

## Grasshoppers in Irrigated Agriculture in the Columbia Basin

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Grasshoppers represent a complex group of insects with hundreds of species found in North America alone. It is common to find several species overlapping generations over the course of the spring and summer months. The U.S. Department of Agriculture anticipates that based on early spring surveys, 2012 could be the worst grasshopper year since the mid-1980s. Idaho, Montana, Wyoming, Nebraska and the Dakotas are forecast to feel the impact of grasshoppers, also Oregon, Washington, Texas, Utah, Colorado and Nevada to a lesser degree.



**Common species in the Columbia Basin.** *Camnula pellucida* (clear-winged grasshopper) and *Anabrus* sp. (Mormon cricket) are the most abundant species. Other common species in Oregon include: *Aulocora elliotti*, *Oedaleonotus enigma* (valley grasshopper), *Melanopus sanguinipes* (Lesser or red migratory grasshopper), *Melanopus bivittatus* (two striped grasshopper) and *Melanopus packardii* (Packard's grasshopper). Northeastern Oregon and southeastern Washington have the ideal condition for grasshopper development: low precipitation, sandy soils, warm temperatures and abundant rangeland.

**Biology.** Grasshoppers belong to the Orthoptera group (straight wings) that comprises more than 22,500 species, with 1,015 species described from North America. Grasshoppers have antennae that are generally shorter than their body and short ovipositors. They also have mandibles that cut and tear off food. The back femora are typically long and strong which they use for leaping.



Generally they have two pair of wings, but back wings are membranous while front wings (a.k.a. tegmina) are rough and not really fit for flight. Females are normally larger than males, with short ovipositors; males have a single unpaired plate at the end of the abdomen and females have two pairs of valves in the shape of triangles at the end of the abdomen that they use to dig in sand when egg laying. There is one generation per year; the duration of the nymphal stage is 30-40 days; the duration of the adult life is 40-60 days. Typically, the eggs hatch in the

spring (May-June) and the nymphs and adults are active in summer. They overwinter as late-instar nymphs or adults. Grasshoppers are closely related to cockroaches, praying mantis, termites, earwigs, stick insects.

**Ecology.** In the Pacific Northwest, grasshoppers mainly eat grasses, alfalfa and cereal crops. Potato fields next to rangeland areas can be affected. The majority of grasshoppers are polyphagous (eat several kinds of plants). Many will eat from multiple host plants in one day, while some prefer to rely on the same host plant. On the positive side, as herbivores, grasshoppers contribute to nutrient turnover by returning nutrients as fertilizer for the plants or providing food for birds and other arthropods. On the negative side, several species of grasshoppers can occur in very large numbers causing serious crop damage and loss of plants in pastures. Eight grasshoppers per square yard are considered enough to cause economic damage.

**Management and control.** Robber flies and wind scorpions are relatively good predators of grasshoppers. Also flies from the family Bombyliidae and beetles from the Meloidae family (better known as blister beetles) can feed on grasshopper eggs and nymphs. There is at least one wasp of the family Scelionidae, *Scelio* spp. that parasitizes grasshopper eggs. Other fly species from the Tachinidae have been found to parasitize grasshopper eggs or nymphs. One aspect to consider is to remember that an outbreak of grasshoppers takes place on a landscape level. The best way to control them would be to approach them as a regional problem rather than as a localized problem. Aphis-PPQ has an important role in the grasshopper monitoring program. They conduct annual surveys in May-June (nymphal survey) to confirm predictions and localize outbreaks, and also in July and August (adult survey), to predict grasshopper populations the following year. Chemical options include the use of carabaryl, malathion, or dimilin. Chemical applications targeting the immature stages tend to be more successful.