

OKLAHOMA AGRICULTURAL AND MECHANICAL COLLEGE
AGRICULTURAL EXPERIMENT STATION

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An Ecological Survey of the Orthoptera of Oklahoma

By

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FOREWORD

By

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The grasshopper problem in Oklahoma has become of increasing importance in recent years, and because these insects are among the state's most destructive agricultural pests the Oklahoma Agricultural Experiment Station has taken up their study as one of its important research projects. An important step in this work is a survey to determine what species occur in the State, their geographic distribution, and the relative importance of different species as crop and range pests. The present bulletin represents such a survey which was made during a particularly favorable year when grasshoppers were unusually abundant and destructive. The major portion of the State was covered and collections were made in all of the more important types of habitats. To make the study more complete, all of the Orthoptera have been included in this bulletin. One hundred and four species and 12 subspecies or races are listed for the State, including 17 which are classed as injurious. The data are based upon over seven thousand specimens which were collected during the period of the investigation. This collection was classified by Doctor Morgan Hebard, Curator of Orthoptera, Philadelphia Museum of Natural History, who is the author of this bulletin.

AN ECOLOGICAL SURVEY OF THE ORTHOPTERA OF OKLAHOMA *

MORGAN HEBARD

The great abundance of destructive species of grasshoppers in Oklahoma since 1936 prompted the organization of a field survey during the summer of 1937 in which emphasis was placed on collecting Orthoptera. Collections were made in 56 localities distributed rather widely over various parts of the State (Fig. 1). Work was begun June 4 and ended August 18, but was nearly continuous only in late June and through July. In addition to making general collections of Orthoptera, grasshoppers were collected from eight different environments. Ten collections were made at different dates from each habitat and approximately 100 specimens were collected at a time. For the 17 dominant species, this meant a total of from 483 to 1033 specimens per environment.

The following is a brief description of each environment:

- A. Pasture. Native grass areas grazed by livestock, usually with but few trees. (Fig. 2.)
- B. Range or waste land. Sage, blackjack, or tall grass areas, often sparsely wooded. (Fig. 3.)
- C. Alfalfa. Alfalfa hay fields at any stage of maturity.
- D. Roadside. Areas immediately adjoining roads or highways; i. e., all land along road outside the field fences or field boundaries; vegetation usually weeds, sometimes grass.
- E. Corn. Cultivated corn.
- F. Cotton. Cultivated cotton.
- G. Stubble. Wheat (or occasionally oat) stubble as left by grain binder or combine, with or without grain shocks still remaining on field.
- H. Weeds along stream. Weeds and similar vegetation immediately adjoining a stream (Fig. 4.)

* The collections on which this paper is based were made by John Standish and Robert Kaiser, students in entomology, Oklahoma A. and M. College, and the author gratefully acknowledges their assistance. The photographs to illustrate typical habitats were taken expressly for this bulletin by G. A. Bieberdorf, assistant professor of entomology at the Oklahoma A. and M. College.

Table I.—Distribution of Injurious Species of Grasshoppers in Eight Environments, Oklahoma, 1937.

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Oklahoma Agricultural Experiment Station

Species	ENVIRONMENT								Total*	Percent of Total
	Pasture	Range	Alfalfa	Roadside	Corn	Cotton	Stubble	Weeds Along Stream		
<i>Mermiria maculipennis maculipennis</i>	25	12	10	32	--	--	--	--	79	1.4
<i>Phlibostroma quadrimaculatum</i>	30	13	--	12	--	1	3	11	70	1.2
<i>Ageneotettix deorum deorum</i>	58	16	2	50	--	--	11	3	140	2.5
<i>Aulocara ellioti</i>	36	4	4	27	--	1	64	4	140	2.5
<i>Spharagemon collare</i>	40	52	5	5	14	17	85	--	218	3.8
<i>Trimerotropis citrina</i>	3	--	7	32	20	77	2	6	147	2.6
<i>Hesperotettix speciosus</i>	79	27	4	15	--	24	8	33	190	3.3
<i>Melanoplus glaucipes</i>	2	36	3	3	1	4	10	45	104	1.8
<i>Melanoplus mexicanus mexicanus</i>	33	22	66	16	14	108	67	22	348	6.0
<i>Melanoplus foedus iselyi</i>	92	35	53	90	39	20	71	173	573	10.0
<i>Melanoplus foedus fluviatilis</i>	135	--	5	2	5	57	--	--	204	3.6
<i>Melanoplus packardii</i>	117	86	178	124	6	54	78	--	643	11.2
<i>Melanoplus angustipennis impiger</i>	162	151	18	83	16	69	110	26	635	11.1
<i>Melanoplus bispinosus</i>	28	12	26	54	3	16	33	1	173	3.0
<i>Melanoplus bowditchi bowditchi</i>	2	108	--	3	--	--	--	--	113	1.9
<i>Melanoplus differentialis</i>	151	115	382	151	426	101	134	134	1,594	27.9
<i>Melanoplus bivittatus</i>	40	49	52	36	53	57	40	25	352	6.2
	1033	738	815	735	597	606	716	483	5,723	

* The total number recorded for each habitat does not necessarily coincide with the number given in the text under the discussion of each species. This is because in many cases no record was given of the environment or the specimen was collected in a plant association not given in the table. The habitat collection was kept separate from the general collection and no records are available except locality and date.

Seventeen species of grasshoppers representing 5,723 specimens were sufficiently abundant to indicate they were doing serious damage. (Table 1). It was evident that members of the genus *Melanoplus* were vastly more harmful than those of any other genus. Among these, *differentialis* was by far the most abundant, followed by the races of *foedus*, a large and vigorous species characteristic of the Great Plains. Next in abundance were *packardii*, a species of similar size and distribution, and *angustipennis impiger*, which averages somewhat smaller (as is true for typical *foedus fluvialis*). Next to these in numbers was *bivittatus*, then *mexicanus mexicanus*. The latter, though a much smaller insect, merits close observation. In the past, *spretus*, believed to be the migratory phase of this species, was capable of doing far greater injury to

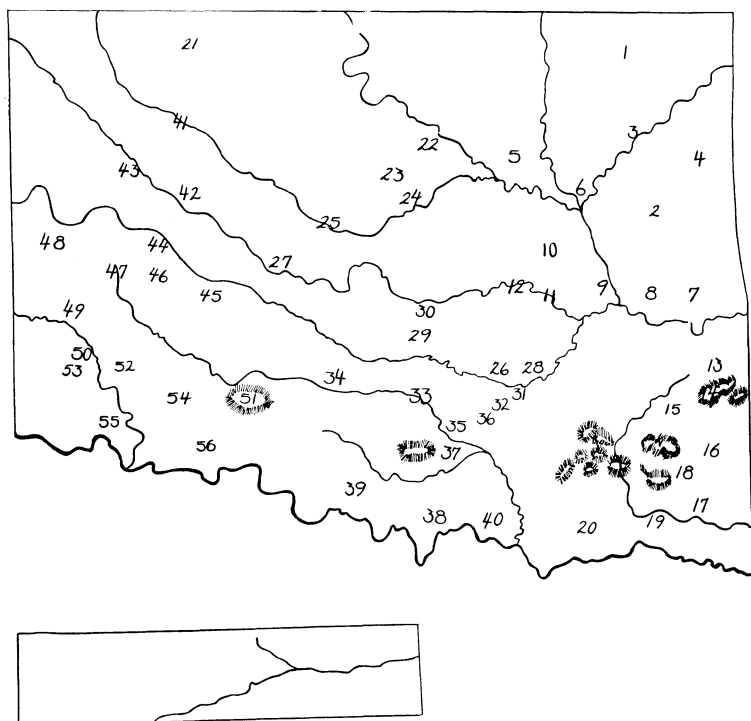


Figure 1.—Map of Oklahoma showing locations where collections were made. See list on page 11.

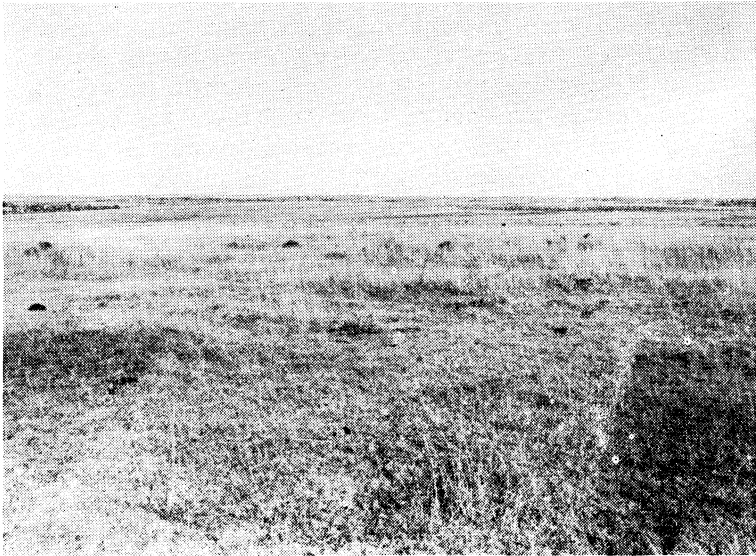


Figure 2.—Typical pasture. See description of habitat A, page 5.

almost all vegetation than any other form of grasshopper inhabiting temperate North America. Its last serious outbreaks occurred in the eighties.

In addition to the species listed in the table, the following were present in much smaller quantities, though in sufficient numbers to be termed abundant: *Chortophaga viridifasciata*, *Hippiscus rugosus*, *Dissosteira carolina*, *Spharagemon equale*, *Schistocerca lineata*, *Aeoloplus turnbulli bruneri*, *Hesperotettix viridis viridis*, *Hesperotettix viridis pratensis*, *Melanoplus femur-rubrum femur-rubrum*, *Melanoplus foedus foedus*, *Melanoplus arizonae* and *Melanoplus flavidus*.

A study of the relative numbers of the 17 dominant species collected in eight habitats shows that for the period during which this survey was made *M. differentialis* was the most abundant species in alfalfa, roadside, corn and wheat stubble, and second in numbers in the other habitats. *M. angustipennis impiger* was dominant in pasture and range and second in wheat stubble, *M. mexicanus mexicanus* was most numerous in cotton and third in alfalfa and *M. foedus iselyi*

was dominant in the weeds along streams. Of economic importance as range and pasture species were *M. angustipennis impiger*, *M. differentialis*, *M. foedus fluviatilis* (pasture only), *M. packardii*, *M. bowditchi bowditchi* (range only), *M. foedus iselyi* and *Hesperotettix speciosus*. The three most important species attacking alfalfa were *M. differentialis*, *M. packardii* and *M. mexicanus mexicanus*. Corn was attacked by *M. differentialis*, *M. bivittatus* and *M. foedus iselyi* and cotton by *M. mexicanus mexicanus*, *M. differentialis* and *Trimerotropis citrina*.

SYSTEMATIC TREATMENT

It should be observed that only the Acrididae (or true grasshoppers) can here be considered in anything like a normal ratio, as species of the other families of Orthoptera might be present in great numbers though relatively few might be seen, due either to their usually more secretive habits or the fact that very many of them are nocturnal. It should also be remembered that adult grasshoppers of various species are present in the State from early April to late November, and that many of these earlier species may have either disappeared at

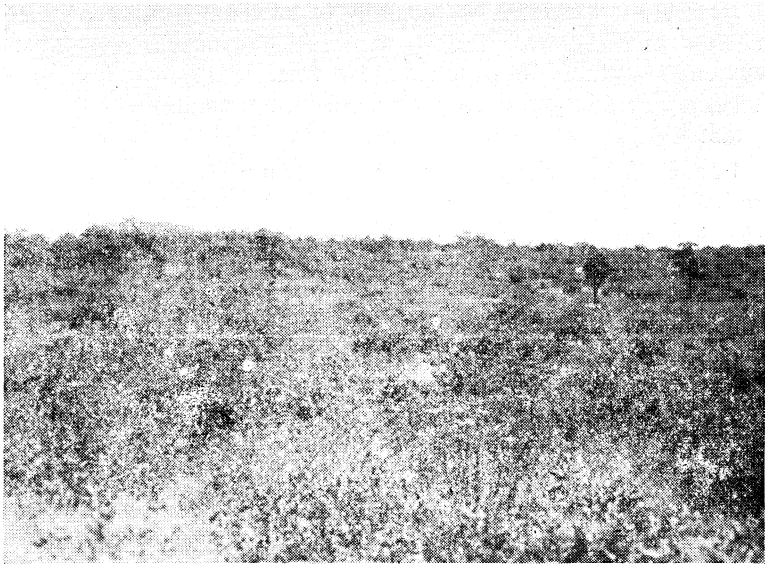


Figure 3.—Range country. See description of habitat B, page 5.



Figure 4.—Wooded area along stream. See description of habitat H, page 5.

the time the collections were made or at least had greatly diminished in numbers. This is true for *Melanoplus mexicanus mexicanus* and *M. bivittatus*. The former species developed a second generation in 1937 and became very abundant after the last field collections were made.

In Oklahoma, the major problem concerns the grasshoppers only. In other portions of the United States, however, other Orthoptera are known to be very harmful at times. Included in this group are the mole-crickets (*Scapteriscus*) in the Southeast, katydids (*Anabrus*, a flightless terrestrial species) in the West, and, locally, tree-crickets (*Oecanthus*). The latter mainly concern the horticulturist. Sometimes very harmful locally and indoors are certain cockroaches (*Supella*, *Blattella*, *Periplaneta* and *Blatta*). These are mainly introduced species. All of the species secured have been recorded in systematic order. Many of the records given here are of value in increasing our knowledge of the distribution of the species in question.

The early date at which so many species appear adult in Oklahoma should be noted. The length of time here given

for the presence of adults is, however, very incomplete as the work commenced after the beginning and terminated long before the end of the period during which adults are present. Maximum damage is, however, undoubtedly done by them from late June to at least early October.

As general collecting in all types of natural environment was not undertaken when making the present collection, it is surprising to find that so many of the least known and scarcest Oklahoma species are represented.

The following 56 localities were visited: (See map, page 27.)

Ada	SC 32	Grant	SE 20	*Sallisaw	CE 7
Allen	SC 31	Guthrie	NC 25	Sayre	CW 49
*Big Cedar	SE 14	*Henryetta	CE 11	Schoolton	C 26
*Blue Jacket	NE 1	Hinton	WC 45	Shawnee	C 30
*Broken Bow	SE 13	Holdenville	C 28	Sherwood	SE 16
Butler	WC 47	*Idabel	SE 19	*Snyder	SW 54
*Cherokee	NC 21	*Lebanon	SC 40	*Spavinaw	NE 3
Cheyenne	WC 43	Lugert	SW 52	Stillwater	NC 23
Chickasha	SC 34	Mangum	SW 53	Sulphur	SC 35
*Cleo Springs	NW 41	Muse	SE 15	*Taloga	CW 43
*Davis	SC 37	Okemah	CE 12	Thomas	CW 44
*Eagletown	SE 17	Okmulgee	CE 10	Tulsa	NE 5
*Ellerville	NE 2	Oswalt	SC 38	Watonga	NW 42
Elmer	SW 55	*Page	SE 13	Waurika	SC 39
*El Reno	C 27	Pauls Valley	SC 33	Weatherford	CW 46
*Fint	NE 4	*Pawnee	NC 22	Webber Falls	CE 9
*Fort Gibson	CE 6	*Pearson	C 29	*Wichita N. F.	SW 51
*Gore	CE 8	*Perkins	NC 24	Willow	SW 50
Grandfield	SW 56	Roff	SC 36		

* Indicates no ecologic collection.

ORTHOPTERA

BLATTIDAE

PSEUDOMOPINAE

Ischnoptera deropeltiformis (Bruner).

Snyder, VI, 11, 1 male. Page, VI, 23, 1 male.

Parcoblatta bolliana (Saussure and Zehntner).

Twenty-five males, taken June 2 to August 18, the great majority in June, are from **Flint, Sallisaw, Okemah, Muse, Broken Bow, Cherokee, Pawnee, El Reno, Oswalt, Lebanon, Taloga, Hinton, Cheyenne, Lugert**. One of these from Muse is exceptionally dark, two from Broken Bow are dark, and one from Okemah is paler than normal.

Smallest species of the genus, this is a common native cockroach in eastern Oklahoma. It is probable, however, that neither it nor the other native cockroaches here recorded do much damage.

Parcoblatta zebra Hebard.

Eleven males, taken June 19 to July 20, are from **Ellerville, Flint, Sallisaw, Gore, Page, Eagletown, Broken Bow, Idabel**.

Though it long remained unrecognized, this really distinctive species is probably the second or third most generally distributed and common of the genus in eastern Oklahoma.

Parcoblatta fulvescens (Saussure and Zehntner).

Lebanon, VII, 2, 1 male. Wichita National Forest, VI, 12, 1 male. Grandfield, VII, 5, 1 male.

Parcoblatta caudelli Hebard.

Page, VI, 25, 2 males (one larger than usual for Oklahoma material). Sherwood, VI, 27, 3 males. Oswalt, VII, 3, 1 male. Sayre, VII, 8, 1 male.

Parcoblatta lata (Bruner).

Fort Gibson, VII, 21, 1 male. Eagletown, VI, 28, 1 male.

Parcoblatta divisa (Saussure and Zehntner).

Broken Bow, VI, 29, 1 male (very large for the species, as large as is normal for *P. pennsylvanica*).

Parcoblatta pensylvanica (DeGeer).

Ten males and 2 females, taken June 11 to July 21, are from **Blue Jacket, Fort Gibson** (a male like that of *divisa* in coloration except for its dark occiput), **Okemah, Cherokee, Roff, Lebanon, Snyder.**

Pseudomops septentrionalis Hebard.

Ada, VII, 16, 2 females. **Davis**, VII, 14, 1 male.

POLYPHAGINAE

Arenivaga tonkawa Hebard.

Cheyenne, VII, 9, 1 male. **Lugert**, VI, 9, 2 males. **Grandfield**, VII, 5, 1 male.

MANTIDAE

AMELINAE

Litaneutria minor (Scudder).

Waurika, VII, 4, 1 male (macropterous). **Lugert**, VII, 7, 1 male (macropterous). **Grandfield**, VII, 5, 2 males (macropterous).

PHASMIDAE

HETERONEMIINAE

Diapheromera velii velii Walsh.

Elmer, VII, 5, 1 male, 2 females.

ACRIDIDAE

ACRYDIINAE

Acrydium arenosum angustum (Hancock).

Eagletown, VI, 28, 1 female.

Paratettix aztecus aztecus (Saussure).

Sherwood, VI, 27, 1 male.

Paratettix cucullatus cucullatus (Burmeister).

Fort Gibson, VII, 21, 1 female. **Cherokee**, VI, 4, 1 female. **Cheyenne**, VI, 7, 1 male.

ACRIDINAE

Mermiria bivittata (Serville).

Pawnee, VI, 15, 1 male. **Stillwater**, VII, 29 (in alfalfa), 1 male.
Holdenville, VII, 17, 4 males, 1 female (four in pasture, one on range).

Mermiria maculipennis maculipennis Bruner (Table 1).

Fifty-five males and 48 females, taken July 4 to August 8, are from **Chickasha**, **Holdenville**, **Shawnee**, **Guthrie**, **Pauls Valley**, **Ada**, **Sulphur**, **Waurika**, **Watonga**, **Thomas**, **Sayre**, **Lugert**, **Mangum**, **Grandfield**.

One of the four destructive species of the Acridinae which occur in Oklahoma, this insect is generally distributed in grasses and, particularly in the female, is large. In Oklahoma, this insect averages as large but not as maculate as the typical condition of the race described from southwest central Texas. In the habitat collection, this species was taken chiefly from roadside areas and pastures. A few were collected in range or waste land and alfalfa.

Acrolophitus hirtipes hirtipes (Say).

Waurika, VII, 4, 2 males, 1 female (in pasture).

Syrbula admirabilis (Uhler).

Five males and two females, taken July 4 to August 18, are from **Shawnee**, **Chickasha**, **Waurika**, and **Weatherford**.

Amphitornus coloradus coloradus (Thomas).

Thomas, VII, 10, (in pasture) 1 female. **Sayre**, VII, 8, (on range) 2 males (without supplementary carinae). **Elmer**, VII, 5, (weeds near stream), 1 male, 1 female. **Grandfield**, VII, 15, (on range) 1 female.

Phlibostroma quadrimaculatum (Thomas) (Table 1).

Twenty-eight males and 40 females, taken June 11 to August 8, are from **Stillwater**, **Guthrie**, **Waurika**, **Watonga**, **Thomas**, **Cheyenne**, **Sayre**, **Willow**, **Lugert**, **Mangum**, **Elmer**, **Grandfield**. Collected principally in pastures, but also in range or waste land, roadsides, and in weedy areas along streams.

Preferring a plains environment, this species finds its eastern limits in central Oklahoma. Though of small size, it has an economic significance when present in large numbers by reducing the amount of grasses available for forage.

Cordillacris occipitalis occipitalis (Thomas).

Sayre, VII, 8, (on range) 4 males, 1 female.

Orphulella speciosa Scudder.

Shawnee, VII, 23, (roadside) 1 female.

Because it is locally abundant in the short grass of pastures, it is surprising that a large series of this species was not secured during the present investigation.

Orphulella pelidna (Burmeister).

Henryetta, VII, 19, 1 male, 1 female. Pawnee, VI, 17, 1 female (brown). Holdenville, VII, 17, 1 male. Thomas, VII, 10, 1 male. Elmer, VII, 5, (in stubble) 1 male.

Ageneotettix deorum deorum (Scudder) (Table 1).

Sixty-seven males and 67 females, taken July 5 to August 18, are from **Tulsa, Okmulgee, Stillwater, Guthrie** (in great numbers in pastures and on roadsides), **Schoolton, Roff, Chickasha, Watonga, Thomas, Weatherford, Cheyenne, Sayre, Lugert, Elmer, Grandfield**. Occurring chiefly in pastures, along roadsides; a few taken in range or waste land and wheat stubble.

One of the most abundant species of the Acridinae in Oklahoma. A small species preferring grasses, although generally distributed in cereal and forage crops.

Aulocara elliotti (Thomas) (Table 1).

Sixty-four males and 76 females, taken June 7 to August 18, are from **Guthrie, Chickasha, Watonga, Thomas, Weatherford, Butler, Cheyenne** (in large numbers), **Sayre, Willow, Mangum** (in large numbers), **Elmer, Grandfield**.

Present (at least during the current outbreak of grasshoppers) as far east as central Oklahoma, this, like *Ageneotettix deorum deorum*, is also a common species of the Acridinae found in the state. In size it averages larger than the preceding insect. In the habitat collection, this species was taken principally from wheat stubble, pastures, and along roadsides.

Boopedon nubilum (Say).

Cheyenne, VII, 9, 6 males. Grandfield, VII, 5, 1 male.

Boopedon gracile Rehn.

Stillwater, VII, 29 (in pasture and on range), 3 males, 3 females. Guthrie, VII, 11 (on roadside and in cotton), 2 males, 1 female (female green). Shawnee, VII, 23 (on roadside), 5 males, 2 females (one female brown with tegmina more than normally developed; one female part green).

OEDIPODINAE

Arphia sulphurea (Fabricius).

Big Cedar, VI, 24, 1 male. **Sherwood**, VI, 27, 4 males, 1 female (two males with dorsal pale tegminal stripe). **Cherokee**, VI, 4, 1 female (with dorsal pale tegminal stripe). **Sulphur**, VII, 14 (near stream), 2 males, 1 female.

Arphia simplex Scudder.

Ten males and 10 females, taken July 1 to 25, are from **Sulphur**, **Waurika**, **Hinton**, **Sayre**, **Elmer**, **Lugert**.

Arphia conspersa Scudder.

Cherokee, VI, 4, 1 female.

Chortophaga viridifasciata (DeGeer).

Twenty-nine males and 28 females (of which 6 males and 16 females are green), taken June 4 to August 1, are from **Fort Gibson**, **Gore**, **Webber Falls**, **Sherwood**, **Grant**, **Cherokee**, **Stillwater**, **Guthrie**, **Schoolton**, **Holdenville**, **Shawnee**, **Allen**, **Ada**, **Pauls Valley**, **Chickasha**, **Sulphur**, **Roff**, **Oswalt**, **Waurika**, **Hinton**, **Wichita National Forest**.

Encoptolophus subgracilis texensis Bruner.*

Mangum, VII, 8 (in cotton), 7 males, 8 females. Appearing in colonies locally on almost bare soil.

Hippiscus rugosus (Scudder).

Nineteen males and 21 females, taken July 25 to August 18, are from **Stillwater**, **Shawnee**, **Hinton** (abundant), **Weatherford**. The wing disk is pink in 3 males and 5 females, yellow in the others.

Pardalophora apiculata (Harris).

Sherwood, VI, 27, 1 female.

Pardalophora phoenicoptera (Burmeister).

Page, VI, 23, 1 male, 1 female. **Muse**, VI, 25, 7 males, 8 females (two in cotton, others in pasture).

Pardalophora haldemanii (Scudder).

Cherokee, VI, 4, 1 female (wing disk yellow). **Stillwater**, VII, 29 (on range), 3 males, 1 female (wing disk pink). **Guthrie**, VII, 11 (in pasture), 1 female (large, wing disk pink). **Roff**, VII, 15, 1 female (large; wing disk yellow). **Cheyenne**, VII, 9 (on roadside), (wing disk yellow).

* Recent investigations of a very large series show that *texensis* must be recognized as a race of *subgracilis*, not a synonym as I stated in 1925.

The specimen from Cheyenne is the only typical one in this series, the others suggesting variation toward *saussurei*.

Pardalophora saussurei (Scudder).

Cherokee, VI, 4 (roadside), 3 males, 1 female (small; wing disk yellow; caudal tibiae pinkish buff; caudal femora blue-black proximo-internally in all but one male.) **Stillwater**, VII, 29 (in pasture), 1 male (wing disk yellow; caudal femora normal). **Guthrie**, VII, 11 (roadside), 1 female (large; wing disk yellow; caudal femora normal). **Thomas**, VII, 10 (in stubble, on range, males, 1 female (wing disk yellow in pair, pink in one male; caudal femora normal). **Thomas**, VII, 10 (in stubble, on range, and roadside), 3 males, 6 females (large; wing disk pink in one male and five females; caudal femora blue-black proximo-internally in one male and three females, banded internally in two females, normal in others; caudal tibiae pink in one male and three females, buff in others). **Hinton**, VI, 13 (roadside), 4 males, 2 females (wing disk pink in one male, yellow in others; caudal femora blue-black proximad and pink distad in two males and one female, normal in others; caudal tibiae pink in one pair, buff in two males, salmon pink in one female). **Sayre**, VII, 8 (roadside), 2 females (large; wing disk yellow; caudal tibiae pinkish).

Xanthippus corallipes pantherinus (Scudder).

Ada, VII, 16 (in alfalfa), 1 female. **Thomas**, VII, 10 (in pasture), 1 female. **Weatherford**, VIII, 18 (on range), 2 females.

Dissosteira carolina (Linnaeus).

Thirty-three males and 33 females, taken June 18 to August 8, are from **Spavinaw**, **Webber Falls**, **Okmulgee**, **Muse**, **Sherwood**, **Eagletown**, **Broken Bow**, **Stillwater**, **Guthrie**, **Allen**, **Roff**, **Oswalt**, **Lebanon**, **Watonga**, **Butler**, **Cheyenne**, **Sayre**, **Mangum**, **Elmer**.

Dissosteira longipennis (Thomas).

Stillwater, VII, 29 (in stubble), 1 female. **Weatherford**, VIII, 18 (on range), 3 males, 1 female. **Sayre**, VII, 8 (in stubble), 1 female.

A survey made by R. L. Shotwell July 18 to 22, 1937, in 14 western counties including the Panhandle showed this species to be dominant in Cimarron county, common in Texas and Harper counties and present in Beaver, Woodward, Dewey, Blaine, Custer, Greer, Harmon and Canadian counties.

Spharagemon equale (Say).

Fourteen males and 27 females, taken July 8 to August 18, are from **Webber Falls**, **Stillwater**, **Guthrie**, **Watonga**, **Weatherford**, **Cheyenne**, **Sayre**, **Mangum**, **Elmer**. Striking pale pronotal collars are found in three males and six females of this series.

This large species has some, but probably not great, economic importance.

Spharagemon collare (Scudder) (Table 1).

One hundred fourteen males and 102 females, taken June 8 to July 25, are from **Okemah, Grant, Guthrie, Holdenville, Roff, Waurika, Watonga, Thomas, Hinton, Weatherford, Butler, Cheyenne, Sayre, Lugert, Mangum, Elmer, Grandfield.**

This species was present in very large numbers at Sayre, Watonga, and Thomas. It was most abundant in wheat stubble, but was also found in large numbers in pastures and range land. It also was collected in corn and cotton and a few were taken in alfalfa and along roadsides

Spharagemon superbum Hebard.

Big Cedar, VI, 24, 1 male.

The presence of this species in Oklahoma comes as a great surprise. It was previously known only from two males which I collected at Katherine in Willacy county, Texas, among oak sprouts growing in loose sand.

Trachyrhachis kiowa fuscifrons (Stoll).

Guthrie, VII, 11 (in pasture), 1 female. Weatherford, VIII, 18 (on range), 1 female. Elmer, VII, 5 (near stream), 1 male.

Trachyrhachis kiowa kiowa (Thomas).

Guthrie, VII, 11 (in pasture), 1 female.

Trimerotropis pallidipennis pallidipennis (Burmeister).

Cheyenne, VI, 7, 3 males, 9 females. Lugert, VII, 7, 1 female. Elmer, VII, 5 (near stream), 1 male.

Trimerotropis citrina Scudder (Table 1).

Ninety males and 75 females, taken June 4 to July 25, are from **Gore, Webber Falls, Muse, Cherokee, El Reno, Roff, Lebanon, Cleo Springs, Lugert, Elmer.**

This species was collected in greatest numbers in cotton fields but was also found to some extent in corn and along roadsides. While it represented but 2.6 percent of the total collections in the eight habitats, it was third in abundance in cotton (12.7 percent). This is probably due to the greater amount of bare ground in corn and cotton fields. The insect prefers bare or almost bare soil and so is rarely found in grassy pastures or in normal plains environment.

Hadrotettix trifasciatus (Say).

Thirteen males and 17 females, taken June 12 to August 18, are from **Guthrie, Watonga, Thomas, Weatherford, Butler, Cheyenne, Sayre, Lugert.**

CYRTACANTHACRINAE

Paropomala wyomingensis (Thomas).

Elmer, VII, 5 (in pasture), 1 female.

Brachystola magna (Girard).

Cheyenne, VI, 7 (in weeds near stream), 1 female.

Recent investigation has shown that this genus must be placed in the Cyrtacanthacrinae where nearest relationship is found to *Romalea*.

Schistocerca americana americana (Drury).

Three males and four females, taken July 4 to 24, are from **Webber Falls, Muse, Schoolton, Pauls Valley, Roff, Waurika.**

Schistocerca lineata Scudder.

Twenty-one males and 19 females, taken July 4 to August 8, are from **Okmulgee, Stillwater, Guthrie, Pauls Valley, Waurika, Watonga, Thomas, Butler, Sayre, Lugert, Elmer, Grandfield.** One of the four females from Sayre is small and mottled.

Very closely related to *alutacea*, the proper status of *lineata* remains undecided. None of the present series represent the brilliantly and contrastingly colored southwestern condition.

Schistocerca obscura (Fabricius).

Tulsa, VII, 22 (near stream), 1 male. **Okmulgee**, VII, 21 (in cotton), 2 males, 2 females. **Weatherford**, VIII, 18 (on range), 1 female.

This species is commonly found in cotton fields and may at times become quite injurious. It is so active that it is almost impossible to capture with an insect net.

Aeoloplus turnbulli bruneri Caudell.

Nineteen males and 28 females, taken June 7 to July 10, are from **Butler, Cheyenne, Sayre** (common), **Willow, Mangum** (common, particularly in stubble).

Hesperotettix speciosus (Scudder) (Table 1).

Eighty-seven males and 101 females, taken July 7 to 25, are from **Stillwater, Guthrie, Schoolton, Allen, Ada, Chickasha, Sulphur, Oswalt, Waurika, Watonga, Thomas, Hinton, Weatherford, Butler, Cheyenne, Sayre, Lugert, Mangum, Grandfield.**

Present eastward as far as central Oklahoma. The largest numbers of specimens were collected at Oswalt and Grandfield. This species is partial to heavy, weedy vegetation, but was also found in cotton. Large numbers were taken in pastures, in weeds along streams, and on range land, but it was rare in alfalfa and wheat stubble.

Hesperotettix viridis viridis (Thomas).

Twenty-six males and 36 females, taken July 3 to August 18, are from **Stillwater, Guthrie, Allen, Oswalt, Waurika, Watonga, Weatherford, Cheyenne, Sayre, Willow, Lugert, Mangum.**

Hesperotettix viridis pratensis Scudder.

Ten males and 20 females, taken July 6 to 22, are from **Tulsa, Stillwater, Holdenville, Allen, Sulphur, Mangum, Elmer, Grandfield.**

The material from the three last localities is all or part atypic, showing divergence toward *viridis viridis*.

Paratylotropidia brunneri Scudder.

Sulphur, VII, 14 (in weeds near stream), 1 male, 2 females.

Melanoplus texanus (Scudder).

Sulphur, VII, 14 (in weeds near stream), 2 males, 1 female. **Hinton, VI, 13, 1 female.**

Melanoplus oklahomae Hebard.

Broken Bow, VI, 29, 1 female.

Melanoplus scudderi scudderi (Uhler).

Hinton, VI, 13, and VII, 25, 2 males, 1 female (one male atypic toward *scudderi texensis*.)

Melanoplus inconspicuus Caudell.

Guthrie, VII, 11 (in cotton), 1 female. **Ada, VII, 16** (in alfalfa), 1 female.

Melanoplus glaucipes (Scudder) (Table 1).

Forty-four males and 56 females, taken July 5 to August 18, are from **Guthrie, Ada, Sulphur** (common near stream), **Waurika, Watonga, Thomas, Hinton, Butler, Cheyenne, Sayre, Lugert** (common on range), **Elmer, Grandfield**.

This species reaches eastward to central Oklahoma. In the West it is usually found in grasses under semi-desert brush. In Oklahoma collections, it occurred most frequently in range and weeds along streams. A few were taken in other habitats.

Melanoplus ponderosus ponderosus (Scudder).

Ten males and 5 females, taken July 5 to 25, are from **Watonga, Thomas, Hinton, Cheyenne, Grandfield**.

Melanoplus ponderosus viola (Thomas).

Sherwood, VI, 27, 1 male (atypic; coloration intensive and of *ponderosus viola* type, but tegmina only moderately reduced).

Melanoplus bivittatus (Say) (Table 1).

Eight males, taken June 25 to July 18, are from **Okemah, Muse, Schoolton, Holdenville, Thomas, Willow, Mangum**. All have glaucous and buff caudal tibiae. Three hundred fifty-two specimens,* taken July 4 to July 29, are from **Cheyenne, Guthrie, Butler, Sayre, Elmer, Watonga, Mangum, Oswalt, Willow, Thomas, Weatherford, Stillwater, Hinton, Chickasha, Shawnee, Okmulgee, Roff, Sulphur, Holdenville, Okemah, Schoolton, Allen, Webber Falls, Pauls Valley**.

This species was found associated with *differentialis*, but always in much smaller numbers except locally. Ranked next to *differentialis* as a corn pest.

Melanoplus differentialis (Thomas) (Table 1).

Eight males and three females, taken July 4 to August 8, are from **Waurika, Watonga, Butler, Cheyenne, Sayre**. Fifteen hundred ninety-four specimens,* taken July 4 to July 29, at **Thomas, Cheyenne, Guthrie, Butler, Sayre, Grandfield, Elmer, Lugert, Watonga, Waurika, Mangum, Oswalt, Willow, Weatherford, Stillwater, Tulsa, Hinton, Chickasha, Shawnee, Okmulgee, Roff, Sulphur, Holdenville, Okemah, Schoolton, Allen, Ada, Webber Falls**.

* Identification—R. W. Kaiser and J. Standish.

This species was by far the most abundant and destructive in Oklahoma, representing 27.9 percent of the collection of 17 species listed as important in Table 1. It feeds for a long time in the late summer and fall and many are present until the first killing frost or freeze. It was very injurious to corn, alfalfa and cotton; and, as previously stated, it was abundant in all the other habitats.

Melanoplus regalis (Dodge).

Seventeen males and 11 females taken June 27 to July 29, are from **Sherwood, Stillwater, Guthrie, Shawnee, Watonga, Thomas, Cheyenne, Sayre, Lugert, Mangum.**

Melanoplus confusus Scudder

Eighteen males and 23 females, taken June 4 to July 18, are from **Cherokee, Guthrie, Schoolton, Sulphur, Roff, Thomas, Sayre, Lugert.** The caudal tibiae are pink in five females, glaucous in the rest of the series.

Melanoplus femur-rubrum femur-rubrum (DeGeer).

Twenty-two males and 23 females, taken June 5 to July 29, are from **Tulsa, Webber Falls, Okmulgee, Page, Muse, Eagletown, Stillwater, Schoolton, Shawnee, Allen, Pauls Valley.**

Melanoplus lakinus (Scudder)

Butler, VII, 10 (in pasture), 1 male. **Cheyenne**, VII, 9 (in stubble and on range), 4 males, 10 females (four females macropterous). **Mangum**, VII, 8 (in stubble and on roadside), 5 males.

Melanoplus mexicanus mexicanus (Saussure) (Table 1).

Two hundred two males and 129 females, taken June 18 to July 29, are from **Webber Falls, Okmulgee, Big Cedar, Muse, Sherwood, Grant, Stillwater, Guthrie, Schoolton, Holdenville, Shawnee, Allen, Ada, Chickasha, Sulphur, Roff, Oswalt, Watonga, Thomas, Weathford, Butler, Sayre, Cleo Springs, Mangum.** In this series the caudal tibiae are about 80 percent pink and 20 percent glaucous. One female from Chickasha is very small, shows marked reduction in the organs of flight, is pale, and has the caudal tibiae pink. The insect was very abundant in stubble at Guthrie and in cotton at Schoolton and Roff.

Not only is this one of the most numerous species in the present grasshopper outbreak, but it is the insect which in the past is believed to have developed the *spretus* phase, undoubtedly the most devastating form of grasshopper of North

America north of Mexico. In spite of its small size it should, therefore, be given particular consideration in all economic studies.

A second generation was developed in Oklahoma in 1937, and as a result of favorable conditions this species was predominant in many localities later in the summer and early fall.

Of the 348 in the habitat collection, 108 or 31 percent were taken in cotton. It was the most abundant of the 17 dominant species collected in cotton, representing 17.8 percent of the total collection from this environment. In addition to cotton, a large number were collected in alfalfa and wheat stubble, but it could always be taken in any of the other habitats.

Melanoplus foedus fluviatilis Bruner (Table 1).

One hundred thirty-three males and 112 females, taken June 21 to July 18, are from **Sallisaw, Okmulgee, Okemah** (very large series in pasture), **Stillwater, Guthrie, Schoolton** (large series in cotton), **Holdenville** (large series on range), **Shawnee, Chickasha, Roff** (large series in cotton), **Oswalt, Waurika, Watonga, Cheyenne, Sayre**.

This series averages large for the race, though smaller and more graceful than the other races of *foedus*. The majority have a heavy post-ocular bar and all have the pronotal disk uniform in coloration. The majority have the caudal femora ventrad washed with orange; this is very deep or very brilliant in a number of specimens and obsolete in few. The caudal tibiae vary from rich glaucous to buffy, at least very faintly tinged with glaucous or yellow-green in almost all cases. None has the caudal tibiae pink. One male from Chickasha is semi-brachypterous, an extremely rare abnormality in the species.

In Oklahoma this race averages large and shows all grades of intergradation with *foedus iselyi*, though typically these two races are very different in general appearance. From the other races of *foedus* the present is best distinguished by its smaller size, more slender form, uniform coloration of the pronotal dorsum, heavy dark postocular bar dorsad on the pronotal lateral lobes and orange coloration of the ventral surfaces of the caudal femora. All of these features are subject to great individual variation.

It is evident that in Oklahoma there are three conditions (and another is developed in other portions of the range of *foedus*) so distinctive that nominal recognition seems to be imperative, but each showing a combination of features subject to decided individual variation and not of the character of those which separate the more fixed geographic races. The first race (*fluviatilis*) occurs locally throughout the eastern portion of the range of the species only, while *iselyi* is the generally distributed southeastern race.

This race evidently feeds on cotton at times, although it was most commonly collected in pastures.

Melanoplus foedus foedus Scudder.

Twenty-one males and 29 females, taken July 8 to 24, are from **Chickasha, Watonga, Thomas, Butler, Cheyenne, Sayre** (series in cotton and stubble and on range), **Willow**. The majority are from cotton fields at Cheyenne and Sayre. These specimens are all very large and robust and have the caudal femora not, or much less, definitely banded than in *foedus iselyi*. The pronotal dorsum is frequently pale laterad (as is usual in this race), sometimes unicolorous, while the lateral pronotal stripe is usually obsolete but occasionally faintly to moderately indicated. The caudal tibiae are rich pink in all except one male from Butler, in which they are glaucous. The transitional tendencies toward this race are shown individually to different degrees and in many ways in the large series here discussed under *foedus fluviatilis* and *foedus iselyi*. The present series is typical of the optimum recessive development in *foedus foedus*.

Melanoplus foedus iselyi Hebard (Table 1).

Three hundred seventy-four males and 315 females, taken June 18 to July 23, are from **Spavinaw (A),* Okemah (A), Grant (A), Guthrie (A), Holdenville (AC), Allen (A), Chickasha (ACD), Oswalt (AC), Roff (A), Waurika (A), Watonga (ABC), Thomas (AC), Hinton (A), Butler (A), Cheyenne (A), Sayre (A), Lugert (A), Mangum (A), Elmer (AB), Grandfield (B)**. The greatest numbers were taken in weeds along streams, in pastures, along roadsides and in stubble, chiefly wheat; but it occurred in all the other habitats.

According to specimens at hand, this race is the generally dominant condition for the species in Oklahoma. Part of all of the many series are atypic, variation toward *foedus fluviatilis* being considerably more frequent and stronger than to-

* The letters in parentheses have the following significations:

A. Typical but not rich yellow.

B. Atypic toward *f. foedus*.

C. Slightly atypic toward *f. fluviatilis*.

D. Strongly atypic toward *f. fluviatilis*.

ward *foedus foedus*. The rich yellow condition which *foedus iselyi* develops in northeastern Texas is rare in Oklahoma and possibly limited to local areas in the south-central portion. It is not present in the very large series here reported, though many specimens are dull yellowish in general coloration.

Melanoplus packardii Scudder (Table 1).

Three hundred sixteen males and 335 females, taken July 6 to August 18, are from **Webber Falls, Stillwater** (great numbers on range), **Guthrie** (abundant on roadsides), **Schoolton** (abundant in alfalfa and stubble), **Shawnee, Allen, Chickasha, Waurika, Watonga, Thomas** (common in pasture), **Weatherford, Butler, Cheyenne, Sayre** (common in stubble), **Willow, Mangum** (abundant in stubble). The caudal tibiae are pink in one male from Guthrie and two males and one female from Mangum; they are glaucous in all the others. Two males are extremely small, both taken in alfalfa, one at Stillwater, the other at Chickasha. A pair from Chickasha are semi-brachypterous; the male, with organs of flight having the tips shrivelled slightly, was taken in alfalfa; the female, not in any way distorted, was taken in a pasture. This condition I had for some time known to occur in extremely rare depauperate examples of *M. femur-rubrum femur-rubrum* and *M. mexicanus mexicanus*, all from alkaline arid environment in the far west. It is possible that the few examples of the latter *M. foedus fluviatilis* and the present insect here recorded were forced by crowding into unfavorable environment, perhaps of similar character, with this result. Certain it is that these insects are all normally macropterous.

This species was one of the most injurious grasshoppers found in the western part of the state. It was collected commonly in pastures and along roadsides, and was most abundant in alfalfa. Large numbers were also taken in range, cotton, and wheat stubble.

Melanoplus angustipennis impiger Scudder (Table 1).

Three hundred nine males and 324 females, taken July 1 to 24, are from **Sallisaw, Tulsa, Okmulgee, Okemah, Grant** (common on roadside), **Stillwater, Guthrie** (common in cotton), **Schoolton, Holdenville, Allen, Ada, Chickasha, Sulphur, Roff, Oswalt, Waurika, Watonga** (common in stubble and cotton), **Thomas** (very common in stubble and on roadside), **Hinton, Butler, Cheyenne, Sayre** (common in cotton, in pasture, and on range), **Willow, Lugert** (common on range), **Mangum, Elmer** (common in pasture). Most commonly taken in pastures, range and wheat stubble, but also abundant along roadsides and in cotton.

All of the series now available for study give convincing proof that the insect described as *impiger* represents nothing but the southeastern optimum of *angustipennis*,* very different in general appearance but differing only sufficiently to warrant recognition of a weakly defined race. It reaches its optimum development in southern South Carolina (material before me from Aiken), and is supplanted in western Oklahoma by typical *angustipennis*. All of the present material is typical of *angustipennis impiger*.

From the numbers secured, this insect is widespread in Oklahoma and is a serious pest, particularly to pastures and range.

Melanoplus bispinosus Scudder (Table 1).

One hundred seventeen males and 67 females, taken July 4 to August 18, are from **Webber Falls, Okmulgee, Muse, Sherwood, Grant, Stillwater, Guthrie, Schoolton** (abundant on roadside), **Allen, Ada, Pauls Valley, Chickasha, Roff, Waurika, Watonga, Thomas, Weatherford, Butler, Cheyenne, Elmer, Grandfield.**

This species was collected chiefly from roadsides, stubble, pastures and alfalfa. Apparently of some importance as an alfalfa and cotton pest.

Melanoplus arizonae Scudder.

Fifteen males and 18 females of this southwestern species, taken July 8 to August 18, are from **Thomas, Weatherford, Butler, Cheyenne** (12 on range, 5 in stubble), **Sayre, Willow, Mangum.**

Melanoplus flavidus Scudder.

Thirty-four males and 28 females, taken July 5 to 11, are from **Watonga, Thomas, Butler, Cheyenne, Sayre, Mangum, Elmer** (common in pasture), **Grandfield.**

Though I reduced *elongatus* Scudder** to racial status under *flavidus* in 1925, the much larger series now available for study convinces me that it must be placed as a synonym. Averaging very small in the north, the species gradually increases in size and elongation to south-central Texas and thence into Mexico again becomes definitely less elongate and smaller. The type of *flavidus*, from Morrison, Colorado, is close to that of *elongatus* in size and proportions; although northern

* This I suggested in 1931. Proc. Acad. Nat. Sci. Phila., LXXXIII, p. 188.

** Type from Bledos, San Luis Potosi, Mexico, selected by Rehn and Hebard in 1912.

material averages much smaller, central Texas series are larger and more elongate and the Oklahoma series show strong approach toward the latter condition.

Melanoplus bowditchi bowditchi Scudder (Table 1).

Fifty-one males and 62 females, taken July 5 to 10, are from **Thomas** (very common on range), **Butler, Cheyenne** (very common on range), **Sayre, Mangum, Elmer, Grandfield**. Collected principally on ranges.

The material here recorded is atypic in averaging decidedly larger than series from eastern Colorado and is usually conspicuously trivittate. The insect develops several distinctive conditions. The condition found in Oklahoma may be considered representative of a southeastern race or it may be merely an adaptation to a certain environment. Moreover, except in appearance, the insect is so very closely related to *M. flavidus* that I am not even convinced that distinct species should be recognized, though the presence of typical material of both over a considerable area prevents their assignment as races in the usually accepted sense.

Dactylotum pictum (Thomas).

Thomas, VII, 10, 1 female (in cotton).

TETTIGONIIDAE

PHANEROPTERINAE

Arethaea constricta constricta Bruner.

Waurika, VII, 4 (in pasture), 1 male. **Wichita National Forest**, VI, 12, 1 male. **Lugert**, VI, 11 (on range), 1 male. **Elmer**, VII, 6 (in pasture and on range), 5 males. **Grandfield**, VII, 5, 10 males, 2 females (trace of herring-bone pattern on tegmina in females only).

Arethaea grallator (Scudder).

Allen, VII, 17, 1 male. **Oswalt**, VII, 3, 1 male.

Scudderia curvicauda curvicauda (DeGeer).

Okmulgee, VII, 21, 1 female. **Henryetta**, VII, 19, 1 female. **Holdenville**, VII, 17, 1 female.

Scudderia texensis Saussure and Pictet.

Muse, VI, 25 (in pasture), 1 female.

Though often the female is difficult to separate from *S. c. curvicauda*, in Oklahoma the caudal femora are invariably marked with black distad in *texensis* but are there immaculate in *curvicauda*.

Scudderia furcata furcata Bruner.

Okemah, VII, 18, 1 male. **Ada**, VII, 16, 1 male. **Sulphur**, VII, 14, 1 female. **Roff**, VII, 15 (in cotton), 1 female.

Amblycorypha oblongifolia (DeGeer).

Twenty-seven males and 12 females, taken June 13 to August 3, are from **Tulsa**, **Fort Gibson**, **Gore** (all four females tessellate, brown), **Muse**, **Eagletown** (in pasture), **Grant**, **Pearson** (three tessellate, one male brown), **Ada**, **Sulphur** (in weeds near stream), **Roff** (in cotton), **Oswalt** (in weeds near stream), **Grandfield**.

Amblycorypha huasteca (Saussure).

Ada, VII, 16, 1 male. **Hinton**, VI, 13, 3 females. **Sayre**, VII, 8, 1 female. **Elmer**, VII, 5 (in pasture), 1 male. **Grandfield**, VII, 15, 4 males.

Amblycorypha uhleri Stal.

Holdenville, VII, 17, 1 male.

Amblycorypha parvipennis (Stal).

Sulphur, VII, 14, 1 male.

Additional series before me from Kansas to Texas show that the characters, which in 1936 I thought might distinguish *brachyptera* Ball (with *iselyi* Caudell a synonym) as a northern race, are subject to great individual variation and are of no diagnostic value. Consequently *brevipennis* falls as a synonym of *parvipennis*.

PSEUDOPHYLLINAE

Pterophylla camellifolia (Fabricius).

Tulsa, VII, 22, 1 male, 1 female. **Fort Gibson**, VII, 21, 1 male, 1 female. **Gore**, VII, 20, 1 male. **Sherwood**, VI, 27, 1 female. **Ada**, VII, 16, 1 male.

CONOCEPHALINAE

Orchelimum silvaticum McNeill.

Tulsa, VII, 22, 1 male. **Sulphur**, VII, 14, 1 male. **Hinton**, VI, 13, 1 male, 1 female. **Cheyenne**, VI, 7 (in weeds near stream), 1 male.

Orchelimum concinnum concinnum Scudder.

Oswalt, VII, 3, 1 female (macropterous).

Conocephalus fasciatus fasciatus (DeGeer).

Okmulgee, VII, 21 (in cotton), 1 male.

COPIPHORINAE

Neoconocephalus robustus crepitans (Scudder).

Holdenville, VII, 17, 6 males (green). **Ada**, VII, 16, 2 males (green). **Cheyenne**, VII, 9 (in weeds near stream), 1 large juvenile female.

RHAPHIDOPHORINAE

Udeopsylla robusta Haldeman.

Cleo Springs, VI, 5, 1 large juvenile male. **Hinton**, VI, 13, 1 male, 1 female. **Cheyenne**, VII, 9, 1 male, 1 female. **Sayre**, VII, 8, 1 male.

Ceuthophilus pallidus Thomas.

Cheyenne, VII, 9 (abundant in cellar of vacant house with *Ammobaenetes*) 18 medium small to medium juvenile males, 16 small to medium juvenile females.

Daihinia brevipes Haldeman.

Cherokee, VI, 4, 2 males, 2 females. **Cleo Springs**, VI, 5, 1 male, 1 female. **Cheyenne**, VI, 7 1 male. **Lugert**, VI, 11, 1 female.

This is commonly called the sand cricket in Oklahoma. Its distribution is in the western half of the state in places where sandy soil is predominant. For example, in Kingfisher county, it is quite plentiful around Hennessey and Lacey, yet in Stillwater, 45 miles east, it apparently does not occur. Experiments have shown that it will cut off certain tender vegetables and it is recorded as a pest in places. It becomes active at night, remaining at the bottom of a deep burrow during the day.

STENOPELMATINAE

Stenopelmatus fuscus Haldeman.

Perkins, IV, 1, 1 large juvenile male.

DECIICINAE

Pediodes haldemanii (Girard).

Cheyenne, VII, 9 (on roadside), 1 male.

GRYLLIDAE

GRYLLINAE

Gryllulus assimilis (Fabricius).

Tulsa, VII, 22, 1 male. Okmulgee, VII, 21, 1 female.

NEMOBIINAE

Nemobius fasciatus socius Scudder.

Grant, VII, 1, 1 male (macropterous). Roff, VII, 15, 1 female (macropterous). Grandfield, VII, 5, 1 male (macropterous).

It is probable that typical *fasciatus* intergrades with the poorly defined southern race *fasciatus socius* over a large portion of eastern Oklahoma.

Nemobius bruneri Hebard.

Cheyenne, VI, 7, 1 male.

Nemobius carolinus carolinus Scudder.

Six males and 6 females, taken June 27 to July 15, are from Sherwood, Idabel, Grant, Ada, Roff, Oswalt, Lugert, Elmer. All are macropterous.

OECANTHINAE

Oecanthus angustipennis Fitch.

Sulphur, VII, 14, 1 female.

Oecanthus nigricornis quadripunctatus Beutenmuller.

Three males and 5 females, taken June 21 to July 17, are from Sallisaw, Page, Muse, Eagletown, Holdenville, Oswalt, Waurika. All are very small for this insect.

Oecanthus nigricornis argentinus Saussure.

Hinton, VI, 13, 1 male. Sayre, VII, 8, 1 female. Lugert, VI, 8, 1 female.

Oecanthus nigricornis nigricornis F. Walker.

Five males and 8 females, taken June 21 to July 10, are from Sallisaw, Grant, Oswalt, Lebanon, Thomas, Sayre, Elmer.

All of this series are atypic, the proximal antennal joints being marked as in *nigricornis quadripunctatus*. Only a few have the ventral surface of the antennae faintly suffused. I do not place them as that insect only on account of their larger size and more robust form.

TRIDACTYLINAE

Tridactylus minutus Scudder.

Sulphur, VII, 14, 1 juvenile male.