

Survey of Grasshoppers in South Dakota



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Introduction

In South Dakota, grasshoppers (Orthoptera: Acrididae) are a commonly observed insect during the summer. Grasshoppers have the potential to cause substantial economic losses to rangeland as well as crops. In their study, Hewitt and Onsager (1982) estimated that grasshoppers consume approximately 21-23% of rangeland in the western United States, which translated to approximately \$393 million lost each year. In 2025, that would amount to approximately \$1.3 billion based on inflation. It is estimated that approximately 50% of South Dakota's production acres, 24 million acres, are classified as rangeland (Jones and Johnson 2024). This indicates the importance of knowing which species of grasshoppers are present in South Dakota and what their population densities are within the state.

Grasshopper Abundance and Species Diversity

In the United States, there are 620 species of grasshoppers (Arnett 2000). Approximately 400 of those species are found in 17 states in the western US (Pfadt 1984, USDA-APHIS 2002). Although grasshoppers can be found in several ecosystems (e.g., prairies, mountain meadows, disturbed lands, rangelands and row crops) not every grasshopper species that is observed is necessarily a pest (Pfadt 1994a, Pfadt 2002). Approximately 20 grasshopper species of the 400 found in the western US are considered common or serious pests of rangelands and crops (USDA-APHIS 2002). The presence of more than one pest species in rangeland is likely to have a more

negative impact than a single species (USDA-APHIS 2002).

The last extensive survey of grasshopper species diversity and abundance in South Dakota was conducted by Hebard (1925). Fauske (2007) conducted a more recent survey of grasshoppers in the Northern Great Plains, with some sampling sites in South Dakota. A grasshopper field guide by McDaniel (1987) included grasshopper species present in South Dakota, but a large portion of its information originated from a guide produced for Colorado (Capinera and Sechrist 1982). Each year, USDA-APHIS conducts a survey of grasshopper populations in western South Dakota. These public records include population data for multiple sites in each county and are used primarily to forecast potential grasshopper outbreaks for the next growing season.

Grasshopper Pest Species

Grasshoppers that can cause economic damage to crop yields and rangeland are classified as pests in South Dakota (Pfadt 1994a). Although plague level outbreaks that were observed in the 1800s and 1900s rarely occur, grasshoppers can still cause significant economic damage in localized areas. An important step to prevent grasshopper outbreaks is to monitor populations that are present within the state (Smith 1954, Joern and Gaines 1990, Lockwood 1997, Joern 2000, Branson et al. 2006). In South Dakota, the USDA-APHIS historical records indicate that multiple species of grasshoppers can cause yield loss.

One of these, the Rocky Mountain locust, *Melanoplus spretus* Walsh, was a common pest before becoming extinct (Parker 1939). In 1937, the dominant pest species were the migratory grasshopper, *Melanoplus sanguinipes* Fabricius, and the redlegged grasshopper, *Melanoplus femurrubrum* DeGeer. By 1943 the dominant pest species were the two-striped grasshopper, *Melanoplus bivittatus* Say, the differential grasshopper, *Melanoplus differentialis* Thomas, the migratory grasshopper, the pasture grasshopper, *Melanoplus confusus* Scudder, and Packard's grasshopper, *Melanoplus packardii* Scudder (McDaniel 1987). This change in dominant grasshopper species was likely associated with changes in agricultural production. To effectively manage pest species, it is necessary to understand the abundance and species composition present in the state (Whipple et al. 2010).

Hebard (1925) observed a total of 103 species of grasshoppers in South Dakota. The most abundant species were the lesser migratory grasshopper, *Melanoplus mexicanus* Saussure, redlegged grasshopper, barren land grasshopper, *Trimerotropis pistrinaria* Saussure, Kiowa grasshopper, *Trachyrhachys kiowa* Thomas, slantfaced pasture grasshopper, *Orphulella speciosa* Scudder, largeheaded grasshopper, *Phoetaliotes nebrascensis* Thomas, keeler grasshopper, *Melanoplus keeleri luridus* Dodge, and Gladson grasshopper, *Melanoplus gladstoni* Scudder. The estimated total species present in South Dakota was reduced by McDaniel (1987) to 94 species. Fauske (2007) collected 99 species of grasshoppers in South Dakota but did not determine abundance for each species. Table 1 contains a list of the most common grasshopper pests in South Dakota (Pfadt 1994).

Table 1. Common Grasshopper Pest Species in South Dakota Based on Habitat

Common Name	Species Name	Rangeland	Crop	Both
Bigheaded Grasshopper	<i>Aulocara ellioti</i>	Major ^a	--	--
Bluelegged Grasshopper	<i>Metator pardalinus</i>	Minor ^b	--	--
Brownspotted Grasshopper	<i>Psoloessa delicatula</i>	Pest ^c	--	--
Bruner Grasshopper	<i>Bruneria brunnea</i>	Minor	--	--
Bruner Spurthroated Grasshopper	<i>Melanoplus bruneri</i>	Pest	--	--
Carolina Grasshopper	<i>Dissosteira carolina</i>	Minor	--	--
Clearwinged Grasshopper	<i>Camnula pellucida</i>	--	--	Major
Crenulatewinged Grasshopper	<i>Cordillacris crenulata</i>	Pest	--	--
Clubhorned Grasshopper	<i>Aeropedellus clavatus</i>	--	--	Pest
Dawson's Grasshopper	<i>Melanoplus dawsoni</i>	--	--	Pest
Differential Grasshopper	<i>Melanoplus differentialis</i>	--	Major	--
Dusky Grasshopper	<i>Encoptolophus costalis</i>	Minor	--	--
Ebony Grasshopper	<i>Boopedon nubilum</i>	Pest	--	--
Flabellate Grasshopper	<i>Melanoplus occidentalis</i>	Pest	--	--
Fourspotted Grasshopper	<i>Phlibostroma quadrimaculatum</i>	Pest	--	--
Keeler Grasshopper	<i>Melanoplus keeleri</i>	--	--	Minor
Kiowa Grasshopper	<i>Trachyrhachys kiowa</i>	Pest	--	--
Largeheaded Grasshopper	<i>Phoetaliotes nebrascensis</i>	Major	--	--
Little Spurthroated Grasshopper	<i>Melanoplus infantilis</i>	Pest	--	--
Marsh Meadow Grasshopper	<i>Chorthippus curtippennisi</i>	Pest	--	--
Migratory Grasshopper	<i>Melanoplus sanguinipes</i>	--	--	Major
Obscure Grasshopper	<i>Opeia obscura</i>	Minor	--	--
Redlegged Grasshopper	<i>Melanoplus femurrubrum</i>	--	Major	--
Redshanked Grasshopper	<i>Xanthippus corallipes</i>	Minor	--	--
Redwinged Grasshopper	<i>Arphia pseudonietana</i>	--	--	Minor
Sagebrush Grasshopper	<i>Melanoplus bowditchi</i>	Minor	--	--
Slantfaced Pasture Grasshopper	<i>Orphulella speciosa</i>	Major	--	--
Spottedwinged Grasshopper	<i>Cordillacris occipitalis</i>	Pest	--	--
Striped Grasshopper	<i>Amphiornus coloradus</i>	Pest	--	--
Two-striped Grasshopper	<i>Melanoplus bivittatus</i>	--	Major	--
Two-striped Slantfaced Grasshopper	<i>Mermiria bivittata</i>	Minor	--	--
Velvetstriped Grasshopper	<i>Eritettix simplex</i>	Minor	--	--
Whitecrossed Grasshopper	<i>Aulocara femoratum</i>	Pest	--	--
Whitewiskered Grasshopper	<i>Ageneotettix deorum</i>	Major	--	--

^aMajor: A pest species that causes significant injury/damage, frequently and tends to be the dominant species during an outbreak

^bMinor: A pest species that either adds to the injury/damage caused by dominant species or causes no serious losses when in low numbers

^cPest: A pest species that causes medium to significant injury/damage, infrequently

2017 and 2018 Survey

A two-year survey of grasshoppers in South Dakota determined that the most abundant pest species differed between Eastern and Western South Dakota. For Western South Dakota, the most abundant major pest species were redlegged grasshopper (Fig. 1 and 2), largeheaded grasshopper (Fig. 3 and 4), and slantfaced pasture grasshopper (Fig. 5) (Table 2). The most abundant minor pest species were velvet-striped grasshopper (Fig. 6 and 7) and obscure grasshopper (Fig. 8 and 9). For Eastern South Dakota,

the most abundant pest species were the redlegged grasshopper, largeheaded grasshopper, two-striped grasshopper (Fig. 10 and 11), differential grasshopper (Fig. 12 and 13), and marsh meadow grasshopper (Fig. 14) (Table 3). The total species observed for Eastern South Dakota was 36 and 39 for Western South Dakota. The species observed in this survey were likely lower than previous surveys because it was conducted exclusively around crop fields and in rangeland. However, the updated information provides insight into the most abundant grasshopper species.

Table 2. Species Diversity and Abundance for Western South Dakota in 2017-2018

Common Name	Scientific Name	Total Count	Population Percentage ¹
Velvet-striped Grasshopper	<i>Eritettix simplex</i> Scudder	1,202	27.28%
Redlegged Grasshopper	<i>Melanoplus femurrubrum</i> DeGeer	992	22.51%
Largeheaded Grasshopper	<i>Photalliotis nebrascensis</i> Thomas	757	17.18%
Slant-faced Pasture Grasshopper	<i>Orphulella speciose</i> Scudder	330	7.49%
Obscure Grasshopper	<i>Opeia obscura</i> Thomas	301	6.83%
Gladston's Spur-throated Grasshopper	<i>Melanoplus gladstoni</i> Scudder	108	2.45%
Two-striped Grasshopper	<i>Melanoplus bivittatus</i> Say	87	1.97%
Two-striped Slant-faced Grasshopper	<i>Mermiria bivittata</i> Serville	83	1.88%
Redwinged Grasshopper	<i>Arphia pseudonietana</i> Thomas	79	1.79%
Brownspotted Grasshopper	<i>Psoloessa delicatula</i> Scudder	67	1.52%
Whitewiskered Grasshopper	<i>Ageneotettix deorum</i> Scudder	64	1.45%
Keeler's Spurthroated Grasshopper	<i>Melanoplus keeleri</i> Thomas	46	1.04%
Dawson Grasshopper	<i>Melanoplus dawsoni</i> Scudder	45	1.02%
Cudweed Grasshopper	<i>Hypochlora alba</i> Dodge	44	1.00%
Migratory Grasshopper	<i>Melanoplus sanguinipes</i> Fabricius	42	0.95%
Marsh Meadow Grasshopper	<i>Chorthippus curtippennis</i> Harris	34	0.77%
Dusky Grasshopper	<i>Encoptolophus costalis</i> Scudder	24	0.54%
Kiowa Grasshopper	<i>Trachyrhachys kiowa</i> Thomas	19	0.43%
Differential Grasshopper	<i>Melanoplus differentialis</i> Thomas	16	0.36%
Carolina Grasshopper	<i>Dissosteira carolina</i> Linnaeus	9	0.20%
Spottedwinged Grasshopper	<i>Orphulella pelindna</i> Burmeister	8	0.18%
Pasture Grasshopper	<i>Melanoplus confusus</i> Scudder	7	0.16%
Packard's Grasshopper	<i>Melanoplus packardii</i> Scudder	6	0.14%
Clearwinged Grasshopper	<i>Camnula pellucida</i> Scudder	5	0.11%
Fourspotted Grasshopper	<i>Phlibostroma quadrimaculatum</i> Thomas	5	0.11%
Flabellate Grasshopper	<i>Melanoplus occidentalis</i> Thomas	4	0.09%
Plains Lubber Grasshopper	<i>Brachystola magna</i> Girard	3	0.07%
Snakeweed Grasshopper	<i>Hesperotettix viridis</i> Thomas	3	0.07%
Striped Grasshopper	<i>Amphiornus coloradus</i> Thomas	3	0.07%
Burner's Spurthroated Grasshopper	<i>Melanoplus bruneri</i> Scudder	2	0.05%
Narrowwinged Sand Grasshopper	<i>Melanoplus angustipennis</i> Dodge	2	0.05%
Russianthistle Grasshopper	<i>Aeoloplides turnbulli</i> Thomas	2	0.05%
Admirable Grasshopper	<i>Syrbula admirabilis</i> Uhler	1	0.02%
Clubhorned Grasshopper	<i>Aeropedellus clavatus</i> Thomas	1	0.02%
Kennicott Grasshopper	<i>Melanoplus kennicotti</i> Scudder	1	0.02%
Shortwinged Toothpick Grasshopper	<i>Pseudopomala brachyptera</i> Scudder	1	0.02%
Threebanded Grasshopper	<i>Hadrotettix trifasciatus</i> Say	1	0.02%
Western Green Grasshopper	<i>Hesperotettix speciosus</i> Scudder	1	0.02%
Wrinkled Grasshopper	<i>Hippiscus ocelote</i> Saussure	1	0.02%
Total		4406	--

¹Population Percentage calculated using total abundance for each species and total grasshoppers

Table 3. Species Diversity and Abundance for Eastern South Dakota in 2017-2018

Common Name	Scientific Name	Total Count	Population Percentage ¹
Redlegged Grasshopper	<i>Melanoplus femurrubrum</i> DeGeer	14,972	47.32%
Largeheaded Grasshopper	<i>Phoetaliotes nebrascensis</i> Thomas	6,905	21.82%
Two-striped Grasshopper	<i>Melanoplus bivittatus</i> Say	4,116	13.01%
Differential Grasshopper	<i>Melanoplus differentialis</i> Thomas	2,030	6.42%
Marsh Meadow Grasshopper	<i>Chorthippus curtippennis</i> Harris	1,728	5.46%
Migratory Grasshopper	<i>Melanoplus sanguinipes</i> Fabricius	415	1.31%
Slant-faced Pasture Grasshopper	<i>Orphulella speciosa</i> Scudder	298	0.94%
Lakin Grasshopper	<i>Melanoplus lakinus</i> Scudder	214	0.68%
Dusky Grasshopper	<i>Encoptolophus costalis</i> Scudder	206	0.65%
Keeler's Spur-throated Grasshopper	<i>Melanoplus keeleri</i> Thomas	107	0.34%
Obscure Grasshopper	<i>Opeia obscura</i> Thomas	100	0.32%
Shortwinged Green Grasshopper	<i>Dichromorpha viridis</i> Scudder	97	0.31%
Redwinged Grasshopper	<i>Arphia pseudonietana</i> Thomas	92	0.29%
Carolina Grasshopper	<i>Dissosteira carolina</i> Linnaeus	74	0.23%
Dawson's Grasshopper	<i>Melanoplus dawsoni</i> Scudder	55	0.17%
Packard's Grasshopper	<i>Melanoplus packardii</i> Scudder	43	0.14%
Shortwinged Toothpick Grasshopper	<i>Pseudopomala brachyptera</i> Scudder	43	0.14%
Spottedwinged Grasshopper	<i>Orphulella pelidna</i> Burmeister	25	0.08%
Gladston's Spur-throated Grasshopper	<i>Melanoplus gladstoni</i> Scudder	24	0.08%
Clubhorned Grasshopper	<i>Aeropedellus clavatus</i> Thomas	21	0.07%
Two-striped Slant-faced Grasshopper	<i>Mermiria bivittata</i> Serville	19	0.06%
Admirable Grasshopper	<i>Syrbula admirabilis</i> Uhler	13	0.04%
Cudweed Grasshopper	<i>Hypochlora alba</i> Dodge	7	0.02%
White-whiskered Grasshopper	<i>Ageneotettix deorum</i> Scudder	7	0.02%
Wrinkled Grasshopper	<i>Hippiscus ocelote</i> Saussure	7	0.02%
Flabellate Grasshopper	<i>Melanoplus occidentalis</i> Thomas	6	0.02%
Kiowa Grasshopper	<i>Trachyrhachys kiowa</i> Thomas	5	0.02%
Clearwinged Grasshopper	<i>Camnula pellucida</i> Scudder	3	0.01%
Sagebrush Grasshopper	<i>Melanoplus bowditchi</i> Scudder	3	0.01%
Fuzzy Olivegreen Grasshopper	<i>Campylacantha olivacea</i> Scudder	2	0.01%
Barren Land Grasshopper	<i>Trimerotropis pistrinaria</i> Saussure	1	0.00%
Brownspotted Grasshopper	<i>Psoloessa delicatula</i> Scudder	1	0.00%
Burner's Spurthroated Grasshopper	<i>Melanoplus bruneri</i> Scudder	1	0.00%
Mottled Sand Grasshopper	<i>Spharagemon collare</i> Scudder	1	0.00%
Ornate Pygmy Grasshopper	<i>Tetrix ornate</i> Say	1	0.00%
Specklewinged Grasshopper	<i>Arphia conspersa</i> Scudder	1	0.00%
Total		31643	--

¹Population Percentage calculated using total abundance for each species and total grasshoppers.



Figure 1. Redlegged grasshopper adult. Photo courtesy of Sangmi Lee, Grasshoppers of the Western U.S., USDA APHIS PPQ, Bugwood.org.

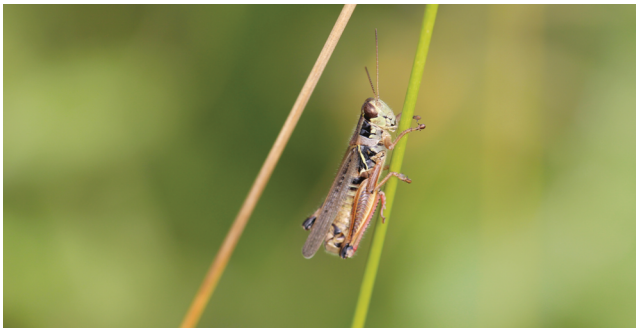


Figure 2. Redlegged grasshopper adult. Photo courtesy of Adam Varenhorst, South Dakota State University.



Figure 3. Largeheaded grasshopper adult. Photo courtesy of Sangmi Lee, Grasshoppers of the Western U.S., USDA APHIS PPQ, Bugwood.org.

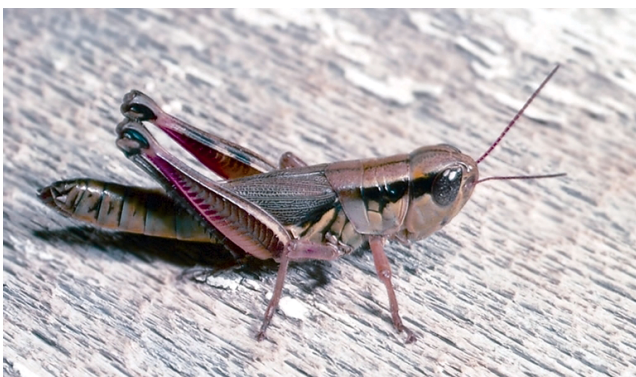


Figure 4. Largeheaded grasshopper adult. Photo courtesy of Kansas Department of Agriculture, Bugwood.org.



Figure 5. Slantfaced pasture grasshopper adult. Photo courtesy of Sangmi Lee, Grasshoppers of the Western U.S., USDA APHIS PPQ, Bugwood.org.



Figure 6. Velvetstriped grasshopper adult. Photo courtesy of Sangmi Lee, Grasshoppers of the Western U.S., USDA APHIS PPQ, Bugwood.org.



Figure 7. Velvetstriped grasshopper adult. Photo courtesy of Whitney Cranshaw, Colorado State University, Bugwood.org.



Figure 8. Obscure grasshopper adult. Photo courtesy of Sangmi Lee, Grasshoppers of the Western U.S., USDA APHIS PPQ, Bugwood.org.



Figure 9. Obscure grasshopper adult. Photo courtesy of Kansas Department of Agriculture, Bugwood.org.



Figure 10. Twostriped grasshopper adult. Photo courtesy of Sangmi Lee, Grasshoppers of the Western U.S., USDA APHIS PPQ, Bugwood.org.



Figure 11. Twostriped grasshopper adult. Photo courtesy of Whitney Cranshaw, Colorado State University, Bugwood.org.



Figure 12. Differential grasshopper adult. Photo courtesy of Sangmi Lee, Grasshoppers of the Western U.S., USDA APHIS PPQ, Bugwood.org.



Figure 13. Differential grasshopper adult. Photo courtesy of Adam Varenhorst, South Dakota State University.



Figure 14. Marsh meadow grasshopper adult. Photo courtesy of Sangmi Lee, Grasshoppers of the Western U.S., USDA APHIS PPQ, Bugwood.org.

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