

Field guide to some of the common grasshoppers of the Front Range of Colorado



Instructions: The following guide presents the grasshopper species most commonly found along an elevational gradient from the plains of Boulder, Colorado, to the subalpine that lies to the west. Use this guide to identify the species that are found during each weekly sample at your designated site. This will help you determine whether climate change is impacting the timing to adulthood of each community.

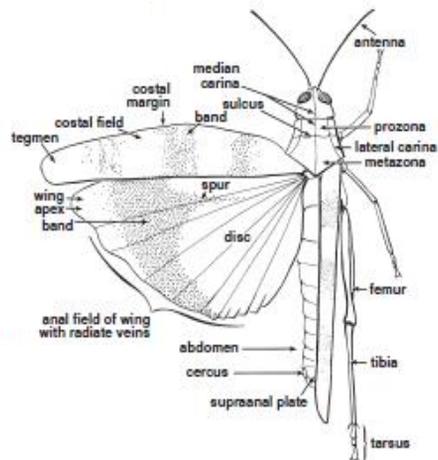
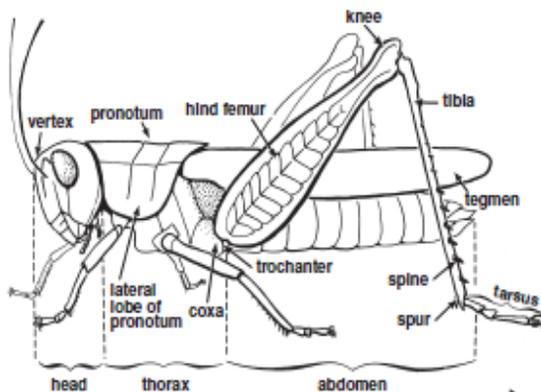


Grasshoppers of the Front Range

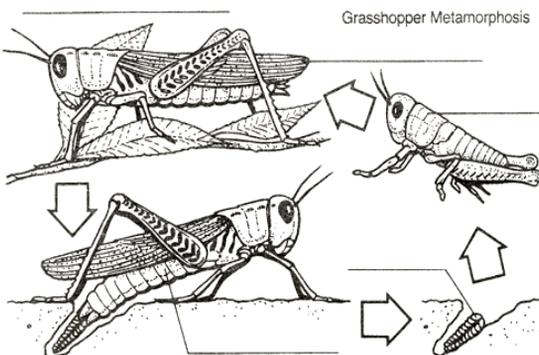
There are 548 species of North American grasshoppers and 133 of these occur in Colorado. Only about a dozen of these species are considered important pests on rangelands, with five of these causing most problems on crops. Within the Front Range of Colorado, 72 species can be found, although most are relatively uncommon. The most commonly encountered species along our lower foothills (1752m) to subalpine (3000 m) transect can be placed into 3 groups (subfamilies); Gomphocerinae, Melanoplinae and Oedipodinae.

The **Gomphocerinae** (slant-faced grasshoppers) are grass specialists that tend to be small and are the grasshoppers commonly heard in meadows chorusing during the day. The **Melanoplinae** (spur-throated grasshoppers) are the most commonly encountered grasshoppers and are primarily forb feeders. Melanoplinae are small (but some can be large) and several of these species tend to be short winged and cannot actively fly. They do not chorus. Most of the **Oedipodinae** (banded-winged grasshoppers) tend to be grass feeders or herbivorous (both grass and forb feeding) and are rarely solely forb feeders. These grasshoppers are commonly found in open areas where they bask and display, they vary considerably in size, and are all active fliers that often use their wings to make loud clicking sounds. Hind wings are often colorful and may have distinct bands.

Grasshopper morphology



Egg and nymphal diapausers



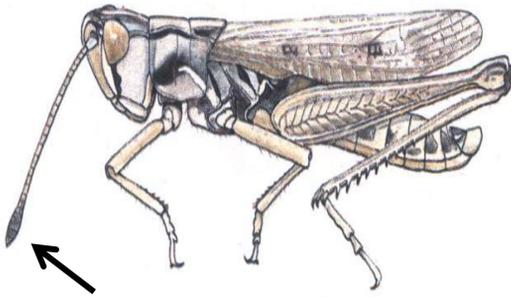
Most grasshoppers spend the winter as eggs underground (egg diapausers), although a few spend the winter as juveniles nestled within the leaf litter (juvenile diapausers). Egg diapausers hatch in May through July and become adults a month or so after they hatch.

Juvenile diapausers become adults in March-April, and are typically gone by early July. Their eggs hatch in late-July and August. Because the dates at which these species became adults were not noted by Alexander's Original survey, they are not included as focal species in this study.

Gomphocerinae (slant-faced grasshoppers)

Aeropedellus clavatus

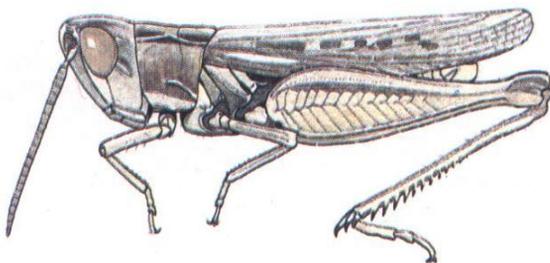
The club-horned grasshopper can be found within the grasslands of western Canada and the northern United States and extends its range from lower prairies to alpine habitats. They are an early emerging species (May) and can be residents at all sites along the elevational gradient except the subalpine known as C1.



Description: Adults of the club-horned grasshopper are medium-sized (17-20 mm) and colored gray or green. They are easily recognized by their distinctive club-shaped antennae and slanted faces.

Eritettix simplex

The velvet-striped grasshopper extends throughout much of North America. This species can be found through a variety of grassy habits within deserts, lowland prairies and montane habitats. They can be found at all sites but C1, it is a nymphal diapauser and is not included as a focal species for this study.

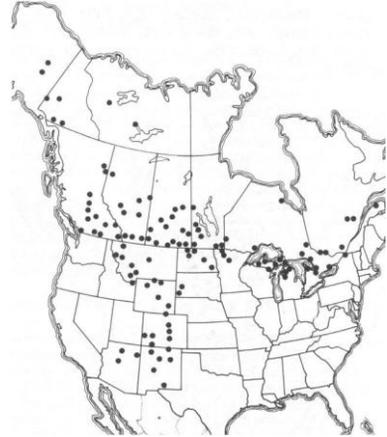
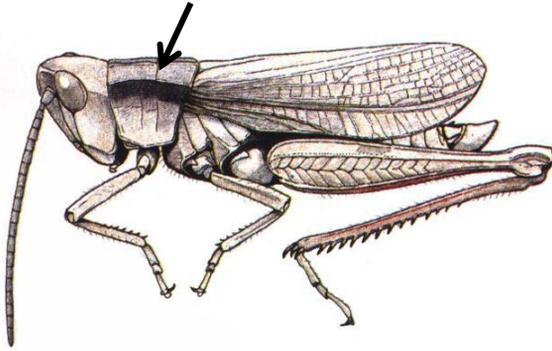


Description: Adults of the velvet-striped grasshopper are medium-sized (23-25 mm) and tan-colored with brown or brown and green markings. They may be confused with *Aeropedullus clavatus*, although the velvet striped grasshopper is more stout, does not have clubbed antennae and has wings that extend to or past their abdomen.

Gomphocerinae (slant-faced grasshoppers)

Chloealtis abdominalis

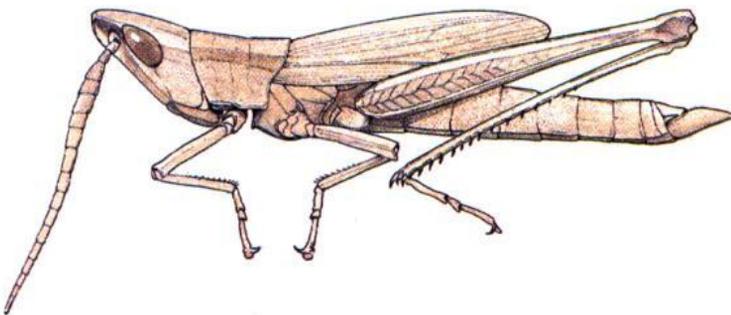
The meadow grasshopper can be found in a variety of foothill to subalpine meadows. They are grass specialists that lay their eggs into decomposing wood. Their eggs hatch in June and become adults in July. They can be found at A1, B1 and C1.



Description: Adults of the meadow grasshopper are medium-sized (17-22 mm long) and tan in color. They are easily recognized by the dark line on their thorax. They do not have clubbed antennae like *A. clavatus* and lack the wing spots and thorax patterns found on *E. simplex*.

Pseudopomala brachyptera

The short-winged toothpick grasshopper can be found throughout much of the Northern extent of the United States. They are tall grass specialists. It is uncommon and found at Chautauqua mesa.

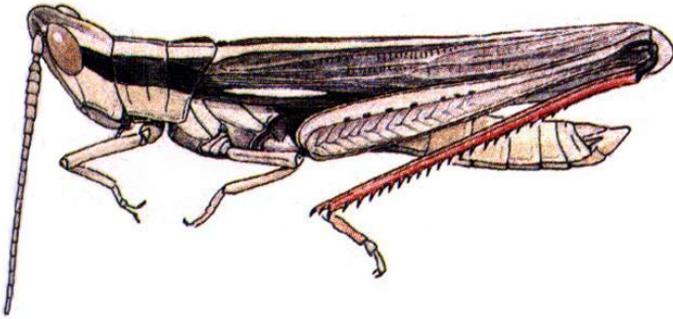


Description: This is a very elongated species with sword shaped antennae. Unlike, *Mermeria bivittata*, this toothpick grasshopper has wings that are much shorter than their abdomen.

Gomphocerinae (slant-faced grasshoppers)

Mermeria bivittata

The two-striped slant-faced grasshopper is tall grass specialist that is distributed throughout most of the United States and Mexico. It is common in lowland prairies with tall grasses, but is uncommon at Chautauqua mesa, the only site that it occurs in.



Description: The two-striped slant-faced grasshopper is elongate, has sword shaped antennae, and unlike *Pseudopomala brachyptera*, its wings reach to the tip of its abdomen. This is a relatively large species (25-40mm).

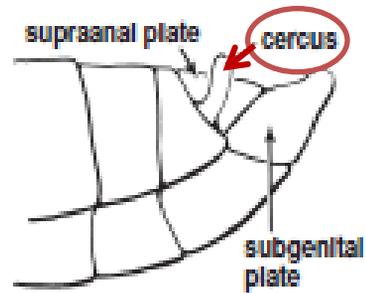
Melanoplinae (spur-throated grasshoppers)

Species in the subfamily Melanoplinae are recognized by the spur on their throats.

Within the subfamily, the male cercus (plural cerci) are important diagnostic characteristics. We will use the male cercus shape to distinguish between most species (see below). The cerci are found at the distal end of the abdomen.

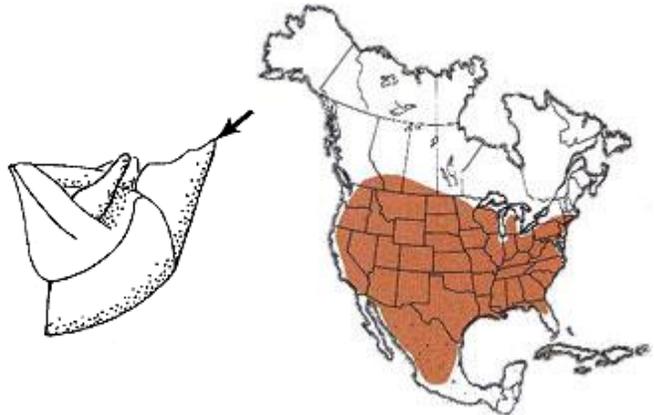


Spur



Hesperotetrix viridis

The snakeweed grasshopper has an extensive range in North America. It feeds on numerous low shrubs in the composite flower family. This species can be found in grasslands, sagebrush and abandoned fields and is often difficult to detect on their host plants. They are found at Chautauqua Mesa and A1.

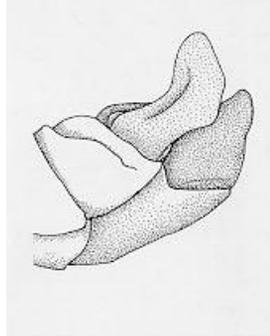


Description: This is a medium-sized (19-22 mm) species that is distinctively green with red eyes and red markings on its fore and hind legs. It has a distinct point at the tip of its subgenital plate and a pointy cercus.

Melanoplinae (spur-throated grasshoppers)

Melanoplus bivittatus

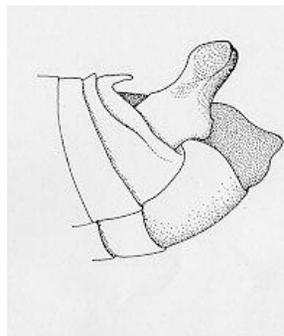
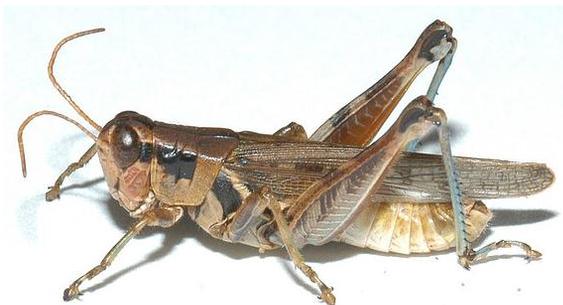
The two-striped grasshopper has an extensive range across North America. It is a mixed feeder (grasses and forbs) that is found in large numbers and can be a serious crop pest. It can be found at Chautauqua Mesa and A-1 and is often an accidental at other sites.



Description: From the top view, this species has two distinct yellow stripes that run across its body. Its cerci often look like a “boot” and it has a solid dark stripe across its hind femur.

Melanoplus confusus

The pasture grasshopper is the earliest egg diapauser to reach adulthood in Colorado and its range extends to many Northeastern states. It is a mixed feeder that feeds primarily on forbs, but also grasses. This species is a resident at Chautauqua Mesa but can be an accidental at other sites.

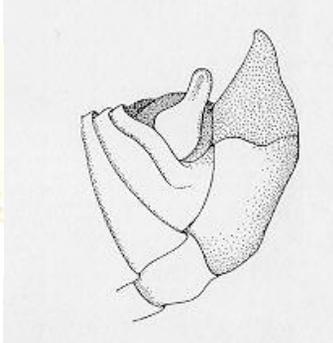


Description: This species is very similar in appearance to *Melanoplus sanguinipes*, although unlike *M. sanguinipes*, its cercus is shaped like a “boot” that folds over its body, rather than being “ear” shaped. It also tends to have blue hind tibia while *M. sanguinipes* has red tibia.

Melanoplinae (spur-throated grasshoppers)

Melanoplus dawsoni

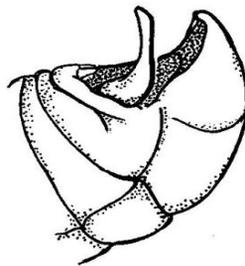
The Dawson grasshopper can be found in grasslands from the North Atlantic coast to the Great Basin of the West. In Colorado, it is a mixed feeder (eating forbs and grasses) that can be found in the foothills of Chautauqua Mesa as well as stations A1 and B1.



Description: The Dawson grasshopper is a small (14.5-22mm) short-winged species that is bright yellow on its underside, red hind tibia and has a male cercus that is short, slightly concave near the end, and rounded at the tip.

Melanoplus dodgei

Dodge's grasshopper is found at middle and high elevations on different mountains across New Mexico, Colorado and to a lesser extent Utah. This is a mixed feeder that can be found at all sites above Chautauqua Mesa.

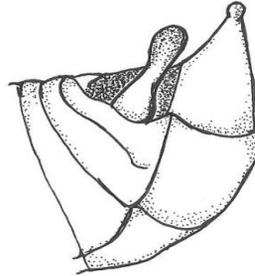


Description: The Dodge grasshopper is a medium sized (20-15mm) short winged species that has distinct chevrons on its femur and a distinct white "V" shaped light pattern can be seen when its wings are seen from above. The male cercus is broad at its base and thins as it approaches its apex.

Melanoplinae (spur-throated grasshoppers)

Melanoplus fasciatus

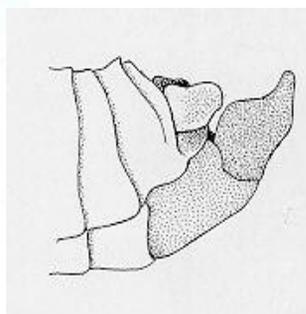
The huckleberry grasshopper extends its range from Canada, south to Alabama, Arkansas and New Mexico. This species prefers dry, open woods and feeds on huckleberry or blueberry bushes in sunlit spots. While it can be found from the foothills to the alpine, along the elevational transect, it is only found at C1.



Description: Adult huckleberry grasshoppers are small to medium-sized (17-22mm). Their wings typically do not reach to the tip of their abdomen, but they have longer wings than *Melanoplus dawsoni* and *M. dodgei*. The male cercus is three to four times as long as wide at its constriction; expansion beyond middle is about as wide as base. The expansion above the middle is often bulbous.

Melanoplus sanguinipes

The distribution of the migratory grasshopper extends through most of North America. It is a mixed feeder that can be found in a variety of habitats across large elevational ranges. This species is considered an economic pest because it can reach such high population sizes. It is found at Chautauqua and A1, and as an accidental at B1 and C1.

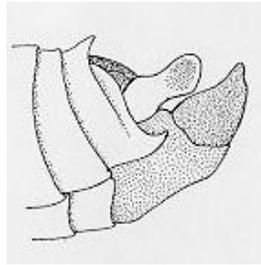


Description: The migratory grasshopper is a medium sized (20-19mm) grasshopper. It looks very similar to *M. confusus*, although unlike *M. confusus*, its cercus is shaped like an “ear” rather than a “boot” that folds over its body, It also tends to have red hind tibia while *M. confusus* has blue tibia.

Melanoplinae (spur-throated grasshoppers)

Melanoplus packardii

The Packard grasshopper can be found through much of western North America. It feeds on many different legumes and other forbs such as clover. It is found at elevations below the subalpine. Along the gradient, it is only a resident at B1.



Description: The Packard grasshopper is a large species (25-35mm) that typically has blue legs (although they can be red as well). The cerci are spatulate (spatula-shaped).

Odipodinae (banded-winged grasshoppers)

Arphia conspersa

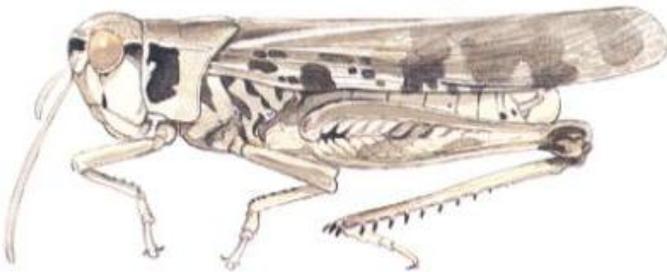
The speckle-winged grasshopper is a grass specialist that is distributed in western North America, from Alaska to Mexico. As nymphal diapausers, the adults are common in spring and early summer. They are residents at all sites along the gradient, but are not included in the study.



Description: This is a medium sized grasshoppers (27-30mm) that is dark brown in color with dark speckles. It's abdomen can be yellow in males and dark in females.

Camnula pellucida

The clear-winged grasshopper is distributed widely in North America. It inhabits a variety of grasslands including the northern mixed grass prairie, the bunchgrass prairie, and mountain meadows. This species is a grass specialist that can be found as a resident at A1, B1, and C1.

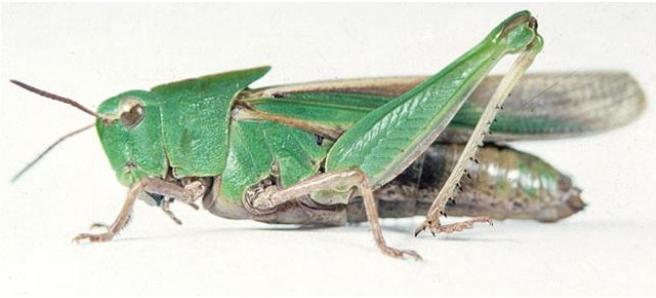


Description: Adult clear-winged grasshoppers (19-25mm) display distinct large spots on their wings and on the thorax. *Pardalophora apiculata* is speckled, but does not have a large spot on the thorax. *Trachyrachus kiowa* also has a much larger head. The inner parts of their legs are yellow with black stripes (unlike *Xanthipus corallipes* which has red shanks).

Odipodinae (banded-winged grasshoppers)

Chortophaga viridifasciata

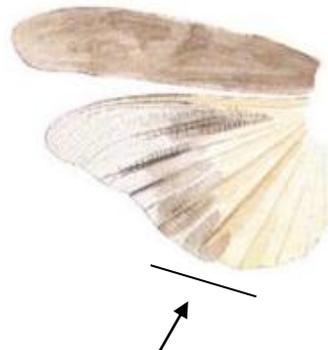
The green-striped grasshopper's distribution includes much of North America and extends southward into Central America. It is a grass specialist that inhabits lands dominated by mid size grasses. It can also be common in disturbed habitats. As nymphal diapausers, the adults are common in spring and early summer. They are residents at Chautauqua Mesa.



Description: The green-striped grasshopper is recognized by the stripe that runs across the top of the body, from the head to the top of the wings. This grasshopper can be solid brown or green and does not have leg stripes or patterns on their wings.

Circotettix rabula

The wrangler grasshopper can be found on bare or eroded soil. It ranges from lowland prairies to higher elevations. It is a mixed feeder preferring forbs such as locoweed, vetch, and sandwort. While it can be found at B1 and C1, it is only common enough at B1 to include in the study.

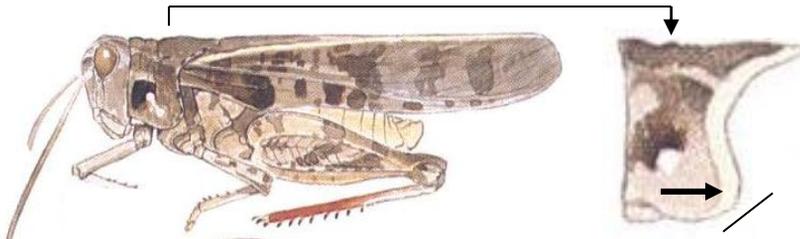


Description: This brown grasshopper ranges from being speckled to having distinct spots that make up solid wing bands. A diagnostic characteristic is the expansion of the lower part of their hind wing. This expansion may help them make loud popping sounds as they fly.

Odipodinae (banded-winged grasshoppers)

Cratyledes neglectus

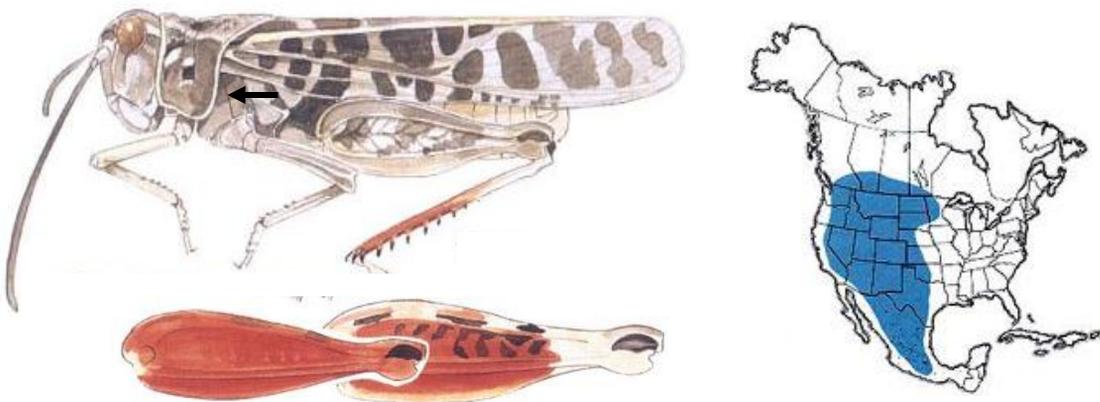
The pronotal range grasshopper is found on grassy hills and prairies, sandy blowouts and small clearings in pine forests. It can be found in the lowland prairies to montane habitats. It is a mixed feeder that prefer grasses. It is a resident at A1 and an accidental at all other sites.



Description: Adults of the pronotal grasshopper are medium to large sized (32-37mm long) and brown and gray in coloration. They have small or large brown blotches on their wings but these are not as distinct as the spots found on *Xanthipus corallipes*. Unlike *Pardalophora apiculata* and *X. corallipes*, the lower distal portion of the pronotum is expanded outwards (compare w/ *X. corallipes* below). This grasshopper has bright orange tibia.

Xanthipus corallipes

The red-shanked grasshopper's range includes much of western North America, inhabiting the grasslands and shrub-grass communities. The species is also present in clearings of montane forests and in open vegetated areas above timberline. It is a grass specialist and nymphal diapauser that is a resident at A1 and B1. It is not part of the current study.

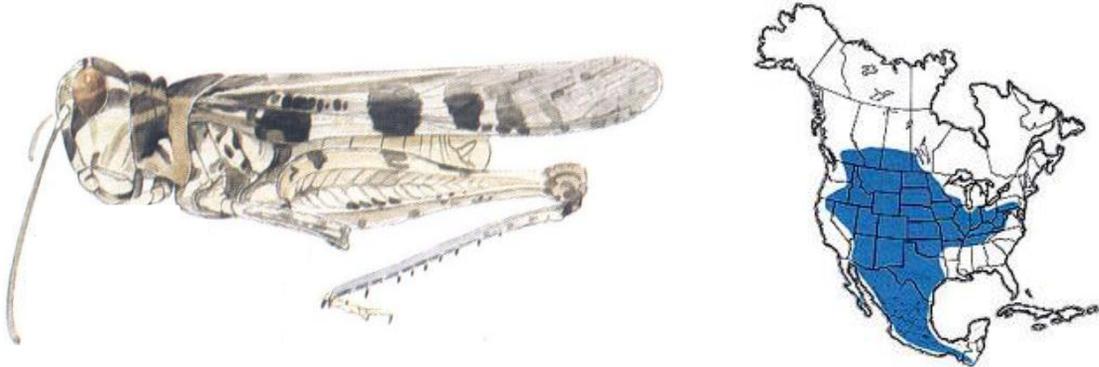


Description: The red-shanked grasshopper is a medium to large grasshopper (24-41 mm) with distinct black spots on its forewing. The inside portion of its hind legs (the shanks) are bright red.

Odipodinae (banded-winged grasshoppers)

Trachyrychus kiowa

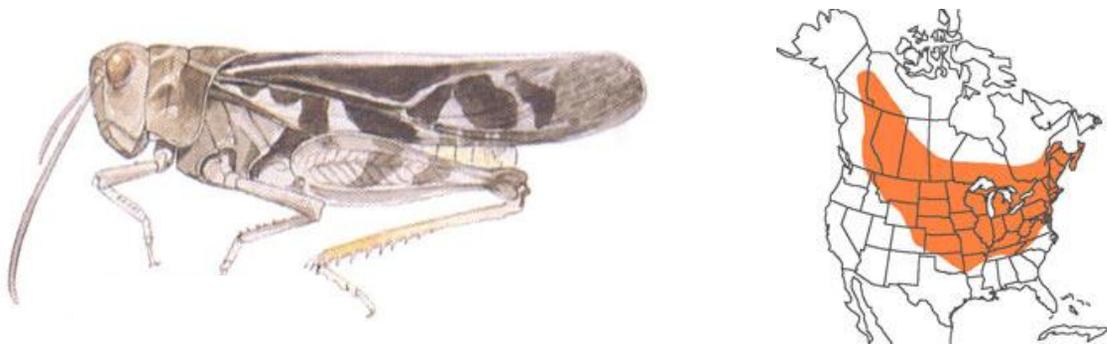
The Kiowa grasshopper is a grass specialist that ranges widely throughout North America. It occupies sparse grassland areas but is found mostly in lowland prairie systems. It is an active flier can be found as an accidental at all survey sites.



Description: The Kiowa grasshopper has blue hind tibia, 3 to 4 large spots on its forewing and an enlarged head that is wider than its thorax.

Pardalophora apiculata

The coral-winged grasshopper ranges from northwestern Canada and southern Quebec to North Carolina, Oklahoma, Colorado, and Montana. It inhabits grassy areas on dry and sandy soils as well as upland meadows. It is an uncommon grass specialist that is a nymphal diapauser. It is found as an accidental at Chautauqua Mesa.



Description: The coral-winged grasshopper is a medium to large grasshopper (24-41 mm) with distinct black spots on its forewing. It can have many small distinct spots on the forewing (like *Xanthipus corallipes*) that can fill in to look dark (as above). The inside portion of its hind legs is not bright red as seen in *Xanthipus corallipes*. Unlike *C. pellucida*, it does not have a large black spot on its thorax.

Acknowledgments: This lab manual was made possible with funding from the National Science Foundation (Grant #1543813) and the Biological Science Initiative at CU Boulder. Images and grasshopper information came from the following source. We also thank City of Boulder Open Space and Mountain Parks for research access to Chautauqua Mesa.

Otte, D. 1981. The North American grasshoppers. Vol. I. Acrididae: Gomphocerinae and Acridinae. Harvard Univ. Press

Otte, D. 1984. The North American grasshoppers. Vol. II. Acrididae: Oedipodinae. Harvard Univ. Press

Mathew Brust @

<http://www.flickr.com/groups/orthoptera/pool/with/2078930689/>

Bob Pfadt's Grasshopper species fact sheets

http://www.sidney.ars.usda.gov/grasshopper/ID_Tools/F_Sheets/index.htm

Grasshoppers of Wisconsin By Kathryn Kirk and Charles R. Bomar

http://dnr.wi.gov/org/es/science/publications/ss1008_2005.htm

Photo's used in the activity were from Gerald M. Fauske

http://www.ndsu.nodak.edu/ndmoths/hopper/orthoptera_index.htm

A key to the grasshoppers of North America can be found at

Grasshoppers of the Western United States Edition 3

<http://keys.lucidcentral.org/keys/v3/grasshopperE3/Media/frmsetRLGH.htm>