



# Socking it to Spurge

Angus ranchers pioneer spurge control.

by Ed Haag

**W**hen Tom Elliott, Montana Angus breeder and recently retired operating partner of the 45,000-acre N-Bar Land & Cattle Co., Livingston, Mont., first considered using sheep and insects to control leafy spurge in 1984 on the N-Bar, he had no idea it would develop into a statewide, federally funded program involving 892 different landowners and 70,000 acres of weed-infested rangeland in his state.

“All we wanted was to get a handle on the spurge before it took over the ranch,” he recalls. “All conventional control methods had failed.”

Elliott was spending more than \$20,000 a year on herbicides and related control costs trying to stop the infestations from spreading. In spite of these efforts, in less than one decade the areas infested with spurge had doubled. “It reached the point where it was very expensive,” he recalls. “And, it seemed like all the money was going to someone outside of the ranch.”

Spurge isn't a new problem in the West. The invasive perennial from Eurasia is believed to have arrived in the western states with the railroad at the turn of the 19th century and has been moving into rangeland ever since.

To understand Elliott's frustration, one has only to look at spurge's highly effective survival mechanisms. Besides spreading by seed, roots and rhizomes, the plant has

evolved a unique defense system consisting of root nodules that separate from the main plant if toxins are detected. When a plant is treated with herbicide, it might die, but nodules will generate an entirely new plant the next year. Once established, a stand of spurge is nearly impossible to eradicate.

Historically, cattle ranchers are

particularly vulnerable to the economic effect of spurge. When the plant's tissue is damaged, it emits a milky sap that irritates the skin and makes the plant unpalatable to cattle. Once a site reaches the 50% infestation level, cattle refuse to graze at all, making the land worthless to the rancher.

With such a formidable presence in western grasslands, it is not surprising that the economic effect of leafy spurge is staggering. Infestations in the Dakotas, Montana and Wyoming alone are estimated to cost agricultural producers and taxpayers \$144 million a year in production losses, control expenses and other effects on the economy. It is estimated that spurge has affected 2.7 million acres in North America.

### Time for something different

Elliott found little solace in knowing he wasn't the only rancher in Montana who was economically affected by spurge, nor did he take comfort in the fact that the N-Bar's previous owners — Elliott's family purchased the ranch in 1964 — had been unsuccessfully battling the weed for more than a half a century. The bottom line was that by 1985, almost 10% of his ranch was heavily infested with spurge.

“It has been around the country a lot of years and that is part of our problem,” he says of the affected acres on the N-Bar. “It's a Class 3-type infestation — one that has a



PHOTO BY ED HAAG

► Tom Elliott, recently retired operating partner of the 45,000-acre N-Bar Land & Cattle Co., has successfully rotated sheep and cattle twice a season on land that was once considered useless for beef production.

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mature root structure and has been in place for a long time.”

North Dakota State University studies show that while areas that are moderately infested with spurge do have reduced grass production, the real problem lies with the well-established infestations that discourage cattle from even entering the area.

### From adversary to ally

While Elliott was looking for answers, Pete Fay, livestock researcher at Montana State University (MSU), was conducting a unique feeding experiment. For years, spurge had been considered toxic to sheep. Unconvinced that the weed actually harmed livestock, Fay was out to determine whether or not the premise was valid.

“Fay had set out to kill sheep,” Elliott recalls. “Instead, he got weight gain.”

The experiment’s unexpected results offered Elliott new hope in his ongoing battle with spurge. Fay discovered that, after a period of adjustment, the sheep not only ate the weed, they actually preferred it to domestic forage. If sheep could be successfully pastured on Elliott’s infested acreage, then it might offer his local grasses the competitive edge to reestablish themselves.

After discussing his theory with Fay, Elliott decided to enlist an unlikely ally. He approached the Lehfeltdts, a sheep-producing family in his area.

“John Lehfeltdt decided to take the risk and brought one band (800 head) of sheep out to the ranch in 1985,” Elliott says. “They

herded them on spurge that summer, and the lambs did better than the lambs they had on conventional pasture.”

By 1990, approximately 3,000 of the Lehfeltdts’ sheep were being pastured on the N-Bar’s spurge-infested acreage. Initially, the older, more established infestations were grazed in a circular pattern so disbursement allowed for each area to be grazed for several weeks, twice a year.

This system reduced the spurge plant density to the point cattle actually entered the infested areas and grazed on the grasses. In this way, Elliott has successfully rotated sheep and cattle twice a season on land that was once considered useless for beef production.

For Elliott, the long-term prognosis for the two-specie grazing system is bright. Since incorporating sheep into his operation, he has witnessed a definite density reduction of many of his spurge stands. Infestations that originally grazed sheep for several weeks will now only support animals for a fraction of that time. At Elliott’s retirement in 2002, the N-Bar ranch was grazing about 4,000 ewe and lamb pairs, and the number of gallons (gal.) of herbicide it used for leafy spurge control had dropped from 500 gal. a year in the early 1980s to 10 gal. after 2000.



PHOTO COURTESY ARS

► *Aphthona flava* flea beetle feeding on leafy spurge.

### Insects into the mix

While Elliott was fine-tuning his sheep rotations in the 1980s and 1990s, he was also working with MSU entomologists in a program to introduce European and Asian insects that feed on spurge in their native habitat. Flea beetles (*Aphthona nigricutis*, *Aphthona flava* and *Aphthona lacertosa*) were released in spurge-infested areas and proved extremely effective, especially when used in conjunction with sheep grazing.

The host-specific flea beetles consumed spurge roots in their larval stage

and consumed the leaves as adults. Sheep grazed the spurge as well, weakening the plants, opening up the canopy and reducing seed production.

Two separate studies conducted in North Dakota and Alberta, Canada, support Elliott’s view that introduced flea beetles can have a major effect on spurge. One test site saw the reduction of leafy spurge foliar cover from 40% to 1.7% five years after the introduction of the beetle, while another site recorded a decrease from 45% to 7% in three years. During that same three years, stem densities in the second spurge site were reduced nearly 40-fold.

### Word gets around

When Elliott was initiating his first spurge control measures, Wayne Pearson, Stillwater County weed supervisor, was seeing similar results from a sheep-on-spurge pilot grazing program. By 1997 Pearson had more than 28,000 spurge-infested acres enrolled in the county’s sheep grazing program.

One of the early converts to using sheep to control spurge was Lantana Angus, operated by Ken and Venessa Monson of Absarokee, Mont. The Monsons have incorporated sheep grazing into their pasture system for 20 years. They have found the practice is especially effective during drought years, when the spurge outcompetes the grasses for limited moisture. “Bringing in the sheep takes away the spurge’s competitive edge,” Venessa says. “It gives the grasses a chance to recover.”

She cites as an example one particular pasture that has been successfully rehabilitated. “The cattle are usually brought



PHOTO COURTESY MSU NEWS SERVICES

► Seventeen projects of the Montana Sheep Institute are under way at areas across the state, including this ranch outside Missoula, where nearly 2,000 ewes and lambs are making short work of a leafy spurge infestation.

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in June 1 and rotated out July 8,” Venessa says. “Right behind them is a band of sheep to graze off the spurge.”

Insects are also playing their part in helping transition unusable spurge infestations back into productive pasture. Ken has observed that while sheep make a salad of the spurge above ground, flea beetle larvae are attacking its network of roots below the surface.

This subterranean assault on spurge is particularly important to its long-term

control. With vertical roots growing to a depth of 26 feet (ft.) and horizontal roots (rhizomes) spreading 15 ft. per year, once the plant is established, the reserves stored in its vast root system can sustain life in the plant for several years. Take away its underground reserves, and the plant becomes vulnerable. “I have seen these bugs move into an established patch of spurge and three or four years later it is hard to find a single plant,” Ken says.

Initially the Monsons maintained their

own band of sheep for spurge control, but now they have turned those duties over to independent contractors. Unlike cows and calves, ewes and lambs are easy targets for a wide range of predators, from foxes to cougars, bears and wolves.

“A lot of people in our area got tired of fighting the predator problem and disbursed out of sheep,” Venessa says. “Every year it is harder to find sheep to graze our spurge.”

### **Low prices threaten sheep**

Predators aren't the only reason it is getting more difficult for ranchers like the Monsons to find sheep to graze their spurge. Since 1980, the number of sheep raised in the United States has dropped from 12 million to 6 million. Montana's industry is no exception, with foreign competition, low prices and increased labor costs reducing the state's sheep and lamb population to less than 300,000 as of January 2004.

In response to this issue, rangeland scientists like MSU's Rodney Kott, Extension sheep specialist, have actively encouraged support of an ailing sheep industry by beef producers. “Ranchers are now paying \$1 to \$3 per head for sheep to graze on their spurge land,” Kott says, adding that it is still a bargain when compared with the going rate of \$15 per acre for treating an infestation with herbicide. “With less spurge on our rangeland and more profit to the sheep producers, everyone benefits.”

### **Gold standard for spurge control**

In 2002, MSU received a \$400,000 U.S. Department of Agriculture (USDA) grant to fund a statewide Sheep Institute. Currently under the direction of Kott, the Institute is studying the effects of sheep rotation on spurge- and spotted knapweed-infested pastureland. The program affects 892 different landowners and 70,000 acres of weed-infested rangeland in Montana. Approximately 16,000 ewes and lambs from 26 Montana sheep producers' flocks participate in Institute projects.

Some of the best news to emerge from the Sheep Institute's studies relates to rehabilitating land so infested by spurge that it could no longer be used for cattle grazing. Data from 31 extensively monitored plot sites clearly reveal a turnaround.

“We can take land that is out of production because of spurge and return it to at least 75% of its original production value in three to five years,” Kott says. “One sheep can usually clear up 1 acre of spurge per month.”

