
The Tettigoniidae (Orthoptera) of Oklahoma

VERNON N. POWDERS¹ and W. A. DREW,

Oklahoma State University, Stillwater

The long-horned grasshoppers 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".

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.

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

We wish to acknowledge the help received from Drs. A. B. Gurney, K. F. Schaefer and D. S. Shorter and Mr. James Shaddy. We also thank the following museums, The Stovall Museum, The Museum of Comparative Zoology, The American Museum of Natural History, The Great Smoky Mountains National Park Museum, and the United States National Museum for the use of facilities and the loan of specimens which made it possible to see all species included in this paper except for *Orchelimum campestre* Blatchley. Appreciation is extended to the National Science Foundation, whose financial aid has helped make this work possible.

¹Authors present address: Georgia Southwestern College, Americus.

This work includes 10 genera and 31 species in six subfamilies of the Tettigoniidae; however, due to the lack of taxonomic characters, the keys, in some genera, do not include the females. Twenty-two species were listed in papers by Caudell (1902), and Hubbell and Ortenburger (1927), 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, as follows: Rehn and Hebard (1914, 1914a, 1914b, 1915, 1915a, 1915b, 1916), Rehn (1957), Hebard (1925, 1929, 1931, 1934, 1934a, 1934b, 1941), Blatchley (1903, 1920), Caudell (1907, 1924), Tinkham (1944), Thomas (1951) and Thomas and Alexander (1962).

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; if not, the pronotum never exceeds five mm in length; usually greenish in color 3
2. Tegmina longer than pronotum Listroscelinae
Tegmina shorter than pronotum Decticinae
3. Prosternal spines absent 4
Prosternal spines present 5
4. Vertex not produced forward as a tubercle or cone Phaneropterinae
Vertex produced forward as a rounded tubercle Conocephalinae
5. Pronotum about as long as wide with two transverse grooves Pseudophyllinae
Pronotum longer than wide with only one transverse groove, or none 6
6. Vertex produced into a long sharp cone Copiphorinae
Vertex terminated in a rounded tubercle Conocephalinae

LISTROSCELINAE

Rehnia Caudell

Rehnia victoriae Caudell

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 an incurved tooth.

County records: Beaver, Harper, and Woodward.

DECTICINAE

Pediodes Rehn and Hebard

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.

KEY TO MALES

1. Cercal tooth inserted apically beyond middle2
 Cercal tooth inserted about the middle3
2. Pronotum 11-12 mm in length*haldemanii*
 Pronotum 5-8 mm in length*stevensonii*
3. Pronotal disk little if at all lighter in color than upper
 portions of lateral lobes; lateral carinae not evident*grandis*
 Pronotal disk distinctly lighter than upper portions of lateral
 lobes; lateral carinae at least slightly indicated*nigromarginata*

Pediodesctes haldemanii (Girard)

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.

Pediodesctes stevensonii (Thomas)

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.

Pediodesctes grandis (Rehn)

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).

Pediodesctes nigromarginata (Caudell)

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.

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; prosternal 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; pronotum saddle shaped*Arethaea*
 Hind legs less than three times as long as body; eyes globose;
 pronotum not saddle shaped2
2. Tegmina long and narrow*Scudderia*
 Tegmina broad3

Amblycorypha parvipennis parvipennis Stal

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.

Amblycorypha parvipennis brachyptera Ball

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.

County records: Osage, Pawnee, and Payne.

Amblycorypha uhleri Stal

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.

Amblycorypha oblongifolia (DeGeer)

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, Pottawatomie, Sequoyah, Texas, Tillman, and Tulsa.

Amblycorypha huasteca (Saussure)

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.

Microcentrum Scudder

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 *rhombofolium*
 Pronotum with anterior margin squarely truncate without median tooth *retinerve*

Microcentrum rhombifolium (Saussure)

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 hind femora.

County records: Payne and Woodward.

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

Neoconocephalus triops (Linnaeus)

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.

CONOCEPHALINAE

Characteristics: Color green to pale brown; vertex projected to form a blunt rounded tubercle; eyes large; pronotum saddle shaped; prosternum usually 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

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.

KEY TO MALES

1. Cerci each with tooth longer than apical portion*silvaticum*
Cerci each with tooth not longer than apical portion2
2. Cerci with distal portion beyond insertion of median tooth longer
than proximal portion*concinnum* group
Cerci with distal portion beyond insertion of median tooth
not longer than proximal portion3
3. Cerci with dorsal surface with sinuate carination*nigripes*
Cerci with dorsal surface without sinuate carination4
4. Cerci with median tooth thickened at the base*vulgare*
Cerci with median tooth flattened at the base*agile*

Orchelimum silvaticum McNeill

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 hind femora.

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

concinnum group

Several species have been included in the *concinnum* group. Two of these species have been positively identified as being found in Oklahoma. Thomas and Alexander (1962) list *Orchelimum campestre* and *Orchelimum deboutum* in Oklahoma. *Orchelimum concinnum*, a very closely related

species which is almost impossible to separate from *campestre* and *delicatum*, is found in Texas and Illinois. There is a good possibility that this species may be found in Oklahoma.

Rehn and Hebard (1915a) placed *O. campestre* Blatchley and *O. delicatum* Bruner as synonyms of *O. concinnum* Scudder. They stated that *O. concinnum* is a widely diverse species. Blatchley (1920) placed *campestre* and *delicatum* as trinomials of *O. concinnum*. Hebard (1934b) placed *campestre* as a synonym of *O. concinnum concinnum* and left *O. concinnum delicatum* as a subspecies.

Thomas (1951) considered *campestre*, *delicatum* and *concinnum* as three distinct species due to their existence together in a number of places without evident intergradation. Thomas and Alexander (1962) pointed out that morphological characters in the *O. concinnum* group vary, both geographically and within local populations, and that song features are the most reliable characteristics for separating the species.

We have not attempted to separate the three species in the key due to lack of distinct morphological characters. The three species are listed with their synonymy and a short description. Refer to Thomas and Alexander (1962) for a detailed discussion of the three species.

Orchelimum concinnum Scudder

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; body color variable, face nearly always with conspicuous mid-facial stripe extending from mouth to vertex; male cerci with carinae distinctly developed; ovipositor is usually less than half the length of the hind femur and relatively straight for the distal two-thirds of its length.

Orchelimum delicatum Bruner

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; body color variable, ground color of face is usually clear pea green; male cerci with carinae distinctly developed; ovipositor is always more than one-half as long as the hind femur and the upper margin of the ovipositor is relatively straight for the distal two-thirds of its length.

County records: Beaver, Craig, Osage, Tulsa and Washington.

Orchelimum campestre Blatchley

Characteristics: Length of body, male and female, 17.5-19 mm; length of pronotum, male and female, 4.2-5 mm; length of ovipositor, 7-7.5 mm; body color variable, ground color of face is nearly always a translucent dull amber, suffused with red which is usually concentrated along the lateral margins of the face; male cerci with carinae clearly developed; ovipositor is definitely upcurved from about the middle posteriorly.

County records: Pushmataha and Tulsa.

Orchelimum nigripes Scudder

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.

Orchelimum vulgare Harris

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; hind femora may exceed tips of tegmina.

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

Orchelimum agile (DeGeer)

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 hind femora in length, hind wings extending beyond tegmina.

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

Conocephalus Thunberg

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)

Characteristics: Length of body, male and female, 11-15.5 mm; length of pronotum, male and female, 3-3.5 mm; length of ovipositor, 11.5-15.5 mm; slender; color dull reddish brown, sides of abdomen with narrow yellow stripe; tegmina and hind wings when 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.

Conocephalus fasciatus fasciatus (DeGeer)

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.

Conocephalus strictus (Scudder)

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 hind 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.

LITERATURE CITED

- Blatchley, W. S. 1903. The Orthoptera of Indiana. 27th Ann. Rept. Indiana Geol. & Nat. Resour. 123-471.
- 1920. *The Orthoptera of Northeastern America*. Nature Publishing Company, Indianapolis, Indiana. 1-784.
- Caudell, A. N. 1902. Notes on Orthoptera from Oklahoma and Indian Territory with descriptions of three new species. Trans. Amer. Entomol. Soc. 28:83-91.
- 1907. The Decticinae (a group of Orthoptera) of North America. Proc. U. S. Nat. Mus. 32: 285-410.
- 1924. *Amblycorypha brachyptera* Ball (Orthoptera). Proc. Wash. Entomol. Soc. 26: 180.
- Hebard, M. 1925. The Orthoptera of South Dakota. Proc. Acad. Nat. Sci. Philadelphia 77: 33-155.
- 1929. The Orthoptera of Colorado. Proc. Acad. Nat. Sci. Philadelphia 81: 303-425.
- 1931. The Orthoptera of Kansas. Proc. Acad. Nat. Sci. Philadelphia 83: 119-227.
- 1934. Dermaptera and Orthoptera in Kansas State College collection. J. Kans. Entomol. Soc. 7: 25-36.
- 1934a. Studies in Orthoptera which occur in North America north of Mexico boundary, A revision of the genus *Arethaea* (Tettigoniidae, Phaneropterinae). Trans. Amer. Entomol. Soc. 62: 231-256.
- 1934b. The Dermaptera and Orthoptera of Illinois. Ill. Nat. Hist. Surv. 20: 125-279.
- 1941. The Group *Pterophyllae* as found in the United States. Trans. Amer. Entomol. Soc. 67: 197-219.
- Hubbell, T. H. and A. I. Ortenburger. 1927. Notes on Oklahoma Orthoptera with a list of species from the state. Proc. Okla. Acad. Sci. 6: 149-183.
- Rehn, J. A. G. 1957. On the removal of certain New World genera from the Decticinae to the Listroscolinae (Orthoptera; Tettigoniidae). Entomol. News. 68: 175-177.
- Rehn, J. A. G. and M. Hebard. 1914. A revision of the Orthopterous group *Insarae*. Trans. Amer. Entomol. Soc. 40: 37-184.
- 1914a. A synopsis of the species of the genus *Scudderia*. Trans. Amer. Entomol. Soc. 40: 271-314.
- 1914b. A synopsis of the species of the genus *Amblycorypha* found in America north of Mexico. Trans. Amer. Entomol. Soc. 40: 315-344.
- 1915. A synopsis of the species of the genus *Neoconocephalus* found in North America north of Mexico. Trans. Amer. Entomol. Soc. 40: 365-413.
- 1915a. A synopsis of the species of the genus *Orchelimum*. Trans. Amer. Entomol. Soc. 41: 11-83.

- 1915b. A synopsis of the species of the genus *Conocephalus* found in North America north of Mexico. Trans. Amer. Entomol. Soc. 41: 155-224.
- 1916. A revision of the species of the genus *Atlanticus*. Trans. Amer. Entomol. Soc. 42: 33-100.
- Thomas, E. S. 1951. Distribution of Ohio animals. Ohio J. Sci. 51: 153-167.
- Thomas, E. S. and R. D. Alexander. 1962. Systematic and behavioral studies on the meadow grasshoppers of *Orchelimum concinnum* group (Orthoptera: Tettigoniidae). Occas. pap. Mus. Zool., Univ. Mich. 626:1-31.
- Tinkham, E. R. 1944. Biological, taxonomic and faunistic studies on the shield-back katydids of the North American deserts. Amer. Midland Nat. 31: 257-328.
-