

# Clubhorned Grasshopper

## *Aeropedellus clavatus* (Thomas)

### Distribution and Habitat

The clubhorned grasshopper, *Aeropedellus clavatus* (Thomas), inhabits grasslands of western Canada and the northern United States and extends its range into mountainous areas as far south as Arizona and New Mexico. In Colorado, one resident population survives above timberline at 13,600 feet in a rocky, grass-sedge habitat. In the prairie provinces of Canada it is the most widely distributed and abundant of the grassland species, occurring on all dry and somewhat sandy areas south of the boreal forest. In four of ten years it was the dominant species of a grasshopper assemblage inhabiting the sand prairie of southeastern North Dakota.

### Economic Importance

The clubhorned grasshopper is primarily a pest of grasses and sedges in the mixedgrass and bunchgrass prairies and in mountain meadows and parks. Populations may reach 20 per square yard on rangeland in Canada, causing severe damage to forage grasses. It has also attacked seedling cereals; in 1936 an outbreak in Saskatchewan destroyed 300 acres of wheat. In Montana

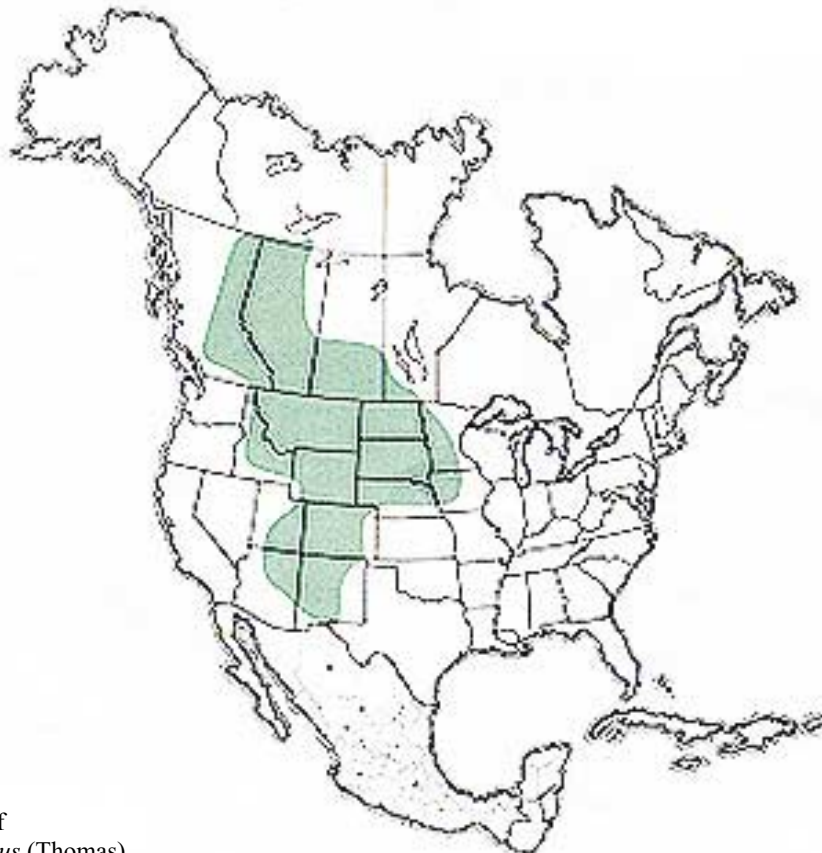
and North Dakota it is frequently abundant in grasshopper assemblages infesting rangeland.

### Food Habits

The clubhorned grasshopper feeds on grasses and sedges. Examinations of crop contents show that in mixedgrass prairie this grasshopper feeds on western wheatgrass, prairie junegrass, Sandberg bluegrass, needleandthread, threadleaf sedge, and needleleaf sedge. In mountain meadows and parks different groups of grasses and sedges are used for food. Wherever Kentucky bluegrass has invaded an area, it is a preferred host plant. When grass seeds and glumes become available in the habitat, they are fed upon heavily. The clubhorned grasshopper is known to feed upon 28 species of grasses and six species of sedges. Small amounts of forbs, fungi, pollen, and arthropod parts have been found in crop contents.

### Migratory Habits

Little is known about the migratory habits of the clubhorned grasshopper. The females do not fly; their



Geographic range of  
*Aeropedellus clavatus* (Thomas)

Instar 1



1. BL 5.4-7.1 mm FL 2.9-3.4 mm AS 13.

Instar 2



2. BL 6.8-8.1 mm FL 4.3-4.9 mm AS 16-18.

Instar 3



3. BL 11-11.5 mm FL 6.4-6.7 mm AS 20.

Instar 4



4. BL 14-16 mm FL 8.7-9.3 mm AS 22.

Figures 1-4. Appearance of the four nymphal instars of *Aeropedellus clavatus* — their sizes, structures, and color patterns. Notice the progressive development of the wing pads. BL=body length, FL=hind femure length, AS=antennal segments number.

wings are short, not reaching the middle of the abdomen. Males have either short or long wings. In plains habitats the long-winged males fly extensively. A study of predator avoidance conducted above timberline in Colorado showed that the females merely hop away from a predator but the males hop away and then prance (i.e., they take small, repeated hops without appreciable progression).

### Identification

Adults of the clubhorned grasshopper are medium-sized and colored gray or green with various markings (Fig. 5 and Fig. 6). They possess clavate antennae that give this grasshopper both its common name and scientific species name. The six terminal segments of an antenna are enlarged and dark. The head has a dark streak running from beneath the compound eye to the base of mandible. Anterior to this streak lies a vertical cream or light tan band. The head has distinct oblong lateral foveolae (Fig. 7). The pronotum has low but definite median carina and lateral carinae, all of which are cut once by a sulcus behind the middle; the lateral carinae converge (curve inward) near the middle of the prozona (Fig. 7); the lateral lobe usually bears a pale diagonal mark (Fig. 6).

The nymphs are identifiable by their shape, external structures, and color patterns (Fig. 1-4):

1. Head with strongly slanted face; antennae flat and nearly same width the entire length in females, clavate in males (instars II to IV); lateral foveolae oblong and distinct.
2. Narrow light line beginning behind middle of compound eye, running along side of head onto lateral carina of pronotum and continuing on abdomen; broad fuscous stripe adjacent and below the light line.
3. Pronotum with lateral carinae converging near middle.
4. Hind femur with entire medial area gray; lower marginal area pale gray.

### Hatching

The clubhorned grasshopper is a very early-hatching species. Nymphs begin to emerge ten days before nymphs of the bigheaded grasshopper, or

Figures 5-8. Appearance of the adult male and female of *Aeropedellus clavatus*, diagnostic characters, and the egg pod and loose eggs.

about the first week in May in eastern Wyoming. The hatching period lasts for three to four weeks. In mountain areas above timberline in Colorado, hatching begins in mid to late June depending on altitude, location, and seasonal temperatures.

### Nymphal Development

The clubhorned grasshopper has four instars that develop rapidly. Accelerated development is a life history adaptation frequently associated with boreal existence. Nymphal development is completed in approximately 30 days on the plains and 42 days in alpine habitats.

### Adults and Reproduction

The adults remain in the same area in which the eggs hatch and the nymphs develop. Because of early hatching and rapid development, the adults emerge when there is still an abundance of green grasses and sedges available for food. However, the cost of this early access to food is that this grasshopper may be intensively controlled by predators. Birds, rodents, spiders, and predaceous insects usually reduce the number of clubhorned grasshoppers to fewer than one per square yard by early summer. Later-hatching species, such as the bigheaded and whitewiskered grasshoppers, may numerically overwhelm predators (trading more intensive competition over poorer food for the potential of swamping the predators' response) and thereby remain abundant through early summer.

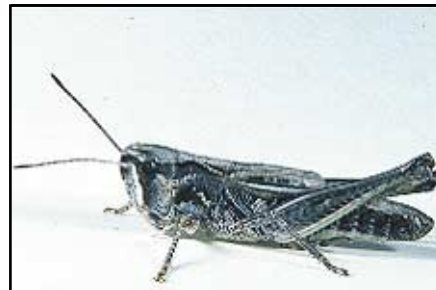
Courtship and fecundity have not been studied in this grasshopper. The males stridulate loudly by vibrating the hind femur through a small arc against a raised vein on the tegmen. The "song" is probably part of the courtship ritual. Females select grasses or sedges in which to oviposit, laying the eggs among the roots. The eggs develop rapidly to stage 26 in which the embryo appears as a young grasshopper nearly ready to hatch. Evidently the embryo has entered diapause, as it does not emerge until the following spring. Egg pods (Fig. 8) are 10 to 13 mm long and 3.5 to 4.0 mm in diameter; they are oriented vertically in the soil. The pods contain five to eight eggs surrounded by a tan, hardened froth. Eggs are light tan and 4.6 to 5.5 mm long. They are arranged in two rows and are inclined about 30 degrees from vertical.

The species has one generation annually in plains habitats. The eggs of resident populations of alpine



5. BL 17-17.5 mm FL 11.1-11.6 mm AS 24.

Male



6. BL 19.5-21.0 mm FL 11.5-12.3 mm AS 23-24.

Female



7. Dorsal view of head and pronotum of adult male.

Head  
Pronotum



8. Egg pod, two eggs in situ, and one separate egg.

Egg pod

habitats pass through two, or possibly three, winters before hatching.

### Population Ecology

Outbreaks of the clubhorned grasshopper occur in limited areas of the prairie provinces of Canada, where populations may increase to 20 per square yard. In at least one instance, this grasshopper was abundant in a year that followed an unusually wet year. In relatively lush habitats of the mixedgrass prairie in Wyoming, populations may increase to four adults per square yard in early summer.

More often, the densities in these habitats range from one to two adults per square yard.

### Daily Activity

Cursory observations of adult activity have been made in Montana. Males appear to do much crawling on the ground and they frequently take short flights. The females are slower and remain motionless on the ground for long periods. Further observations of their daily activities are desirable.

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