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## **An overview of federal research on biological control of weeds in the Northern Plains area of the United States of America**

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This research is cooperative with Agriculture Canada, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service, U.S. Forest Service, Animal and Plant Health Inspection Service, several State Agricultural Experiment Stations and Departments of Agriculture, and other state/county/city entities. Major weed targets for “classical” biological control include leafy spurge, *Euphorbia esula*, spotted knapweed, *Centaurea maculata*, diffuse knapweed, *C. diffusa*, squarrose knapweed, *C. squarrosa*, Russian knapweed, *Acroptilon repens*, Canada thistle, *Cirsium arvense*, musk thistle, *Carduus nutans*, St. Johnswort, *Hypericum perforatum*, field bindweed, *Convolvulus arvensis*, and toadflax spp., *Linaria* spp.. Six USDA, ARS scientists (4 entomologists, 1 plant pathologist, and 1 weed scientist) conduct research against these target weeds at the Biological Control of Weeds Research Unit, Rangeland Weeds Laboratory, Bozeman, Montana, with satellite stations at Sidney, Montana and Albany, California. A variety of biological control agents have been released in the Northern Plains Area on the target weeds in cooperation with USDA, ARS Biological Control of Weeds Laboratory-Europe in Rome, Italy, and Agriculture Canada. Among projects generating progress toward suppression of target weeds are fleabeetles, *Aphthona* spp., against leafy spurge, root-boring moths, *Pterolonche inspersa* and *Agapeta zoegana*, against diffuse and spotted knapweeds, and a nematode, *Subanguina picridis*, against Russian knapweed. Additional insects as biological control agents are in the clearance process for employment against leafy spurge. A project has been initiated to investigate (for augmentation) those plant pathogens extant on rangeland weeds in the United States.

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