

6-1-2002

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Recommended Citation

Deneke, Darrell L. and Wrage, Leon J., "Biocontrol of Noxious Weeds in South Dakota" (2002). *Extension Extra*. Paper 329.
http://openprairie.sdstate.edu/extension_extra/329

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Extension Extra

ExEx 8133
Updated June 2002
Plant Science

COLLEGE OF AGRICULTURE & BIOLOGICAL SCIENCES / SOUTH DAKOTA STATE UNIVERSITY / USDA

Biocontrol of Noxious Weeds in South Dakota

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Biocontrol offers another tool for noxious weed control. There are potential economic benefits, as well as advantages where environmental situations or site restrictions limit or preclude other control options. Biocontrol approaches usually require at least 3 to 5 years for significant results. Ultimately, the greatest benefit will be realized if biocontrol is integrated with other control measures.

Development of biological control approaches continues. At least 57 insects have been identified as having potential use on 27 weeds in the Midwest and western states. These biological agents are being evaluated and introduced as information becomes available. There have been numerous releases of about 20 insect species in South Dakota over the past several years. Research to study the life cycle and define aspects of the bioagent and the weed is important. The SDSU Agricultural Experiment Station and the USDA Northern Grain Insect Laboratory have research initiated; the South Dakota Department of Agriculture and USDA-APHIS are involved with initial introductions and development of insectary sites for future distributions. County weed and pest boards as well as state and federal agencies who manage lands in South Dakota have made releases of several insects that have been evaluated and approved for release as biocontrol agents.

There currently are release sites on leafy spurge, musk thistle, biennial knapweed, St. Johnswort, purple loosestrife, and Canada thistle. Some sites are well established and others are in early phases of development.

Current activities showing potential in South Dakota include the following:

Musk thistle. *Rhinocyllus conicus*, a seed head weevil was initially released more than 20 years ago. It can be found statewide in musk thistle infestations. Seed production is substantially reduced. A rosette weevil, *Trichosirocalus horridus*, and a foliage feeder, *Cassida rubiginosa* have also shown potential.

Leafy spurge. Since 1988 several species of flea beetles have been introduced. Several counties have release sites. An insectary site of *Aphthona nigriscutis*, a root boring flea beetle is producing populations for redistribution. *A. nigriscutis* prefers dry sandy sites such as sandy knolls or hilltops. Additional sites for other *Aphthona* spp. Such as *A. cynarissiae*, *A. flava* as well as a stem borer, *Oberea erythrocephala* and a tip gall midge *Spurgia esulae* have been developed. Research to evaluate the effect of special bacteria in addition to insect agents is underway.

Canada thistle. Introduction of biocultural agents is in initial stages. The use of several potentially effective species is limited because there are a number of desirable plant species related to Canada thistle. There have been releases of *Ceutorhynchus litura* (stem mining weevil), *Urophora cardui* (stem and shoot gall fly), *Larinus planus* (seedhead weevil) and *Cassida rubiginosa* (defoliating beetle). The Canada thistle stem mining weevil is showing some real promise in several sites in South Dakota. The stem weevil has shown significant seed reduction in the Canada thistle as well as weakening the plants prior to going into the winter.

Purple loosestrife. *Galerucella californiensis* (leaf feeding beetle) has been introduced in wetland sites invaded by this weed. This insect has produced dramatic results in other areas. A root mining weevil, *Hylobius transversovittatus* has also been released.

Biennial knapweed. Several insects have been studied and released including *Terellia virens* (green clearwing fly-larval seed feeder), *Larinus minutus* (seed head weevil), *Sphenoptera jugoslavica* (root borer), and *Cyphocleonus achates* (root mining weevil).

St. Johnswort. *Chrysolina quadrigemina* (foliage feeding weevil) has shown promise and has been introduced to some western South Dakota counties.

Field bindweed. A plant mite *Aceria malherbae* and a leaf feeding notuid moth, *Tyta luctuosa* have been released and are being evaluated.

REDISTRIBUTION

After populations at insectory sites develop sufficiently, collection for redistribution procedures are established by the South Dakota Department of Agriculture. Currently *nigriscutis* is available for collection in South Dakota. Those interested in obtaining insects for release should contact the county weed and pest board in their county. Information concerning requirements for the release site and collection procedures is available.

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ExEx 8133- pdf by CES. August 1997; updated June 2002.