. Clarification of the species in the genus *Dendrotettix*. Florida Entomol. 40:127-139.

(11) FULTON, B. B. 1931. A study of the genus *Nemobius*. Ann. Entomol. Soc. Amer. 24:205-237.

(12) ———. 1956. The genus *Anaxipha* in the United States. J. Elisha Mitchell Sci. Soc. 72:222-243.

(13) GURNEY, A. B. 1940. A revision of the grasshoppers of the genus *Orphulella* Giglio-Tos, from America north of Mexico. Entomol. Amer. 20:85-157.

(14) ———. 1941. Taxonomic and bionomic notes on the grasshopper *Melanoplus impudicus* Scudder. Amer. Midland Natur. 26: 558-569.

(15) ———. 1951. Preying mantids of the United States. Rep. Smithson. Inst. Wash., D.C. 1950:339-362.

(16) ———. 1962. On the name of the migratory grasshopper of the United States and Canada, *Melanoplus sanguinipes* (F.) Proc. Biol. Soc. Wash. 75:189-192.

(17) ———, AND A. R. BROOKS. 1959. Grasshoppers of the *mexicanus* group, genus *Melanoplus*. Proc. U.S. Nat. Mus. 110:1-93.

(18) HANDFORD, R. H. 1946. The identification of nymphs of the genus *Melanoplus* of Manitoba and adjacent areas. Sci. Agr. 26:147-180.

(19) HEBARD, MORGAN. 1917. The Blattidae of North America north of the Mexican boundary. Mem. Amer. Entomol. Soc. 2:1-284.

(20) ———. 1918. New genera and species of Melanopli found within the United States. Part I. Trans. Amer. Entomol. Soc. 44:141-169.

(21) ———. 1919. New genera and species of Melanopli found within the United States. Part II. Trans. Amer. Entomol. Soc. 45:257-298.

(22) ———. 1920. New genera and species of Melanopli found within the United States. Part III. Trans. Amer. Entomol. Soc. 46: 355-403.

(23) ———. 1922. North American Acrididae, papers 1 and 2. Trans. Amer. Entomol. Soc. 48:89-108.

(24) ———. 1925. The North American genus *Inscudderia*. Trans. Amer. Entomol. Soc. 51:321-330.

(25) ———. 1926a. A key to the North American genera of the Acridinae which occur north of Mexico. Trans. Amer. Entomol. Soc. 52:47-59.

(26) ———. 1926b. A revision of the North American genus *Belocephalus*. Trans. Amer. Entomol. Soc. 52:147-186.

(27) ———. 1931. The Mogoplistinae of the United States. Trans. Amer. Entomol. Soc. 57:135-160.

(28) ———. 1934a. Studies in Orthoptera which occur in North America north of the Mexican boundary, III. Revisionary data and new North American Decticinae. Trans. Amer. Entomol. Soc. 60: 31-55.

(29) ———. 1934b. The Dermaptera and Orthoptera of Illinois. Bull. Illinois' Natur. Hist. Surv. 20:125-279.

(30) ———. 1935. New genera and species of the Melanopli found within the United States and Canada. Parts V and VI. Trans. Amer. Entomol. Soc. 60:337-390.

(31) ———. 1936a. New genera and species of the Melanopli found within the United States and Canada. Parts VII, VIII, and IX. Trans. Amer. Entomol. Soc. 62:167-222.

(32) ———. 1936b. Studies in Orthoptera. VI. A revision of the genus *Arethaea*. Trans. Amer. Entomol. Soc. 62:231-256.

(33) ———. 1941. The group Pterophyllae as found in the United States. Trans. Amer. Entomol. Soc. 67:197-219.

(34) ———. 1943. The Dermaptera and Orthopterous families Blattidae, Mantidae, and Phasmidae of Texas. Trans. Amer. Entomol. Soc. 68:239-311.

(35) Howell, A. H. 1921. A biological survey of Alabama; I. Physiography and life zones. II. The Mammals. USDA Bur. Biol. Surv. N. Amer. Fauna. No. 45, 88 pp.

(36) Hubbell, T. H. 1932. A revision of the *puer* group of the North American genus *Melanoplus* with remarks on the taxonomic value of the concealed male genitalia in the Cyrtacanthacrinae. Univ. Michigan Mus. Zool. Misc. Pub. No. 23, 64 pp.

(37) ———. 1936. A monographic revision of the genus *Ceuthophilus*. Univ. Florida Pub. Biol. Sci. Ser. 2:1-55.

(38) ———. 1937. A new apterous grouse-locust from western Florida. Univ. Michigan Mus. Zool. Occasional Papers. No. 350, 9 pp.

(39) ———. 1956. A new collecting method: the oatmeal trail. Entomol. News. 67:49-51.

(40) ———. 1960. The sibling species of the *alutacea* group of the bird-locust genus *Schistocerca*. Univ. Michigan Mus. Zool. Misc. Pub. No. 116, 91 pp.

(41) KUITERT, L. C. AND R. V. CONNIN. 1952. Biology of the American grasshopper in the southeastern United States. Florida Entomol. 35: 22-33.

(42) MARCOVITCH, S. 1920. Grasshoppers of Tennessee. Tennessee State Board of Entomol. Bull. 33, 112 pp.

(43) MCKITTRICK, F. A. 1964. Evolutionary studies of cockroaches. Cornell Univ. Agr. Exp. Sta. Mem. 389, 197 pp.

(44) ———. 1965. A contribution to the understanding of cockroach-termite affinities. Ann. Entomol. Soc. Amer. 58:18-22.

(45) MORSE, A. P. 1904. Researches on North American Acrididae. Carnegie Inst. Washington Pub. 18:1-55.

(46) ———. 1906. New Acrididae from the southern states. Psyche. 13:119-122.

(47) ———. 1907. Further researches on North American Acrididae. Carnegie Inst. Washington Pub. 68:1-54.

(48) RANDELL, R. L. 1964. The male genitalia in Gryllinae and a tribal revision. Can. Entomol. 96:1565-1607.

(49) REHN, J. A. G. 1919. Description of new and critical notes upon previously known forms of North American Oedipodinae. First Paper. Trans. Amer. Entomol. Soc. 45:229-255.

(50) ———. 1946. On the *punctulatus* species-group of the genus *Melanoplus*, with a description of a new species from Kansas. Proc. Acad. Natur. Sci. Philadelphia. 98:241-269.

(51) ——— AND D. C. EADES. 1961. The genus *Opshomala* of Serville, 1831. Notulae Naturae. 345:1-9.

(52) ——— AND H. J. GRANT. 1955. The North American tetrigid genus *Nomotettix*. Proc. Acad. Natur. Sci. Philadelphia. 107:1-34.

(53) ———. 1956a. The components of *Tetrix ornata*. Proc. Acad. Natur. Sci. Philadelphia. 108:117-153.

(54) ———. 1956b. An analysis of *Tetrix arenosa*. Trans. Amer. Entomol. Soc. 82:117-145.

(55) ———. 1956c. A review of the genus *Neotettix*. Trans. Amer. Entomol. Soc. 82:217-250.

(56) ———. 1957. The genus *Paratettix* as found in North America. Proc. Acad. Natur. Sci. Philadelphia. 109:247-319.

(57) ———. 1958. The Batrachideinae of North America. Trans. Amer. Entomol. Soc. 84:13-104.

(58) ———. 1959a. A review of the Romaleinae found in America north of Mexico. Proc. Acad. Natur. Sci. Philadelphia. 111:109-271.

(59) ———. 1959b. Critical remarks on the recent contribution on the taxonomy of the Acridoidea by V. M. Dirsh. Entomol. News. 70:245-249.

(60) ———. 1961. A monograph of the Orthoptera of North America (north of Mexico). Volume I. Acad. Natur. Sci. Philadelphia. Monogr. No. 12, 257 pp.

(61) ——— AND MORGAN HEBARD. 1914a. Studies in American Tettigoniidae I. A synopsis of the species of the genus *Scudderia*. Trans. Amer. Entomol. Soc. 40:271-314.

(62) ———. 1914b. Studies in American Tettigoniidae II. A synopsis of the species of the genus *Amblycorypha* found in America north of Mexico. Trans. Amer. Entomol. Soc. 40: 315-344.

(63) ———. 1914c. Studies in American Tettigoniidae III. A synopsis of the species of the genus *Neoconocephalus* found in North America north of Mexico. Trans. Amer. Entomol. Soc. 40:365-413.

(64) ———. 1915a. Studies in American Tettigoniidae IV. A synopsis of the species of the genus *Orchelimum*. Trans. Amer. Entomol. Soc. 41:11-83.

(65) ———. 1915b. Studies in American Tettigoniidae V. A synopsis of the species of the genus *Conocephalus* found in North America north of Mexico. Trans. Amer. Entomol. Soc. 42:155-224.

(66) ———. 1916a. Studies in the Dermaptera and Orthoptera of the Coastal Plain and Piedmont region of the southeastern United States. Proc. Acad. Natur. Sci. Philadelphia. 68:87-314.

(67) ———. 1916b. Studies in American Tettigoniidae VII. A revision of the species of the genus *Atlanticus*. Trans. Amer. Entomol. Soc. 42:33-100.

(68) ——— AND J. W. H. REHN. 1936. On new or redefined genera of Nearctic Melanopli. Trans. Amer. Entomol. Soc. 62:1-30.

(69) REHN, J. W. H. 1943. A key to the genera of North American Blattaria including established adventives. Entomol. News. 61:64-67.

(70) ROBERTS, H. R. 1941. A comparative study of the subfamilies of the Acrididae primarily on the basis of their phalic structures. Proc. Acad. Natur. Sci. Philadelphia. 93:201-246.

(71) ———. 1942. Two subspecies of *Melanoplus differentialis* and related new species from Mexico with discussion of their variations. Trans. Amer. Entomol. Soc. 68:151-166.

(72) SCUDDER, S. H. 1868. Catalogue of the Orthoptera of North America described previous to 1867. Smithsonian Inst. Misc. Collections. No. 189, 89 pp.

(73) ———. 1900a. Catalogue of the described Orthoptera of the United States and Canada. Proc. Davenport Acad. Natur. Sci. 8:1-101.

(74) ———. 1900b. The distribution of *Leptysma marginicollis* (Serv.) Psyche. 9:116.

(75) SHOTWELL, R. L. 1930. A study of the lesser migratory grasshopper. USDA Tech. Bull. No. 190, 34 pp.

(76) THOMAS, E. S. AND R. D. ALEXANDER. 1962. Systematic and behavioral studies on the meadow grasshoppers of the *Orchelimum concinnum* group. Univ. Michigan Mus. Zool. Occasional Papers. No. 626, 31 pp.

(77) WALKER, T. J. 1957. Specificity in the response of female tree crickets to calling songs of males. Ann. Entomol. Soc. Amer. 50:626-636.

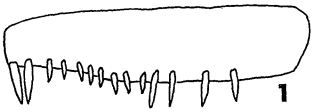
(78) ———. 1962. The taxonomy and calling songs of the United States tree crickets I. The genus *Neoxabea* and the *niveus* and *varicornis* groups of the genus *Oecanthus*. Ann. Entomol. Soc. Amer. 55: 303-322.

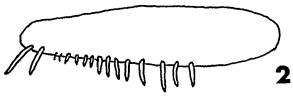
(79) ———. 1963. The taxonomy and calling songs of United States tree crickets II. The *nigricornis* group of the genus *Oecanthus*. Ann. Entomol. Soc. Amer. 56:772-789.

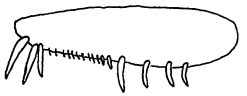
(80) ———. 1964. Cryptic species among sound-producing ensiferan Orthoptera. Quart. Rev. Biol. 39:345-355.

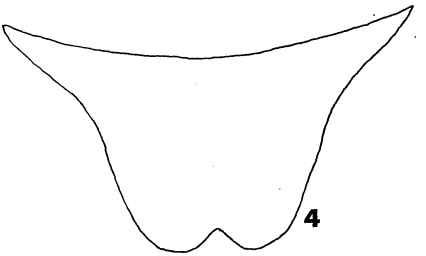
(81) WEST, M. J. AND R. D. ALEXANDER. 1963. Subsocial behavior in a burrowing cricket *Anurogryllus muticus* (DeGeer). Ohio J. Sci. 63: 19-24.

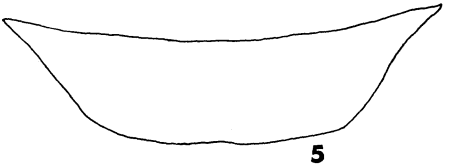
FIG. 1. Outline of front femur of *Cariblatta lutea lutea* (Saussure and Zehntner).
FIG. 2. Outline of front femur of *Supella supellectilium* (Serville).
FIG. 3. Outline of front femur of *Ischnoptera deropeltiformis* (Brunner).
FIG. 4. Dorsal view of supra-anal plate of *Periplaneta americana* (Linnaeus).
FIG. 5. Dorsal view of supral-anal plate of *Periplaneta brunnea* Burmeister.
FIG. 6. Lateral outline of front of head of *Paratettix cucullatus* (Burmeister).
FIG. 7. Lateral outline of front of head of *Paratettix mexicanus* (Saussure).
FIG. 8. Lateral outline of front of head of *Tetrix arenosa angusta* (Hancock).
FIG. 9. Dorsal outline of head of *Tetrix arenosa angusta* (Hancock).
FIG. 10. Dorsal outline of head of *Paratettix mexicanus* (Saussure).
FIG. 11. Dorsal outline of head of *Neotettix femoratus* (Saussure).
FIG. 12. Dorsal outline of head of *Neotettix proavus* Rehn and Hebard.
FIG. 13. Dorsal outline of head of *Tettigidea armata* Morse.


1


2


3


4


5


6

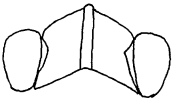

7


8


9


10


11


12

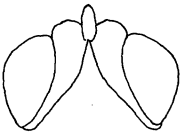
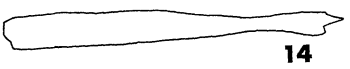
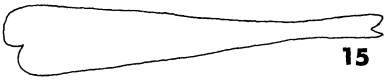
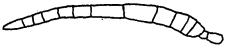

13

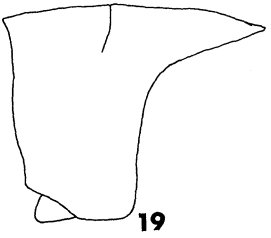
FIG. 14. Outline of hind femur of *Radinotatum carinatum carinatum* (Walker).
FIG. 15. Outline of hind femur of *Metaleptea brevicornis* (Johannson).
FIG. 16. Dorsal outline of antenna of *Radinotatum carinatum carinatum* (Walker).
FIG. 17. Lateral view of tip of aedeagus of *Orphulella pelidna pelidna* (Burmeister).
FIG. 18. Lateral view of tip of aedeagus of *Orphulella olivacea olivacea* (Morse).
FIG. 19. Lateral view of pronotum of *Chortophaga viridifasciata* (DeGeer).
FIG. 20. Lateral view of pronotum of *Arphia sulphurea* (Fabricius).
FIG. 21. Lateral view of pronotum of *Arphia xanthoptera* (Burmeister).
FIG. 22. Lateral view of pronotum of *Dissosteira carolina* (Linnaeus).

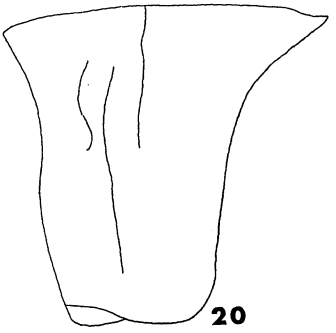

14

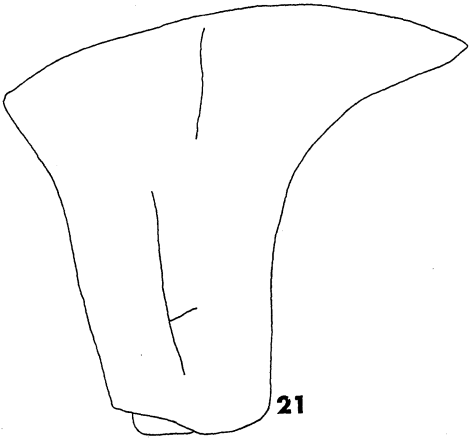

15


16


17 18


19


20


21

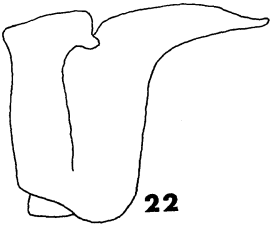
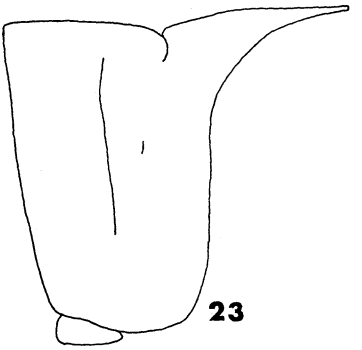
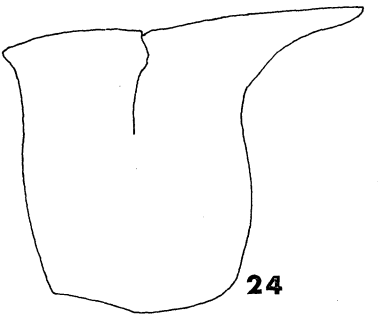
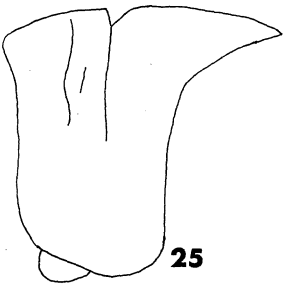
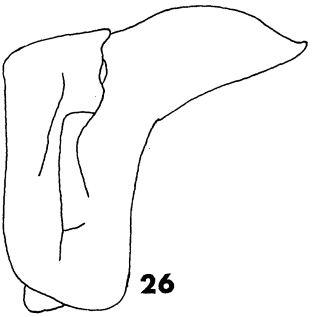

22

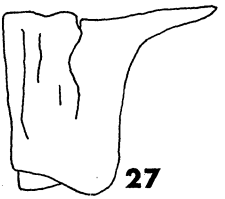
FIG. 23. Lateral view of pronotum of *Hippiscus rugosus* (Scudder).
FIG. 24. Lateral view of pronotum of *Pardalophora phoenicoptera* (Burmeister).
FIG. 25. Lateral view of pronotum of *Spharagemon bolli* Scudder.
FIG. 26. Lateral view of pronotum of *Spharagemon collare collare* (Scudder).
FIG. 27. Lateral view of pronotum of *Trimerotropis citrina* Scudder.
FIG. 28. Lateral view of pronotum of *Psinidia fenestralis* (Serville).
FIG. 29. Lateral view of pronotum of *Trachyrhachis kiowa fuscifrons* (Stal).

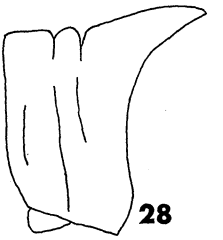

23


24


25


26


27


28

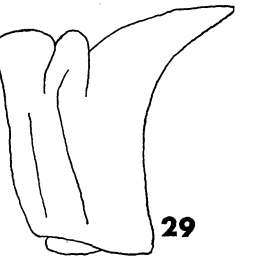

29

FIG. 30. Left cercus of male *Schistocerca americana americana* (Drury).
FIG. 31. Left cercus of male *Schistocerca damnifica damnifica* (Saussure).
FIG. 32. Left cercus of male *Schistocerca alutacea* (Harris).
FIG. 33. Left cercus of male *Schistocerca rubiginosa* (Scudder).
FIG. 34. Left cercus of male *Schistocerca obscura* (Fabricius).
FIG. 35. Left cercus of male *Melanoplus cantralli* Dakin.
FIG. 36. Left cercus of male *Melanoplus similis* Morse.
FIG. 37. Left cercus of male *Paroxya hoosieri* (Blatchley).
FIG. 38. Left cercus of male *Melanoplus querneus* Rehn and Hebard.
FIG. 39. Left cercus of male *Melanoplus nigrescens* (Scudder).
FIG. 40. Left cercus of male *Gymnoscirtetes morsei* Hebard.
FIG. 41. Left cercus of male *Melanoplus punctulatus aboreus* (Scudder).
FIG. 42. Left cercus of male *Melanoplus differentialis differentialis* (Thomas).
FIG. 43. Left cercus of male *Melanoplus hebardi* (Rehn).
FIG. 44. Left cercus of male *Melanoplus tribulus* Morse.
FIG. 45. Left cercus of male *Melanoplus tribuloides* Morse.
FIG. 46. Left cercus of male *Melanoplus decoratus* Morse.
FIG. 47. Left cercus of male *Melanoplus femurrubrum femurrubrum* (DeGeer).
FIG. 48. Left cercus of male *Melanoplus femurrubrum propinquus* Scudder.
FIG. 49. Left cercus of male *Melanoplus delaware* Hebard.
FIG. 50. Left cercus of male *Melanoplus alabamae* Hebard.
FIG. 51. Left cercus of male *Aptenopedes sphenarioides apalachee* Hebard.
FIG. 52. Left cercus of male *Paroxya atlantica atlantica* Scudder.
FIG. 53. Left cercus of male *Melanoplus keeleri keeleri* Thomas.
FIG. 54. Left cercus of male *Melanoplus impudicus* Scudder.
FIG. 55. Left cercus of male *Melanoplus scudderi scudderi* (Uhler).
FIG. 56. Left cercus of male *Melanoplus gracilis* (Bruner).
FIG. 57. Left cercus of male *Stenacris vitreipennis vitreipennis* (Marschall).
FIG. 58. Left cercus of male *Leptysma marginicollis* (Serville).
FIG. 59. Left cercus of male *Hesperotettix viridis brevipennis* (Thomas).
FIG. 60. Left cercus of male *Eotettix pusillus* Morse.
FIG. 61. Left cercus of male *Campylacantha olivacea olivacea* (Scudder).
FIG. 62. Left cercus of male *Melanoplus strumosus* Morse.
FIG. 63. Left cercus of male *Melanoplus carnegiei* Morse.
FIG. 64. Left cercus of male *Melanoplus primaestivus* Dakin.
FIG. 65. Left cercus of male *Melanoplus tepidus* Morse.
FIG. 66. Left cercus of male *Melanoplus sanguinipes vulturnus* Gurney and Brooks.
FIG. 67. Left cercus of male *Melanoplus bispinosus* Scudder.
FIG. 68. Lateral outline of subgenital plate of male *Campylacantha olivacea olivacea* (Scudder).
FIG. 69. Lateral outline of subgenital plate of male *Melanoplus sanguinipes vulturnus* Gurney and Brooks.
FIG. 70. Caudal outline of subgenital plate of male *Melanoplus sanguinipes vulturnus* Gurney and Brooks.
FIG. 71. Caudal outline of subgenital plate of male *Melanoplus femurrubrum femurrubrum* (DeGeer).
FIG. 72. Terminal portion of abdomen of female *Melanoplus keeleri keeleri* (Thomas).
FIG. 73. Terminal portion of abdomen of female *Melanoplus sanguinipes vulturnus* Gurney and Brooks.
FIG. 74. Terminal portion of abdomen of female *Melanoplus impudicus* Scudder.
FIG. 75. Terminal portion of abdomen of female *Melanoplus querneus* Rehn and Hebard.
FIG. 76. Terminal portion of abdomen of female *Melanoplus femurrubrum femurrubrum* (DeGeer).
FIG. 77. Terminal portion of abdomen of female *Melanoplus nigrescens* (Scudder).
FIG. 78. Terminal portion of abdomen of female *Melanoplus bivittatus* (Say).
FIG. 79. Terminal portion of abdomen of female *Melanoplus differentialis differentialis* (Thomas).

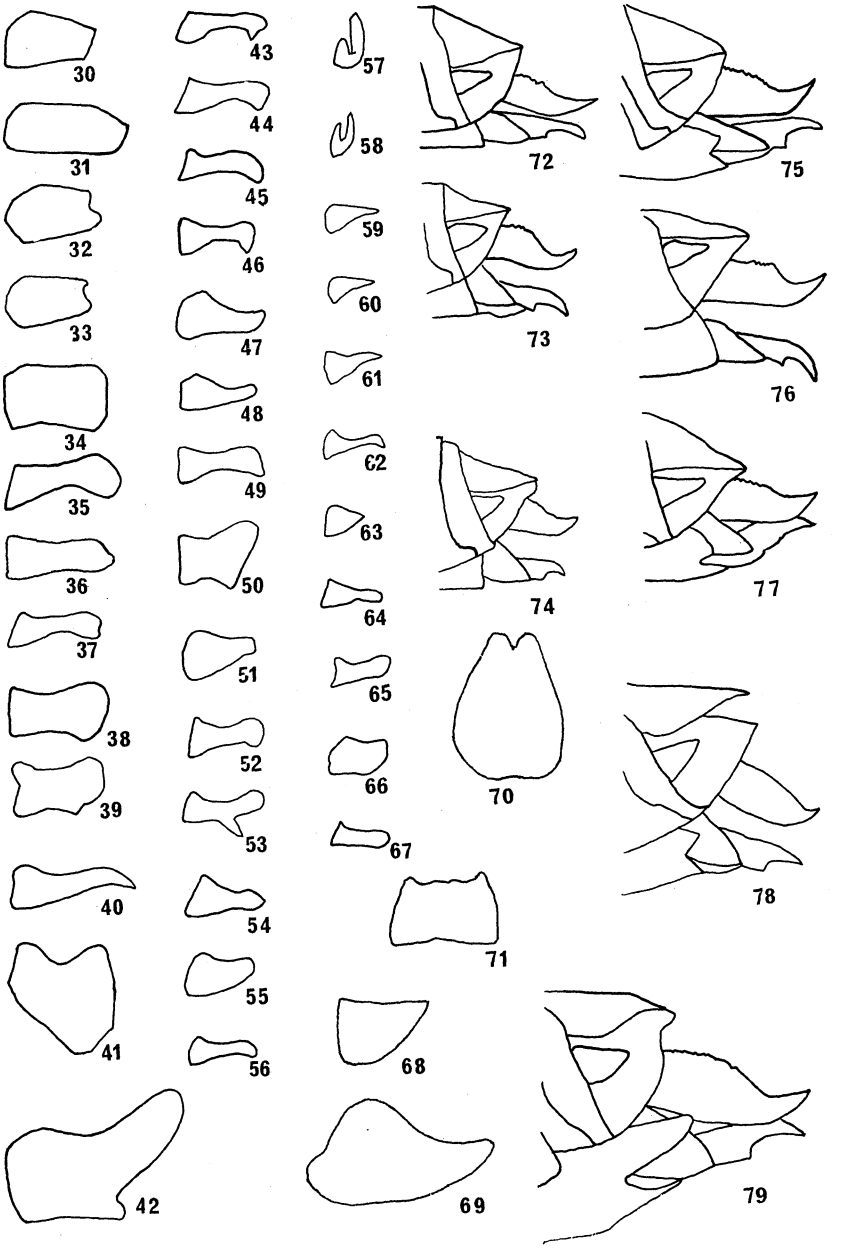
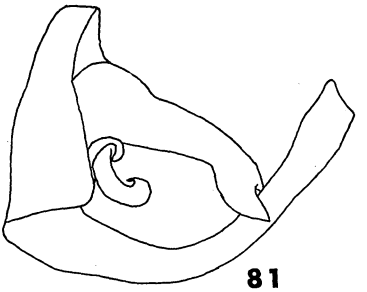
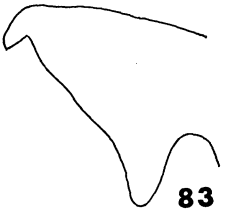

30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79

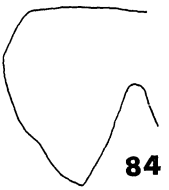
FIG. 80. Dorsal outline of last dorsal abdominal segment of male *Scudderia texensis* Saussure and Pictet.
FIG. 81. Terminal portion of abdomen of male *Scudderia texensis* Saussure and Pictet.
FIG. 82. Dorsal outline of last dorsal abdominal segment of male *Scudderia furcata furcata* Brunner.
FIG. 83. Lateral outline of vertex of *Pyrgocorypha uncinata* (Harris).
FIG. 84. Lateral outline of vertex of *Neoconocephalus triops* (Linnaeus).
FIG. 85. Lateral outline of vertex of *Bucrates malivolens* (Scudder).
FIG. 86. Dorsal view of left cercus of male *Conocephalus strictus* (Scudder).
FIG. 87. Dorsal outline of left cercus of male *Conocephalus fasciatus fasciatus* (DeGeer).
FIG. 88. Dorsal outline of left cercus of male *Concephalus brevipennis* (Scudder).
FIG. 89. Dorsal outline of left cercus of male *Odontoxiphidium apterum* Morse.


80


81


82

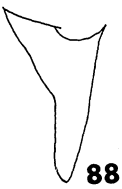

83

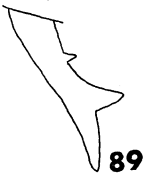

84


85


86


87

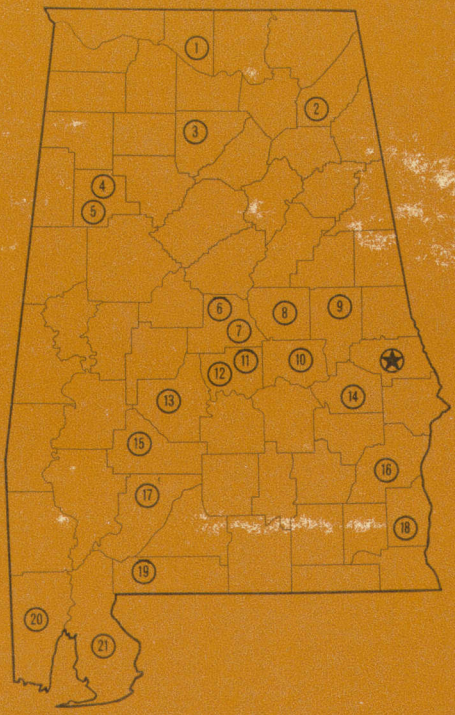

88


89

INDEX TO THE GENERA AND SPECIES

AGRICULTURAL EXPERIMENT STATION SYSTEM OF ALABAMA'S LAND-GRANT UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the State has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

★ Main Agricultural Experiment Station, Auburn.

1. Tennessee Valley Substation, Belle Mina.
2. Sand Mountain Substation, Crossville.
3. North Alabama Horticulture Substation, Cullman.
4. Upper Coastal Plain Substation, Winfield.
5. Forestry Unit, Fayette County.
6. Thorsby Foundation Seed Stocks Farm, Thorsby.
7. Chilton Area Horticulture Substation, Clanton.
8. Forestry Unit, Coosa County.
9. Piedmont Substation, Camp Hill.
10. Plant Breeding Unit, Tallassee.
11. Forestry Unit, Autauga County.
12. Prattville Experiment Field, Prattville.
13. Black Belt Substation, Marion Junction.
14. Tuskegee Experiment Field, Tuskegee.
15. Lower Coastal Plain Substation, Camden.
16. Forestry Unit, Barbour County.
17. Monroeville Experiment Field, Monroeville.
18. Wiregrass Substation, Headland.
19. Brewton Experiment Field, Brewton.
20. Ornamental Horticulture Field Station, Spring Hill.
21. Gulf Coast Substation, Fairhope.