

Little Spurthroated Grasshopper

Melanoplus infantilis Scudder

Distribution and Habitat

The little spurthroated grasshopper has a wide geographic range in Western North America. It occurs in grasslands, often as the dominant grasshopper, from the Canadian provinces to northern New Mexico. It is common in clearings of montane coniferous forest and in the parklands of the Canadian northern forest. In Colorado, it is found in montane grasslands as high as 10,000 feet. Its northern geographic range and its distribution in montane habitats indicate tolerance for colder temperate climates and intolerance for warmer conditions.

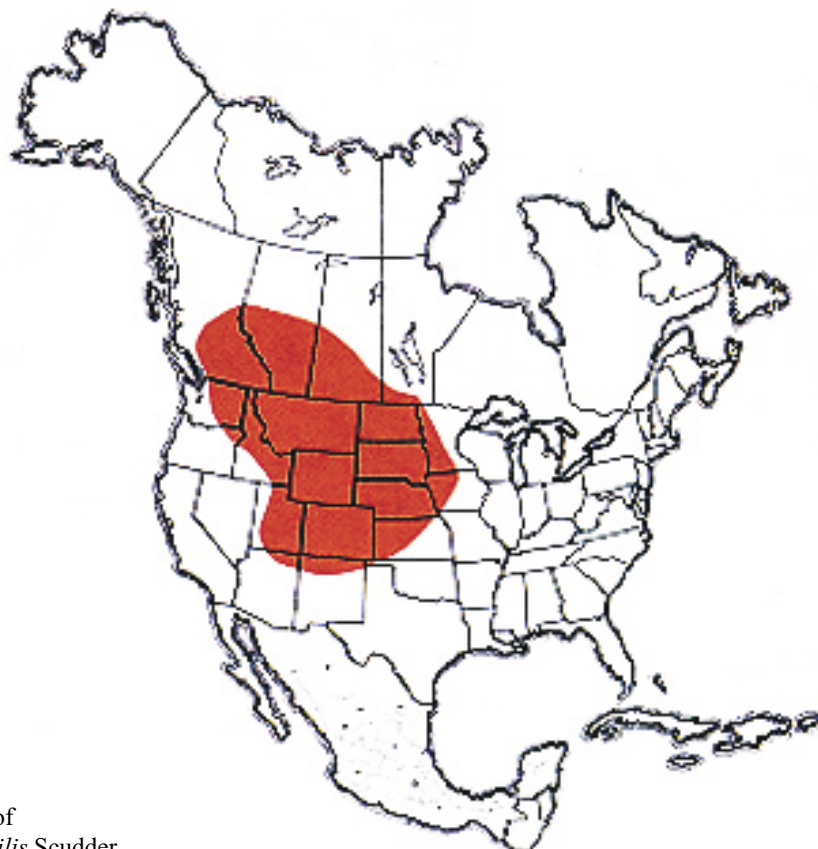
Economic Importance

This grasshopper is an economically important species, becoming abundant in grasslands and feeding on both grasses and forbs. In a rangeland assemblage it is sometimes the dominant grasshopper. During 1953 it was the dominant species in 11 of 42 sites sampled in the mixedgrass prairie of Montana. A small species, the live weight of males averages 157 mg and of females 236 mg (dry weight males 53 mg, females 63 mg).

Large populations infest regions of bunchgrass-sagebrush in Idaho where densities may reach 20 to 40 per square yard in outbreak years. This species confined in field cages on western wheatgrass in Montana, caused a loss of 35 mg dry weight of forage per adult grasshopper per day. This amount was less than that caused by an adult big-headed grasshopper, *Aulocara ellioti*, which caused a loss of 62 mg per day. The reason for this difference is no doubt related to the difference in weight of the two species. The larger grasshopper, which requires more food, caused the greater damage. Unconfined in its natural habitat, the little spurthroated grasshopper may be even less damaging because it feeds on forbs as well as grasses.

Food Habits

The little spurthroated grasshopper feeds on both grasses and forbs. No primary host has been revealed from three studies that have examined crop contents. Rather the studies indicate that the diet varies with the kinds of vegetation growing in the habitat and with the time of season. Populations may be either mainly gram-inivorous or forbivorous. Direct observations of feeding and



Geographic range of
Melanoplus infantilis Scudder

Instar 1



1. BL 4.2-5.2 mm FL 2.1-2.3 mm AS 13.

Instar 2



2. BL 4.6-7.2 mm FL 3-4.3 mm AS 15-18.

Instar 3



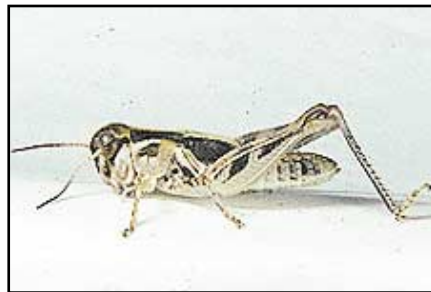
3. BL 7.1-10.1 mm FL 4.9-5.7 mm AS 19-20.

Instar 4



4. BL 9.1-12.1 mm FL 6.3-7.8 mm AS 20-22.

Instar 5



5. BL 12-15 mm FL 8.4-9.2 mm AS 22-25.

Figures 1-5. Appearance of the five nymphal instars of *Melanoplus infantilis* - their sizes, structures, and color patterns. Notice progressive development of the wing pads. BL = body length, FL = femur length, AS = antennal segments number.

examinations of crop contents provide records of feeding on ten species of grasses, three species of sedge, and 16 species of forbs. Major grass hosts include blue grama, western wheatgrass, needleandthread, sand dropseed, Idaho fescue, parry oatgrass, and several species of bluegrass. Threadleaf sedge and needleleaf sedge, grass-like rangeland plants, are also major foods. Major forb hosts include scarlet globemallow, woolly plantain, broom snakeweed, fringed sagewort, Fendler sandwort, dandelion, and several species of milkvetch.

Even though results from the field indicate that the little spurthroated grasshopper is a polyphagous feeder, laboratory tests of food preference show that it discriminates between paired species of plants. It prefers dandelion to blue grama, western wheatgrass, and alfalfa, but it eats equal amounts of dandelion and downy brome.

No field observations have been made of how this grasshopper attacks a food plant; however, several observations have been made of its feeding in a laboratory terrarium. In feeding on needleandthread grass, a hungry female crawled on the soil surface until she contacted the food plant. She then reached up and cut a green leaf about one-half inch above the ground level and held onto the cut section, approximately 1 to 2 inches long, with the front tarsi and consumed the entire section from the cut end to the tip. She repeated this procedure five times on leaves of the same plant. The sixth time she cut another leaf but did not continue feeding, probably having been satiated. Adults were also observed feeding on ground litter such as fallen leaves of needleandthread and scarlet globemallow. In their natural habitat in Montana, adults have been observed feeding on ground litter.

Dispersal and Migration

Dispersal and migration of the little spurthroated grasshopper have been recorded several times. It has been recorded flying into cities and towns. Recently four males and eight females were found on Grasshopper Glacier of Montana along with several other migratory species. Two carbon-dated specimens of this species were determined to be less than 40 years old.

Evasive flights of the little spurthroated grasshopper are straight, silent, and low (4 to 9 inches above ground), and for short distances (3 to 10 feet).

Figures 6-10. Appearance of the adult male and female of *Melanoplus infantilis*, front of head, end male abdomen, and egg pod and eggs.

Identification

The adult of the little spurthroated grasshopper is a small, long-winged member of the genus *Melanoplus*. The hind femur has the medial area distinctively patterned with dark chevrons and light patches (see figures 6 and 7). The upper marginal areas of the hind femur are marked by three dark bands. The hind tibia is usually light blue. A diagnostic character of the species is the shape of the male cercus (Fig. 9). It is forked with the lower arm curving down and ending in a blunt tip (the alpine grasshopper, *Melanoplus alpinus*, has a similarly shaped cercus, but the lower arm curves decidedly downward and narrows to an acute point).

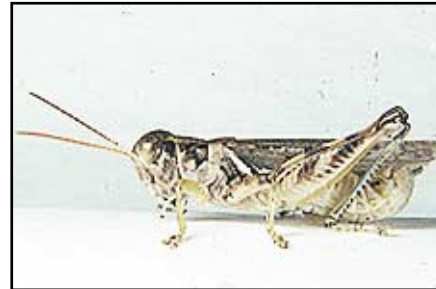
The nymphs are identifiable by their structures, color patterns, and shape (Fig. 1-5).

1. Head with face nearly vertical; frontal ridge distinctively black (Fig. 8), vertical black band running from bottom of compound eye down to mouthparts. Antennae filiform, each segment ringed anteriorly in white. Compound eye brown with many light spots.
2. Cream-colored crescent beginning on gena below compound eye and running onto lateral lobe. Dorsal stripe of hind femur usually interrupted near middle by cream-colored band. Hind tibia pale yellow or pale gray, front edge fuscous.
3. Body color is cream and tan with fuscous lines and marks. Bottom of thorax and abdomen usually white, occasionally pale yellow.

Many of the described nymphal characters of *M. infantilis*, *M. gladstoni*, and *M. occidentalis* are similar, yet nymphs of these species can be separated easily by color and by their seasonal appearance. The venter (ventral side of both thorax and abdomen) of nymphs of *M. infantilis* is usually white, while the venter of nymphs of *M. gladstoni* is usually bright yellow and of *M. occidentalis* pale gray. Nymphs of *M. infantilis* and *M. occidentalis* are present in the grasshopper assemblage early in the season along with nymphs of *M. sanguinipes* and *M. packardii*, while those of the *M. gladstoni* are present late when all four of the former species are adults.

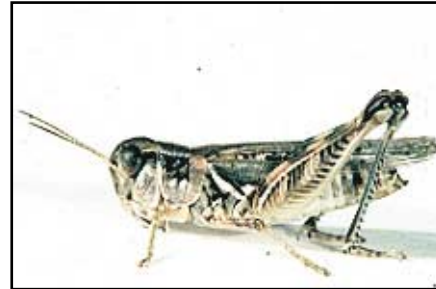
Hatching

The little spurthroated grasshopper is an intermediate-hatching species appearing two to three weeks after the bigheaded grasshopper. In the northern mixedgrass prairie the eggs may hatch from late May to mid June.



6. BL 16.5-17 mm FL 9.6-10.7 mm AS 25-26.

Male



7. BL 16-19 mm FL 10.5-11.2 mm AS 24-25.

Female



8. Distinctively black color of frontal ridge of nymphs.

Frontal
Ridge



9. End of male abdomen showing shape of male cercus.

Cercus



10. Egg pod and loose eggs.

Eggs

Nymphal Development

Nymphs develop and grow during late spring and early summer when weather is usually warm and food plants are green and abundant. Under these favorable conditions the young grasshoppers develop through the nymphal stage in 27 to 34 days. Of six common species inhabiting Montana mixedgrass prairie (*Ageneotettix deorum*, *Amphitornus coloradus*, *Aulocara ellioti*, *Melanoplus infantilis*, *Melanoplus packardii*, and *Melanoplus sanguinipes*), the little spurthroated grass-hopper developed most rapidly.

Adults and Reproduction

Adults remain in the same habitat in which they develop as nymphs. There they feed, mature, mate, and reproduce. No special study has been made of their courtship or reproduction. Four observations of pairs in copulation have been made between the hours of 8:30 and 10:30 a.m. DST. One pair, which was first observed at 10:10 a.m. on 14 August 1990, disengaged after 20 minutes. In the northern mixedgrass prairie the adults are present from mid July to mid September or mid October, a period of 60 to 90 days. Longevity of individual adults is much less, however, ranging from 15 to 22 days on the mixedgrass prairie of Montana.

On South Dakota rangeland, females have been observed ovipositing to a depth of 1 inch in clumps of buffalo grass. Caged females oviposit readily into bare soil. Upon withdrawing their abdomen, females brush soil and litter over the exit holes with their ovipositor. The pods are curved, seven-eighths to 1 inch long, and contain 10-13 light tan eggs in the bottom half (Fig. 10). The eggs are 3.9 to 4.2 mm long. The top half of the pod consists of dry froth. There is one generation annually.

Population Ecology

Population densities of the little spurthroated grasshopper fluctuate in a habitat over time. In the northern mixedgrass prairie where this grasshopper is usually subdominant, it may persist at low adult densities of 0.1 to

0.5 per square yard for six or more years. During a favorable period for growth of grasshopper populations, it may increase with other species of an assemblage and reach densities of one adult per square yard. No study has been made of its rate of increase to outbreak numbers when it becomes the dominant species. The fecundity of this species is unknown. In a three year study on Montana mixedgrass prairie, mortality of nymphs has ranged from 3 to 11 percent per day and mortality of adults from 4 to 6 percent. These rates are similar to mortality rates of other species of *Melanoplus* at the study site.

Daily Activity

Because of low densities of the little spurthroated grasshopper in study sites during the last three years, only a small number of observations of daily activity are available. This grasshopper appears to spend the night either on the ground or on small shrubs. These conclusions are based on the location of adults in early morning before activity began. On the ground they sit horizontally on bare ground or in clumps of blue grama. On shrubs, such as silver sagebrush or broom snakeweed, they sit on a stem vertically, head up, and at heights of 5 to 10 inches.

Both nymphs and adults began to bask about one hour after sunrise by sitting horizontally on bare ground or on the crown of blue grama grass. At this time, temperatures of the soil surface and at 1 inch high were below 60°F. They turned one side perpendicular to the rays of the sun and often lowered the exposed hindleg to the ground. They frequently stirred and raised and lowered their flexed hindlegs during basking. Adults were observed basking till 10 a.m. when soil surface temperature was 80°F. and air temperature 1 inch above the ground was 68°F. Exactly when these grasshoppers start morning activities has not been determined.

Two fifth instar nymphs were observed in the afternoon sitting vertically head up, 2 inches high on the leaves of needleandthread grass when soil surface temperature was 115°F. This behavior was ostensibly to escape ground heat.

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