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Scope and Method of Study: A taxonomic study of the Tettigoniidae known to be in Oklahoma, including probable state species was made. This study was based primarily on collection records and specimens located in the Oklahoma State University and Oklahoma University Museums.

Findings and Conclusions: Twenty-nine species representing ten genera are included in this paper. Keys, descriptions, and distribution data are given for these species.

ADVISER'S APPROVAL

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THE LONG-HORNED GRASSHOPPERS OF OKLAHOMA (ORTHOPTERA TETTIGONIIDAE)

By

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## INTRODUCTION

The long-horned grasshoppers, katydids in part, receive their name from the fact that their antennae exceed the body in length. They are noted songsters, stridulating mainly in the evening, with only the males of the species doing the "singing". This feat being accomplished by rubbing the front wings together in a manner such as a "file" and "rasp".

Habitat and color seem to coincide in the tettigoniids. The color is usually a leaf green for those found in trees, and brown or gray for the ground dwelling species. Forms well adapted for flying use their legs only for support. Others are very saltatorial in moving.

Tettigoniids usually overwinter in the egg stage. They usually acquire adulthood in late June and early July. Generally the tettigoniids are plant feeders, but a few prey on other insects.

I wish to thank my advisors, Dr. W. A. Drew and Dr. L. H. Bruneau for their guidance and help. I also wish to acknowledge the help received from fellow students, Kurt Schaefer, Jim Shaddy, and Dan Shorter. I thank the Stovall Museum, University of Oklahoma, for the use of its facilities and the loan of specimens. Last, I want to thank the National Science Foundation whose financial aid has made this year of work possible.

## REVIEW OF THE LITERATURE

This work includes ten genera and twenty-nine species in six sub-families of the Tettigoniidae. Twenty-two species were listed in papers by Caudell (1902), and Hubbell and Ortenburger (1926), concerning Tettigoniidae of Oklahoma. The additional species added in this paper were from collections in the Oklahoma State University Entomological museum and the Stovall Museum of the University of Oklahoma, and from literature, listed below.

J. A. G. Rehn and Morgan Hebard (1914, 1914a, 1914b, 1915, 1915a, 1915b, 1916), J. A. G. Rehn (1957), and M. Hebard (1925, 1929, 1931, 1934, 1936, 1941), produced the major literature concerning the Tettigoniidae of North America. Also the work of Blatchley (1903, 1920), Caudell (1907, 1924), and Tinkham (1944), contributed greatly to the systematics of the North American tettigoniids. These works have been most helpful in the course of this study.

SYSTEMATICS

Key to the Subfamilies of Tettigoniidae

1. Wings absent or vestigial; pronotum exceeding five mm in length usually gray or brown . . . . . 2  
Wings present and well developed, except Conocephalus saltans whose pronotum never exceeds five mm in length; usually greenish in color . . . . . 3
2. Tegmina longer than pronotum . . . . . Listroscelinae (p. 2)  
Tegmina shorter than pronotum . . . . . Decticinae (p. 3)
3. Prosternal spines absent . . . . . Phaneropterinae (p. 6)  
Poststernal spines present except for Conocephalus saltans whose wings are not apparent . . . . . 4
4. Pronotum about as long as wide with two transverse grooves . . . . .  
. . . . . Pseudophyllinae (p. 18)  
Pronotum longer than wide with only one transverse groove, or none. . . . . 5
5. Vertex produced into a long sharp cone . . . . . Copiphorinae (p. 19)  
Vertex terminated in a rounded tubercle. . . . . Conocephalinae (p. 22)

SUBFAMILY LISTROSCELINAE

Rehnia Caudell

Rehnia Caudell, 1907. Proc. U. S. Natl. Mus. 32: 305.

Characteristics: These are given with the species description.

Rehnia victoriae Caudell

Rehnia victoriae Caudell, 1907. Proc. U. S. Natl. Mus. 32: 306.

Characteristics: Length of body, male and female, 29-42 mm; length of pronotum, male and female, 7-9 mm; length of tegmina, male and female, 10-14 mm; length of ovipositor, 33-39 mm; color green, abdomen with some brown; head inserted into pronotum; eyes round and very prominent; pronotum smooth, dorsally rounded, posterior margin elevated, slightly rounded; prosternum armed with two spines; tegmina longer than hind wings, not exceeding abdomen, about two times as long as pronotum; cerci short and apically produced as a incurved tooth.

County records: Beaver, Harper, and Woodward.

August-September.

## (SUBFAMILY DECTICINAE)

Pediodes Rehn and Hebard

Orchesticus Scudder, 1894 (not Saussure, 1859). Canadian Entomol. 26: 178.

Stipator Rehn, 1900 (in part). Trans. Am. Entomol. Soc. 27: 90.

Pediodes Rehn and Hebard, 1916. Trans. Am. Entomol. Soc. 42: 45.

Characteristics: Robust; color generally yellow, some dark portions in varying degrees on pronotum; pronotum large, disk usually flat, lateral margins rounded, lateral lobes well developed; prosternum armed with a pair of spines; tegmina and hind wings rudimentary, tegmina partially exposed in males, completely concealed by pronotum in females; supra anal plate small; cerci simple in female, armed on inner side with tooth in male; ovipositor arcuate and long. The females of this genus



are not keyed because there are no stable diagnostic characters which are practical to use.

Key to Males

1. Cercal tooth inserted apically beyond middle . . . . . 2  
    Cercal tooth inserted about the middle . . . . . 3
2. Pronotum 11-12 mm in length. . . . . haldemanii  
    Pronotum 5-8 mm in length . . . . . stevensonii
3. Pronotal disk no lighter in color than upper portion of lateral lobes . . . . . grandis  
    Pronotal disk always lighter than upper portions of lateral lobes . . . . . nigromarginata

Pediodes haldemanii (Girard)

Anabrus haldemanii Girard, 1853. Marcy's Expl. Red River p. 259.

Thyreonotus cragini Bruner, 1885. Bull. Washburn Coll. 1: 129.

Stipator americanus Caudell, 1907. Proc. U. S. Natl. Mus. 32: 241.

Pediodes haldemanii: Hebard, 1925. Proc. Acad. Nat. Sci.

Philadelphia 77: 138.

Characteristics: Length of pronotum, male and female, 11-16 mm; length of ovipositor, 25-32 mm; robust; color yellow; pronotum posteriorly produced over the abdomen, anterior margin truncate, posterior margin rounded.

County records: Cimarron, Ellis, Harper, Jackson, Osage, and Roger Mills.

June-September.

Pediodes stevensonii (Thomas)

Anabrus stevensonii Thomas, 1870. Proc. Acad. Nat. Sci. Philadelphia 22: 75.

Anabrus minutus Thomas, 1870. Loc. cit.

Thyreonotus scudderi Bruner, 1885. Bull. Washburn Coll. 1: 129.

Stipator stevensonii: Caudell, 1907. Proc. U. S. Natl. Mus. 32: 344.

Pediodes stevensonii: Hebard, 1925. Proc. Acad. Nat. Sci. Philadelphia 77: 139.

Characteristics: Length of pronotum, male and female, 5-8 mm; length of ovipositor, 14-18 mm; color generally brown, sometimes yellowish brown; pronotum rounded dorsally, posterior margin may be truncate.

County records: Beaver, Harper, and Pawnee.

July-August.

Pediodes grandis (Rehn)

Stipator grandis Rehn, 1904. Proc. Acad. Nat. Sci. Philadelphia 56: 544.

Pediodes grandis: Rehn and Hebard, 1920. Trans. Am. Entomol. Soc. 47: 246.

Characteristics: Length of pronotum, male and female, 8-13 mm; length of ovipositor, 15-29 mm; color dark to light brown.

Reported by A. P. Morse to be found in Oklahoma, Caudell, (1907).

No specimens seen.

Pediodes nigromarginata (Caudell)

Orchesticus nigromarginata Caudell, 1902. Trans. Am. Entomol. Soc.

28: 89.

Stipator nigromarginatus Kirby, 1906. Syn. Cat. Orthoptera 2: 183.

Stipator nigromarginata var. griseis Caudell, 1907. Proc. U. S.

Natl. Mus. 32: 344.

Pediodes nigromarginata: Hebard, 1925. Proc. Acad. Nat. Sci.

Philadelphia 77: 139.

Characteristics: Length of pronotum, male and female, 7-9 mm;  
length of ovipositor, 16-21.5 mm; color various shades of brown.

County records: Alfalfa, Harper, Jackson, Osage, Pawnee, and Payne.

July-September.

SUBFAMILY (PHANEROPTERINAE)

Characteristics: Color usually a bright green; head short, face vertical, vertex either a blunt deflexed attenuation or broadly rounded; eyes small, situated close to basal joint of antennae; pronotum short, flat or concave, median carina absent or faint, lateral carina usually distinct, usually narrowed in front, caudal margin usually rounded; posternal spines absent; tegmina shorter than hind wings, in Amblycorypha parvipennis parvipennis and Amblycorypha parvipennis brachyptera hind wings not evident when tegmina folded; ovipositor and male genitalia vary in shape with species.

## Key to Genera

1. Hind legs nearly or fully four times as long as body; eyes oblong oval, much deeper than side; pronotum saddle shaped . . . . . Arethaea
- Hind legs less than three times as long as body; eyes globose; pronotum not saddle shaped . . . . . 2
2. Tegmina long and narrow . . . . . Scudderia
- Tegmina broad . . . . . 3
3. Caudal femora reaching to or beyond apical fourth of tegmina . . . . . Amblycorypha
- Caudal femora never reaching beyond apical third of tegmina . . . . . Microcentrum

Arethaea Stal

Ephippitytha Thomas, 1870 (not Serville, 1839). Proc. Acad. Nat.

Sci. Philadelphia 22: 76.

Arethaea Stal, 1876. Bihang. Svenska Akad. 4: 55.

Aegipan Scudder, 1877. Proc. Boston Soc. Nat. Hist. 19: 39.

Dichopetala Scudder, 1900 (not Brunner, 1878). Canadian Entomol.

32: 331.

Characteristics: Color green, some areas paler; fastigium triangular; eyes oblong oval, always deeper than wide; pronotum saddle shaped with faint median carina; lower lobe of femoral apices of caudal legs ending in a pointed spine.

## Key to Species

1. Eyes approximately one and one half times as deep as wide. . . . 2  
 Eyes approximately twice as deep as wide . . . . . 3
2. Pronotum with caudal margin of disk sharply angulate . . . . .  
 . . . . . c. constricta  
 Pronotum with caudal margin of disk convex or rounded . . . . .  
 . . . . . g. gracilipes
3. Pronotal disk with median carina . . . . . grallator  
 Pronotal disk without median carina . . . . . ambulator

Arethaea constricta constricta Brunner

Arethaea constricta Brunner, 1878. K. K. Zool. Bot. Gesell. p. 236.

Arethaea gracilipes constricta: Rehn and Hebard, 1914 (in part).

Trans. Am. Entomol. Soc. 40: 130.

Arethaea constricta constricta: Hebard, 1934. Trans. Am. Entomol.

Soc. 62: 236.

Characteristics: Length of body, male and female, 12-14 mm; length of pronotum, male and female, 4 mm; length of ovipositor, 5 mm; color green; sutural margin of tegmina darkened; legs long, femora not compressed dorsally; male cerci bent down apically forming a heavy acute tooth; ovipositor arcuate.

County records: Harper, Jackson, Jefferson, Kiowa, Osage, and Tillman.

June-July.

Arethaea gracilipes gracilipes (Thomas)

Ephippitytha gracilipes Thomas, 1870. Proc. Acad. Nat. Sci.

Philadelphia 22: 76.

Arethaea gracilipes gracilipes: Rehn and Hebard, 1914 (in part).

Trans. Am. Entomol. Soc. 40: 120.

Characteristics: Differs from A. c. constricta by the key characteristics and the not darkened sutural margins of the tegmina.

County record: Texas. No specimens seen.

August.

Arethaea grallator (Scudder)

Aegipan grallator Scudder, 1877. Proc. Boston Soc. Nat. Hist. 19: 39.

Arethaea grallator: Rehn and Hebard, 1914. Trans. Am. Entomol. Soc.

40: 148.

Characteristics: Length of body, male and female, 16 mm; length of pronotum, male and female, 4.5-5 mm; length of ovipositor, 5-5.8 mm; color green; fore and median femora compressed dorsally; male cerci each with small apical tooth; ovipositor arcuate.

County records: Pontotoc and Sequoyah.

July.

Arethaea ambulator Hebard

Arethaea ambulator Hebard, 1936. Trans. Am. Entomol. Soc. 62: 253.

Characteristics: Length of body, male and female, 15-21.5 mm; length of pronotum, male and female, 4-6.1 mm; length of ovipositor, 6.8 mm; color green; fore and median femora compressed dorsally; apical

portion of cerci bent inward at almost ninety degree angle terminating in a tooth.

County record: Commanche.

June.

### Scudderia Stal

Phaneroptera Serville, 1831. Ann. Sci. Nat. 22: 416.

Scudderia Stal, 1873. Ofv. Akad. Forhandl. 30(4): 41.

Characteristics: Color green with traces of yellow on face and ventral surface; vertex compressed into narrow fastigium; pronotal disk flat, hind margin broadly rounded; caudal femora almost as long as tegmina; supraanal plate of male with a long decurved spine notched apically; ovipositor broad, arcuate. The females are not included in the key. They are very difficult to identify unless taken with the male (Blatchley, 1920).

### Key to Males

1. Notch of supraanal spine fork like, lateral processes much swollen (Figure 1) . . . . . f. furcata  
 Notch not fork like, lateral processes not swollen . . . . . 2
2. Notch of supraanal spine square with minute median tooth, lateral processes slender and laterally compressed (Figure 2). . . . .  
 . . . . . texensis  
 Notch of supraanal spine acute, without median tooth, lateral processes broad (Figure 3). . . . . c. curvicauda

Scudderia furcata furcata Brunner

Scudderia furcata Brunner, 1878. K. K. Zool. Bot. Gesell. p. 279.

Scudderia fasciata Beutenmuller, 1894. Bull. Am. Mus. Nat. Hist.  
6: 251.

Scudderia furcata furcata: Rehn and Hebard, 1914. Trans. Am.  
Entomol. Soc. 40: 275.

Characteristics: Length of body, male, 14-20 mm, female, 18-21 mm;  
length of pronotum, male and female, 4.6-5 mm; length of ovipositor,  
5-7 mm; color green and greenish yellow, antennae green basally; pronotal  
disk with parallel or nearly parallel sides, lateral carina rather sharp-  
ly elevated with no yellow color present; tegmina reticulate.

County records: Alfalfa, Beaver, Ellis, Grant, Harper, LeFlore,  
McCurtain, Murray, Okfuskee, Osage, and Woodward.

July-September.

Scudderia texensis Saussure and Pictet

Scudderia texensis Saussure and Pictet, 1897. Biol. Cent. Am. 1:  
330.

Scudderia curvicauda Rehn and Hebard, 1905. Proc. Acad. Nat. Sci.  
Philadelphia 57: 42.

Characteristics: Length of body, male, 21-25 mm, female, 24-28 mm;  
length of pronotum, male and female, 5.5-6.5 mm; length of ovipositor,  
7-8 mm; body and face pale green, extremities grass green; pronotum  
narrower in front, distinct yellow lines on lateral carina.

County records: Alfalfa, Ellis, Harper, LeFlore, Osage, Pawnee,  
Payne, Pittsburg, Woods, and Woodward.

June-August.



Scudderia curvicauda curvicauda (DeGeer)

Locusta curvicauda DeGeer, 1773. Mem. Hist. Inst. 3: 446.

Phaneroptera angustifolia Harris, 1841. Rept. Ins. New England  
Inj. Veg. 1st ed. p. 129.

Scudderia curvicauda: Brunner, 1878. K. K. Zool. Bot. Gesell. p.  
240.

Scudderia furculata Lugger, 1898. Orthoptera of Minnesota. Bull.  
55: 217.

Scudderia texensis Rehn, 1904. Entomol. News 15: 330.

Scudderia curvicauda curvicauda Rehn and Hebard, 1914. Trans. Am.  
Entomol. Soc. 40: 275.

Characteristics: Length of body, male, 18-23 mm, female, 19-25 mm;  
length of pronotum, male and female, 5-6 mm; length of ovipositor, 7-8  
mm; differs from S. texensis by the absence of yellow carinal lines and  
in the shape of the supra-anal plate of the males, as stated in the key.

County records: Delaware, Hughes, McClain, Nowata, Okmulgee,  
Osage, Pawnee, and Payne.

July-August.

Amblycorypha Stal

Orophus Saussure, 1859 (in part). Rev. Mag. Zool. 11: 204.

Amblycorypha Stal, 1873. Ofv. Vet. Forhandl. 30: 41.

Characteristics: Color generally green; fastitium rounded; pro-  
notum with disk flat, narrowed in front; tegminal apices broadly rounded  
may exceed apices of hind wings; supra-anal plate short, broad, and  
truncate; ovipositor broad.

## Key to Species

1. Tegmina definitely longer than wings . . . . .  
 . . . . . p. parvipennis, p. brachyptera  
 Tegmina shorter than wings . . . . . 2
2. Caudal femora always slightly and usually decidedly surpassing  
 apices of tegmina . . . . . uhleri  
 Caudal femora not surpassing apices of tegmina . . . . . 3
3. Subgenital plate of male V-emarginated distally; ovipositor  
 arcuate . . . . . oblongifolia  
 Subgenital plate of male truncate, never V-emarginated;  
 ovipositor elongated . . . . . hausteca

Amblycorypha parvipennis parvipennis Stal

Amblycorypha parvipennis Stal, 1876. Bihang. Svenska Akad. 4(5):  
 55.

Amblycorypha rotundifolia parvipennis: Rehn and Hebard, 1914 (not  
 Scudder, 1862). Trans. Am. Entomol. Soc. 40: 339.

Amblycorypha parvipennis parvipennis: Hebard, 1934. J. Kansas  
 Entomol. Soc. 7: 32.

Characteristics: Length of body, male and female, 21 mm; length of  
 pronotum, male and female, 7 mm; length of ovipositor, 8 mm; color green;  
 wings never evident when tegmina folded; subgenital plate of male V-  
 emarginated distally; ovipositor arcuate.

County records: Carter, McCurtain, Murray, and Pawnee.

June-July.

Amblycorypha parvipennis brachyptera Ball

Amblycorypha brachyptera Ball, 1897. Proc. Iowa Acad. Sci. 6: 237.

Amblycorypha isleyi Caudell, 1904. J. New York Entomol. Soc. 13:  
50.

Amblycorypha rotundifolia isleyi Rehn and Hebard, 1914. (not Scudder,  
1862). Trans. Am. Entomol. Soc. 40: 340.

Amblycorypha rotundifolia brachyptera: Caudell, 1924 (not Scudder,  
1862). Proc. Entomol. Soc. Washington 26: 180.

Amblycorypha parvipennis brachyptera: Hebard, 1934. J. Kansas  
Entomol. Soc. 7: 32.

Characteristics: Length of body, male and female, 21-22 mm; length  
of pronotum, male and female, 6.5-7 mm; length of ovipositor, 8.5 mm.  
Rehn and Hebard (1914b) point out that this form, a northern form of A.  
p. parvipennis, is decidedly robust and less elongate than A. p.  
brachyptera.

County records: Osage, Pawnee, and Payne.

July.

Amblycorypha uhleri Stal

Amblycorypha uhleri Stal, 1876. Bihang. Svenska Akad. 4: 40.

Characteristics: Length of body, male, 14-15 mm, female, 16-17.5  
mm; length of pronotum, male, 4.8-6 mm, female, 5.5-7 mm; length of  
ovipositor, 7.5-10 mm; color pale green; distal margin of subgenital  
plate of male truncate; ovipositor arcuate.

County records: Alfalfa, Hughes, Osage, and Pawnee.

July-August.

Amblycorypha oblongifolia (DeGeer)

Locusta oblongifolia DeGeer, 1773. Mem. Hist. Inst. 3: 445.

Gryllus oblongifolius Harris, 1833. Catalogue of Animals and Plants  
in Massachusetts. In Hitchcock's Rept. on Geol. p. 582.

Phylloptera oblongifolia: Scudder, 1862. J. Boston Soc. Nat. Hist.  
7: 444.

Amblycorypha oblongifolia Brunner, 1878. K. K. Zool. Bot. Gesell.  
p. 266.

Amblycorypha scudderæ Bruner, 1891. Canadian Entomol. 23: 73.

Characteristics: Length of body, male, 19-23 mm, female, 22-25 mm;  
length of pronotum, male, 6-6.5 mm, female, 7 mm; length of ovipositor,  
11.5-13 mm; color bright green.

County records: Alfalfa, Beckham, Caddo, Choctaw, Delaware, Harper,  
Jackson, Kay, Latimer, LeFlore, Love, McCurtain, McIntosh, Murray,  
Muskogee, Osage, Pawnee, Payne, Pontotoc, Pottowatomie, Sequoyah, Texas,  
Tillman, and Tulsa.

June-August.

Amblycorypha huasteca (Saussure)

Phaneroptera huasteca Saussure, 1859. Rev. Mag. Zool. 11: 205.

Phylloptera caudata Scudder, 1862. J. Boston Nat. Hist. 7: 445.

Amblycorypha huasteca Brunner, 1878. K. K. Zool. Bot. Gesell.  
p. 226.

Characteristics: Length of body, male and female, 23-25.5 mm; length  
of pronotum, male and female, 7.5-8 mm; length of ovipositor, 19-21 mm;  
color green.

County records: Alfalfa, Beckham, Caddo, Cleveland, Grant, Harper, Jackson, Osage, Pawnee, Pontotoc, Tillman, Woods, and Woodward.

July-August.

Microcentrum Scudder

Phylloptera Burmeister, 1838. Handbuck der Entomol. 2: 692.

Orophus Saussure, 1859. Rev. Mag. Zool. 11: 204.

Microcentrum Scudder, 1862. J. Boston Nat. Hist. 7: 446.

Characteristics: Color green to pale green; fastigium obtuse; eyes prominent; disk of pronotum flat; tegmina broad, not reaching apices of wings; supra-anal plate of males oblong-triangular; ovipositor strongly arcuate.

Key to Species

1. Pronotum with anterior margin sinuate with a median tooth of variable size . . . . . rhombifolium
- Pronotum with anterior margin squarely truncate without median tooth . . . . . retinerve

Microcentrum rhombifolium (Saussure)

Gryllus laurifolis Linnaeus, 1758. Syst. Nat. p. 126.

Locusta laurifolia Fabricus, 1793. Entomol. Syst. 2: 34.

Phylloptera (Orophus) rhombifolia Saussure, 1859. Rev. Mag. Zool. 11: 204.

Microcentrum affiliatum Scudder, 1862. J. Boston Soc. Nat. Hist. 7: 447.

Microcentrum laurifolium Stal, 1874. Recensio Orthopterorum.

Revue Critique des Orthopteres decrits par Linne, DeGeer et Thunburg 2: 42.

Microcentrum retinervis Riley, 1874. Sixth Ann. Rept. Ins.

Missouri p. 155.

Microcentrum rhombifolium: Kirby, 1906. Syn. Cat. Orthoptera

2: 518.

Characteristics: Length of body, male, 25-28 mm, female, 28-30 mm; length of pronotum, male and female, 6-7 mm; length of ovipositor, 4.5-5 mm; color dark green; tegmina broad, greatly exceeding apices of caudal femora.

County records: Payne and Woodward.

August-October.

Microcentrum retinerve (Burmeister)

Phylloptera retinervis Burmeister, 1838. Handbuck der Entomol. 2:

692.

Phylloptera salicifolia Saussure, 1859. Rev. Mag. Zool. 11: 204.

Microcentrum retinervis: Scudder, 1862. J. Boston Soc. Nat. Hist.

7: 446.

Characteristics: Length of body, male 20-22 mm, female, 24-26 mm; length of pronotum, male and female, 5-6.5 mm; length of ovipositor, 5.5-6.5 mm; color pale green; tegmina broad, with tips more broadly rounded than M. rhombifolium, exceeding apices of caudal femora.

County record: Payne. No specimens seen.

August.

## SUBFAMILY (PSEUDOPHYLLINAE)

Pterophylla Kirby

Pterophylla Kirby, 1828. Introd. Entomol. 5th ed. p. 218.

Cryptophyllus Burmeister, 1838. Handbuck der Entomol. 2: 697.

Thliboselus Serville, 1839. Hist. Nat. des Ins. p. 83.

Characteristics: Robust; color green; vertex terminating in a sharp flat tubercle; eyes small; pronotum saddle shaped, front margin truncate, hind margin rounded, lateral lobes deeper than long, disk crossed by two distinct transverse sulci; prosternum armed with two spines; tegmina broad, leaf-like, completely enclosing abdomen and hind wings, exceed apices of caudal femora; cerci broad at the base, widely forked; subgenital plate long, narrow, spear shaped; ovipositor more than twice as long as pronotum. Females must be taken with males to identify since there are no stable diagnostic characters to use in separation.

## Key to Males

1. Cerci each with ventral projection not forked distad . . . . .  
 . . . . . c. camellifolia  
 Cerci each with ventral projection forked distad . . . . f. furcata

Pterophylla camellifolia camellifolia (Fabricius)

Locusta camellifolia Fabricius, 1775. Syst. Entomol. p. 283.

Locusta perspicillata Fabricius, 1775. Loc. cit.

Platyphyllum concavum Harris, 1831. Encyl. Am. 8: 42.

Platyphyllus zimmermanni Saussure, 1859. Rev. Mag. Zool. 11: 206.

Cyrtophyllus elongatus Caudell, 1906. J. New York Entomol. Soc.  
14: 40.

Pterophylla camellifolia: Morse, 1920. Orthoptera of New England  
p. 350.

Pterophylla camellifolia camellifolia Hebard, 1941. Trans. Am.  
Entomol. Soc. 67: 200.

Characteristics: Length of body, male, 25-30, female, 26-34 mm;  
length of pronotum, male and female, 5.5-6 mm; color green.

County records: Mayes, Muskogee, Pontotoc, and Tulsa.

July.

Pterophylla furcata furcata (Caudell)

Cyrtophyllus furcatus Caudell, 1906. J. New York Entomol. Soc.  
14: 41.

Pterophylla furcata: Hubbell, 1926. Proc. Oklahoma Acad. Sci.  
6: 177.

Pterophylla furcata furcata: Hebard, 1941. Trans. Am. Entomol.  
Soc. 67: 200.

Characteristics: Description same as P. c. camellifolia except  
for the characters mentioned in the key.

County records: LeFlore and McCurtain.

June-July.

SUBFAMILY (COPIPHORINAE)

Neoconocephalus Karney

Conocephalus Thunberg, 1815 (in part). Mem. Acad. Imp. Soc. 5: 271.



Conocephaloides Kirby, 1906. Syn. Cat. Orthoptera 2: 241.

Neoconocephalus Karney, 1907. Abhandl. K. K. Zool. Bot. Gesell.

4: 22.

Characteristics: Color pale green to brown; vertex of fastigium projected forward and upward into a cone, below bearing a pointed basal tooth; eyes small; pronotal disk much longer than wide, never crossed by more than one transverse sulci, truncate anteriorly, rounded posteriorly, lateral carinae distinct; prosternum with two slender spines; tegmina long, narrow, greatly surpassing abdomen and slightly exceeding apices of hind wings; caudal femora greatly exceeded by tegmina; male with supra-anal and subgenital plates emarginate; ovipositor narrow, straight, very long.

#### Key to Species

1. Cone of vertex distinctly longer than wide . . . . . r. crepitans  
 Cone of vertex not or very slightly longer than wide . . . . .  
 . . . . . triops

#### Neoconocephalus robustus crepitans (Scudder)

Conocephalus crepitans Scudder, 1862. J. Boston Nat. Hist. 7: 450.

Neoconocephalus robustus crepitans: Rehn and Hebard, 1915. Trans. Am. Entomol. Soc. 40: 370.

Characteristics: Length of body, male and female, 30-37 mm; length of fastigium, male and female, 2.7-3.7 mm; length of pronotum, male and female, 7.3-9 mm; length of ovipositor, 25-31 mm; color pale green or brown.

County records: Alfalfa, Beaver, Ellis, Harmon, Harper, Hughes, Noble, Osage, Pawnee, Payne, Pontotoc, Roger Mills, Woods and Woodward. July-October.

Neoconocephalus triops (Linnaeus)

Gryllus (Tettigonia) triops Linnaeus, 1758. Syst. Nat. p. 439.

Conocephalus obtusus Burmeister, 1838. Handbuck der Entomol. 2: 705.

Conocephalus dissimilis Serville, 1839. Hist. Nat. des Ins. p. 518.

Conocephalus mexicanus Saussure, 1859. Rev. Mag. Zool. 11: 208.

Conocephalus triops: Stal, 1874. Recensio Orthopterorum, Revue Critique des Orthopteres deserits par Linne. DeGeer et Thunburg 2: 110.

Concephalus hebes Scudder, 1878. Proc. Boston Soc. Nat. Hist. 20: 92.

Concephalus fusco-striatus Redtenbacher, 1891. Verhandl. K. K. Zool. Bot. Gesell. 41: 399.

Neoconocephalus mexicanus var. tibialis Karny, 1907. Abhandl. K. K. Zool. Bot. Gesell. 4: 33.

Neoconocephalus triops: Rehn and Hebard, 1915. Trans. Am. Entomol. Soc. 40: 405.

Characteristics: Length of body, male and female, 27.5-36 mm; length of fastigium, male and female, 2.1-2.6 mm; length of pronotum, male and female, 8.7-9.7 mm; length of ovipositor, 21-25 mm; color green to brown.

County record: Payne. No specimens seen.

July.

## SUBFAMILY (CONOCEPHALINAE)

Characteristics: Color green to pale brown; vertex projected to form a blunt rounded tubercle; eyes large; pronotum saddle shaped; prosternum usually tooth with two slender spines; tegmina usually well developed; legs variable in length; ovipositor and male genitalia vary with genera and species.

## Key to Genera

1. Prosternal spines long, cylindrical; tegmina fully developed . . .  
 . . . . . Orchelimum  
 Prosternal spines very short or wanting; tegmina and hind  
 wings usually covering no more than one-half the abdomen . . .  
 . . . . . Conocephalus

Orchelimum Serville

Orchelimum Serville, 1839. Hist Nat. des Ins. p. 522.

Xiphidium (in part) Redtenbacher, 1891. Verhandl. der K. K. Zool.  
 Bot. Gesell. 41: 493.

Characteristics: Color variable, may be green, reddish brown, or brown; pronotum saddle shaped, caudal margin broadly rounded, lateral lobes usually deeper than long; tegmina narrow, tapering, shorter than hind wings; supra-anal plate of male with apex emarginate, subgenital plate apically "U" or "V" shaped; ovipositor arcuate. The females are not included in the key since there are no stable diagnostic characters which are practical to use.

Key to Males

- 1. Cerci each with tooth longer than apical portion . . . . calcaratum  
     Cerci each with tooth not longer than apical portion . . . . . 2
- 2. Cerci with distal portion beyond insertion of median tooth  
     longer than proximal portion . . . . . c. concinnum, c. delicatum  
     Cerci with distal portion beyond insertion of median tooth  
     not longer than proximal portion . . . . . 3
- 3. Cerci with dorsal surface with sinuate carination . . . . nigripes  
     Cerci with dorsal surface without sinuate carination . . . . . 4
- 4. Cerci with median tooth thickened at the base . . . . . vulgare  
     Cerci with median tooth flattened at the base . . . . . agile

Orchelimum calcaratum Rehn and Hebard

Orchelimum calcaratum Rehn and Hebard, 1915. Trans. Am. Entomol. Soc. 41: 46.

Characteristics: Length of body, male and female, 17-23 mm; length of pronotum, male and female, 5.2-6.2 mm; length of ovipositor, 9-9.6 mm; color pale green; lateral lobes of pronotum longer than deep; tegmina surpassed by hind wings and usually exceeded by caudal femora.

County records: Commanche, Jefferson, Pittsburg, and Pottawatomie.

No specimens seen.

October-November.

Orchelimum concinnum concinnum Scudder

Orchelimum concinnum Scudder, 1862. J. Boston Soc. Nat. Hist. 7: 452.

Orchelimum longipennis Scudder, 1862. Ibid. p. 463.

Xiphidium (Orchelimum) inerme Redtenbacher, 1891. Verhandl. der  
K. K. Zool. Bot. Gesell. 41: 495.

Orchelimum indianense Blatchley, 1893. Canadian Entomol. 25: 90.

Xiphidium gracilum Griffini, 1899. Misc. Entomol. 7: 96.

Orchelimum concinnum concinnum Blatchley, 1920. Orthoptera of  
Northeastern Am. p. 554.

Characteristics: Length of body, male and female, 16.5-18 mm;  
length of pronotum, male and female, 4-5.5 mm; length of ovipositor,  
7.5-8.2 mm; color variable, wings usually pale brown, tinged with green,  
lateral sides and femora pale green, face yellowish white with dark  
stripe extending from mouth to vertex; tegmina narrow and tapering,  
slightly shorter than hind wings, tegmina exceeds apices of caudal  
femora.

County record: Love. No specimens seen.

August.

Orchelimum concinnum delicatum Bruner

Orchelimum gracile Bruner, 1891. Canadian Entomol. 23: 70.

Orchelimum delicatum Bruner, 1892. Entomol. News. 3: 265.

Orchelimum concinnum delicatum: Blatchley, 1920. Orthoptera of  
Northeastern Am. p. 556.

Characteristics: Length of body, male and female, 16-17.5 mm;  
length of pronotum, male and female, 3.8-4 mm; length of ovipositor,  
10.5-11 mm; smaller and more slender than O. c. concinnum; lacking  
stripes on face. These are some of the characteristics used by

Blatchley (1920) for separation.

County record: Alfalfa.

July.

Orchelimum nigripes Scudder

Orchelimum nigripes Scudder, 1875. Proc. Boston Soc. Nat. Hist.

18: 459.

Orchelimum robustum Redtenbacher, 1891. Verhandl. der K. K. Zool.

Bot. Gesell. 41: 499.

Characteristics: Length of body, male and female, 18-21 mm; length of pronotum, male and female, 4.3-5 mm; length of ovipositor, 9-10.5 mm; color green, tibiae and tarsi black; tegmina almost equalling hind wings and exceeding apices of hind femora.

County records: Craig, Osage, and Washington.

July-September.

Orchelimum vulgare Harris

Orchelimum vulgare Harris, 1841. Rept. Ins. New England Inj. Veg.

1st ed. p. 131.

Orchelimum glaberrimum Blatchley, 1903. Orthoptera of Indiana

p. 98.

Characteristics: Length of body, male and female, 18-23 mm; length of pronotum, male and female, 5-6.5 mm; length of ovipositor, 7.5-8.5 mm; robust; color green or pale reddish brown; lateral lobes nearly as long as deep; caudal femora may exceed tips of tegmina.

County records: Alfalfa, Craig, Osage, Payne, and Woodward.

July-October.

Orchelimum agile (DeGeer)

Locusta agilis DeGeer, 1773. Mem. Hist. Inst. 3: 457.

Orchelimum glaucum Serville, 1839. Hist Nat. des Ins. p. 524.

Orchelimum silvaticum McNeill, 1891. Psyche 6: 26.

Xiphidium (Orchelimum) nitidum Redtenbacher, 1891. Verhandl, der  
K. K. Zool. Bot. Gesell. 41: 494.

Orchelimum molossum Rehn and Hebard, 1907. Proc. Acad. Nat. Sci.  
Philadelphia 59: 307.

Orchelimum agile Rehn and Hebard, 1915. Trans. Am. Entomol. Soc.  
41: 29.

Characteristics: Length of body, male and female, 21.5-22.5 mm;  
length of pronotum, male and female, 5-5.6 mm; length of ovipositor,  
7-8 mm; color dull reddish brown dorsally, green ventrally; pronotum  
often with pair of dark brown diverging stripes; tegmina approximately  
equaling caudal femora in length, hind wings extending beyond tegmina.

County records: Caddo, Craig, Harmon, Murray, Osage, Payne, Roger  
Mills, and Tulsa.

June-September.

Conocephalus Thunberg

Conocephalus Thunberg, 1815. Mem. Acad. Imp. Soc. 5: 271.

Anisoptera Latreille, 1829. Regne Animal 2d ed. 5: 184.

Xiphidion Serville, 1831. Ann. Sci. Nat. 22: 159.

Palotta F. Walker, 1869. Cat. Dermaptera Saltatoria Brit. Mus.  
2: 249.

Characteristics: Slender; color green tinged with brown; caudal

margins of pronotum rounded; tegmina narrow, usually abbreviated in length; subgenital plate of male truncate; ovipositor slender, straight.

#### Key to Species

1. Hind tibiae armed with one pair of spines at apices; prosternal spines wanting . . . . . saltans  
 Hind tibiae armed with three pair of spines at apices, prosternal spines short . . . . . 2
2. Tegmina always exceeding apices of hind femora . . . . f. fasciatus  
 Tegmina usually very short and never exceeding apices of hind femora . . . . . strictus

#### Conocephalus saltans (Scudder)

Xiphidium brevipenne Scudder, 1962 (in part). Canadian Nat. and Geol. 7: 285.

Xiphidium saltans Scudder, 1872. Final Rept. U. S. Geol. Survey p. 249.

Xiphidium modestum Bruner, 1891. Canadian Entomol. 23: 56.

Xiphidium taeniatum Redtenbacher, 1891. Verhandl. K. K. Zool. Bot. Gesell. 41: 498.

Conocephalus saltans: Rehn and Hebard, 1915. Trans. Am. Entomol. Soc. 41: 316.

Characteristics: Length of body, male and female, 11-15.5 mm; length of pronotum, male and female, 3-3.5 mm; length of ovipositor, 13.5-15.5 mm; slender; color dull reddish brown, sides of abdomen with narrow yellow stripe; tegmina and hind wings abbreviated usually covering about



one fourth of abdomen; cerci incurved with tooth bent downward and inward; ovipositor at least as long as body.

County records: Cleveland and Jefferson. No specimens seen.

August-October.

Conocephalus fasciatus fasciatus (De Greer)

Locusta fasciata DeGreer, 1773. Mem. Hist. Inst. 3: 458.

Orchelimum gracile Harris, 1841. Rept. Ins. New England Inj. Veg.

1st ed. p. 131.

Conocephalus fasiatus fasiatus Rehn and Hebard, 1915. Trans. Am.

Entomol. Soc. 41: 170.

Characteristics: Length of body, male and female, 11-15.5 mm; length of pronotum, male and female, 2.8-3.5 mm; length of ovipositor, 7.3-9.5 mm; slender; color brown dorsally, green laterally, tegmina reddish brown; tegmina not exceeding apices of hind wings; apical portion of cerci more or less depressed, its apices broad and rounded.

County records: Custer, Delaware, LeFlore, Noble, Okmulgee, Pawnee, Payne, and Washington.

June-November.

Conocephalus strictus (Scudder)

Xiphidium strictum Scudder, 1875. Proc. Boston Soc. Nat. Hist. 17:

460.

Conocephalus strictus: Rehn and Hebard, 1915. Trans. Am. Entomol.

Soc. 41: 193.

Characteristics: Length of body, male and female, 14-19 mm; length

of pronotum, male and female, 3.5-4.5 mm; length of ovipositor, 18-32 mm; slender; sides of head, body, femora green, occiput pronotum reddish brown, dorsum of abdomen dark brown; pronotum with distinct lateral carina; tegmina no more than one-half the length of the abdomen, always much shorter than caudal femora; apical portion of cerci very weakly flattened, the apices narrow; ovipositor slender, longer than the body.

County records: Alfalfa, Harper, Kay, Osage, and Pawnee.

July-August.

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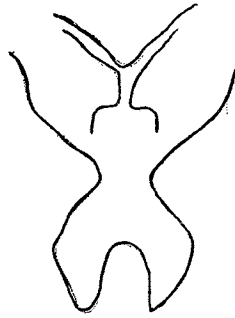
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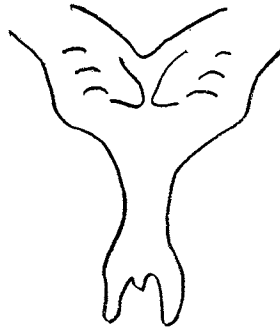
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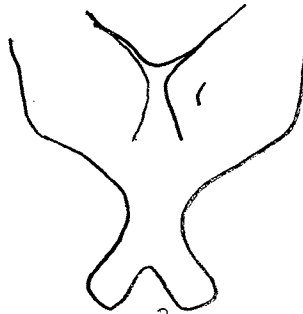
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