



With the help of flea beetles, North Dakota rancher Jeff Dahners has seen about an 80% reduction in leafy spurge.

SPURGE TAKES A BEATING FLEA BEETLES ARE A STRONG WEAPON IN THE ONGOING BATTLE AGAINST LEAFY SPURGE.

As far back as Jeff Dahners can remember, leafy spurge has thrived on his family's ranch near Carson, North Dakota. By the time Dahners took over management of the ranch back in 1990, the population of the noxious, yellow-flowered weed had grown dramatically.

"Our ranch is located in the Heart River Valley, and it's the kind of country that spurge is well adapted to," he says. "The spurge canopy had gotten so thick in some places that the cattle wouldn't even go into those areas to graze."

At about that same time, other states in the northern Great Plains were seeing similar explosions in the populations of leafy spurge, a plant introduced to North America around the early 1900s by Eurasian immigrants. From 1940 to the early 1980s, the estimated population of spurge jumped from a small acreage to nearly 1 million acres in North Dakota alone.

In the 1980s, federal and state agencies began importing and circulating to landowners the flea beetles known to be leafy spurge's natural predators. These keep the weed in check in its native habitats.

"We released 500 spurge beetles in each of two sites in the early 1990s," says Dahners. "It was a mixture of black and brown flea beetles, and it took two to three years for them to get established. We started using a chemical-control program, too. We were able to control the spurge well enough so that the cows started grazing again in those areas that had been heavily infested with spurge."

"In our experience, herbicide won't totally eliminate spurge and neither will beetles," he says. "But the beetles are one of the tools

we can use to control it. Our goal is not to eliminate leafy spurge but to achieve about an 80% reduction in the plant population."

TWO-PRONGED APPROACH

Use by North Dakota agencies and landowners of an integrated control program involving both chemical and beetles has contained the spread of spurge to a little more than 800,000 acres. Without these control efforts, the spurge might potentially have spread to over 4 million acres, according to the estimates of North Dakota State University (NDSU) plant scientist Rod Lym.

"We actually have less leafy spurge in the state than we did in the 1980s due to the use of both flea beetles and herbicides," says Lym. "The use of

flea beetles plus herbicide is better than either used alone."

Despite the relative success of control methods, spurge populations are dynamic. The weed often shows up unexpectedly, and aggressive new growth can appear in patches that were previously thinning.

The Dahners routinely monitor both spurge and beetle populations across the ranch. In late spring and early summer, they collect beetles from sites with well-established beetle communities and release the collected insects in spurge-infested areas where beetle populations are thinning.

"The beetles tend to be cyclical, and some years they're less prevalent than others," says Dahners.

To start new communities of insects or to strengthen existing populations, land-



Aphthona nigriscutis is one of only two biocontrol agents thought to be effective against leafy spurge.



The *Aphthona flava* can kill leafy spurge plants as a direct or indirect consequence of larval feeding on spurge roots.



The black beetle, *Aphthona lacertosa*, can handle a wider range of temperature and moisture conditions than other species.

owners can acquire flea beetles at collection sites on state or federal lands. The gathering of the beetles occurs during collection days organized by the county weed-control board serving the area.

The beetles can be collected in late spring or early summer after the adults emerge from the soil. After emergence, the beetles feed on the leaves of the spurge and can be collected by a gentle sweeping of the spurge plants with an insect net.

During the 45- to 60-day period of their adulthood, the flea beetles lay eggs on the soil surface or slightly below, near the stem base of leafy spurge plants. The larvae feed on the spurge roots until the soil temperature drops below 45°F. They overwinter in the soil and begin feeding again in spring after the soil temperature warms to 45°F.

“Although flea beetle adults do feed on leafy spurge foliage, the major damage to the plant occurs when the larvae feed on the roots,” says Lym. “Larvae feed on both the feeder roots used by the plant to absorb water and nutrients, as well as the storage tissue of the root crown.

“This feeding both destroys root tissue directly and causes the plant to be more susceptible to other methods of control, such as herbicides and infection from soilborne pathogens,” he says.

Research suggests that the sites best suited to the establishment of flea beetle communities are those with silt loam, silt clay loam, clay loam, and clay soils with an organic matter content of 6% to 9.5%.

Beetles are least productive in sandy loam soils with

an organic matter content of 1% to 3%.

“The release area needs to be well drained and not subject to frequent or prolonged flooding or standing water, which will kill the larvae,” says Lym.

Releasing the beetles on the margins of dense stands of spurge gives the population a better chance of establishing rather than releasing the insects in areas of thick spurge.

Management practices – such as livestock grazing or herbicide applications – that serve to thin the spurge population and reduce surface

thatch, help the beetle populations better establish.

Flea beetles tend to ebb and flow with the spurge population.

“Our long-term research shows that when the leafy spurge decreases, the beetle numbers go down because their food source has decreased,” says Lym. “Some beetles remain, and their population builds back if the leafy spurge increases.” **SF**

LEARN MORE

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TRAITS VARY

There are several species of flea beetles that feed on leafy spurge. North Dakota State University (NDSU) research suggests the black beetle, *Aphthona lacertosa*, tolerates a wider range of temperatures and moisture conditions than other species.

The brown beetle, *Aphthona nigriscutis*, has done better on higher, drier sites with low to moderate stands of leafy spurge.

“Releasing a mixture of both species in the same location is the best way to determine which species of flea beetle is best suited to a particular area,” says NDSU plant scientist Rod Lym.

Check with your county weed-control board about the local or regional availability of the beetles. Flea beetles can also be purchased from private companies. **SF**