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## **Biological weed control**

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**(Editor's Note:** This is the 3rd Place winner of the High School Youth Forum presentations at the 1999 SRM Annual Meeting in Omaha, Nebraska, Feb. 1999.)

At the end of the 4th day I continued my usual nightly routine of coming in after dark, coughing and hacking.

I could barely walk, my back and shoulders ached so bad. I made it to my bed and crashed. I lay in bed unable to breathe and then it hit me, there's got to be a better way to control these noxious weeds.

If you have ever felt this way about controlling your weed problem you're not alone. However there is good news for those who seek it. Biological weed control is proving to be one of the most effective weed suppressants yet. And the good news is, you don't have to work hard to accomplish a lot. Today I want to tell you just a few of the benefits of using biological methods to control your weed infestations. But first let's take a look at how big of a problem noxious weeds really are.

The State of South Dakota only has 9 recognized noxious weeds, The 9 noxious weeds in order of economic loss are: Field bindweed, Canada thistle, Leafy spurge, Perennial sow thistle, Hoary cress, Russian knapweed, Spotted knapweed, Diffuse knapweed, and Purple loosestrife. Altogether these 9 plants cost farmers and ranchers in excess of 160 million dollars annually. You may ask how can 9 plants cause that much damage? But with four million South Dakota acres infested with these weeds it doesn't take much to add up all of the costs.

Nearly every state has some kind of regulation that noxious weeds be controlled. In South Dakota if you refuse to control an outbreak you will be subject to a \$100 fine and or 30 days in jail. But the worst part is that your operation may be put into quarantine. This allows the noxious weed outbreak to be controlled on site, but forces the producer to be shut down and not able to market their commodities. This would be a financial nightmare for anyone.

The most commonly used source of control has been chemicals, such as 2,4-D and glyphosphate. Millions of dollars have been put into research to develop these chemicals, and millions of dollars have been spent applying these chemicals. However these substances are very risky to apply and to keep around your operation. When applying chemicals, there is always a chance of killing a non-target plant. Sometimes your favorite shade tree is sacrificed to control a small plot of Canada thistle.

A recent study showed that the average cost to apply chemicals is \$72/acre. However one year will not control your stand of weeds. Field bindweed seeds are known to live in the soil for up to 50 years. It usually takes 5-10 years of diligent labor to control weeds and make sure they don't come back, and even then you have no certainty of the weed not returning. It is a very long-term and expensive fix once you have weeds established.

Among other problems with chemicals is that they accumulate in the soil. This causes problems down the road and limits you to what you can plant on that land. If chemicals seep into ground water it will contaminate livestock watering facilities and even worse, your own drinking water.

So with all of the problems and uncertainties of chemical use, I'm glad to see the use of biological control being implemented. This is a much safer, more efficient way to control a stand of weeds. The two weeds I will be concentrating on will be Canada thistle and leafy spurge because they are the most abundant in my county.

Canada thistle now infests 1,287,286 acres in South Dakota, and has caused a loss of over \$48 million. There are now 4 different insects available on the market to control Canada thistle. They include thistle stem gallfly, Canada thistle flower weevil, Canada thistle, stem mining weevil, and thistle defoliating beetle.

The thistle stem gallfly creates a gall in the stem of the plant causing a nutrient drain and usually inhibits growth above the gall. This also leads to less seed production. The Canada thistle flower weevil feeds on the seed head and stops seed production. The Canada thistle stem mining weevil creates multiple exits from the stem allowing other biological control agents inside the plant. And finally the thistle defoliating beetle feeds on the leaves of the plant causing water loss and plant trauma.

Leafy spurge has been targeted with many biological control agents. There are 7 products available for 1998. They include: 5 root boring beetles: Black dot spurge flea beetle, Amber spurge flea beetle, Brown dot spurge flea beetle, Brown-legged spurge flea beetle, and the Minute spurge flea beetle.

Root boring beetles lay eggs near the base of the plant and the larvae feed on secondary and primary roots. One type of root borer, *Aphthona flava*, reduced leafy spurge canopy cover from 57% of an area to less than 1% in 4 years. The red-headed spurge stem borer's larvae mine through the woody stem of the plant. And the spurge shoot-tip gall midge causes galls to form rendering seed production useless. Best results can be seen when more than one type of biological control is used. Also in areas that can be sprayed, biological control will help reduce the amount of chemicals needed to control the stand. In Idaho bio-control has reduced their use of chemicals by 60%.



Biological control is very helpful in areas where chemical use is not practical. Areas may be difficult to reach with equipment. The ecosystem may be very vulnerable in that area such as a stream running through a plum thicket. If chemicals were used the water

would be contaminated and the thicket would most likely be wiped out. Also biological control is very easy to apply. In most cases it requires opening a styrofoam container and watching the insects go to work. There are absolutely no hazardous warnings to bio-control. The insects are host specific and there is no chance of killing a non-target species.

There have been many success stories since biological control became popular in the 1940s battling St. Johnswort. In Montana at the National Bison Range biological control alone has reduced a 9,000 acre infested area of Musk thistle to less than 25 acres. The U.S. Department of Agriculture estimates that \$155.6 million dollars is saved each year due to biological control across America.

So the next time you find yourself knee deep in noxious weeds without a clue of how to start, call your local extension agent for more information on how to get started with biological weed control.