

# Grasshopper applied research, extension publications

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## contribute to successful grasshopper control program

### Situation:

Grasshoppers are serious rangeland and crop pests in Wyoming and 16 other Western states. The fall 2009 adult grasshopper survey predicted a potentially serious outbreak in 2010. The total acreage infested with 15 or more grasshoppers per square yard (the action threshold) increased more than 10-fold compared to 2008 and reached almost 3 million acres. Efficient, economic, and environmentally friendly methods were necessary to combat the grasshoppers and then make these practices familiar and available to landowners and pest managers across Wyoming.

University of Wyoming Cooperative Extension Service entomologists developed and refined the Reduced Agent and Area Treatments (RAATs) method for rangeland grasshoppers. Funding for recent improvements of RAATs came from the Wyoming Department of Agriculture, USDA-CSREES, USDA-APHIS-PPQ, IR-4, and other federal and state sources. The most recent enhancements included newly available insecticides, recommendations for efficient ultra-low dose rates, kairomonal attractants, and space tracking, which allowed decreasing the program costs as well as the environmental impacts. We developed numerous extension educational materials on grasshopper biology and management. These materials were a part of the joint University of Wyoming, Wyoming Department of Agriculture, and USDA-APHIS-PPQ statewide public educational program in 2010.

The educational materials developed and published by UW extension entomologists included *Pest Grasshoppers of the West: Identification and Management* poster (Latchininsky & Schell, UW Cooperative Extension Service bulletin B-1171), *Mormon Cricket Biology and Management* poster (Latchininsky & Schell, UW CES bulletin B-1191), *Field Guide of Common Wyoming Grasshoppers* (Schell, Latchininsky, & Shambaugh, UW CES bulletin B-1161, 4th edition), *Grasshopper*

*Management Square Foot Job Aid* (Schell & Latchininsky, UW CES MP-123), *Aerial RAATs* and *ATV-RAATs* brochures (Latchininsky, UW CES MP-95). The Square Foot Job Aid and the RAATs brochures were published in 2010.

### Impacts:

As a part of the state-wide public education program, grasshopper materials were distributed free to landowners, pest managers, gardeners, and conservationists in all Wyoming counties. In the short-term, they provided accessible information to a wide range of clientele, from specialists to the general public. As predicted, the grasshopper outbreak in Wyoming was very serious in 2010 – the worst in about 25 years. To help save the state's agriculture, 5,903,616 acres were protected in Wyoming using the RAATs method developed and publicized by UW extension entomologists. About 4.7 million acres out of 5.9 million were treated by private landowners. Had ranchers used the traditional, blanket application of insecticides at conventional high rates, the cost, according to preliminary estimates, would have been \$3.70/acre – the entire program would have cost \$17.4 million. However, by using RAATs, the insecticide dose rate was only half of the maximum labeled one, and the chemical was applied to only 50 percent of the infested area. The RAATs treatments effectively reduced pest densities below the economic level, and the cost was \$8.7 million – a savings of \$8.7 million to Wyoming agriculture in 2010. This allowed Wyoming agriculturists to survive the unprecedented pest outbreak and maintain the viability of their operations. In the mid-term, the impact consists of providing ready-for-use tools for ranchers, farmers, pest managers, and gardeners for identifying pest grasshopper species and choosing appropriate control measures. Wyoming agriculturists learned about efficient and economic ways to control grasshopper outbreaks without doing environmental harm.

