

# LEAFY SPURGE

*Stop the Spread and Gain New Ground*



Listed as a regulated noxious weed in 22 states, leafy spurge has emerged as one of the most aggressive and damaging weeds in the northern Great Plains and beyond. According to the U.S. Department of Agriculture, this noxious weed infests five million acres of land in 35 states, costing agricultural producers and taxpayers hundreds of millions of dollars from production losses, control expenses and other impacts on the economy.<sup>1</sup>

A deep-rooted perennial weed, leafy spurge poses a significant environmental hazard because of its ability to choke out desirable forbs and vegetation, destroy grazing land, reduce rangeland productivity and degrade wildlife habitat. In fact, according to a survey by the Agriculture Research Service of the U.S. Department of Agriculture, 82 percent of ranchers identified leafy spurge as their most important problem.<sup>2</sup>

## Getting to Know Spurge

Known to botanists as *Euphorbia esula* L., leafy spurge is characterized by upright, thickly clustered stems supporting small, yellowish-green flowers enclosed in yellow bracts. The plant's leaves are small, oval to

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lance-shaped and slightly wavy along the margins. The bracts appear from early to late May, and the flowers emerge in mid-June. One of the most distinguishing elements of leafy spurge is the milky, white sap that is contained throughout all parts of the plant.

Leafy spurge is native to Eurasia and was transported to the U.S. as a seed impurity in the early 1800s. It is tolerant of a wide range of habitats, from damp to very dry soils, but is most aggressive in dry conditions. One reason for spurge's success in establishing itself throughout a large sector of the U.S. is the lack of natural enemies that suppress its populations in European ecosystems.

Leafy spurge reproduction occurs through both rootstalks and large quantities of seeds. Seed capsules open explosively, projecting seeds as far as 15 feet. These seeds can remain viable in the soil for up to eight years and may be carried further by water, wildlife, vehicle tires or humans. In addition, the plant's extensive and deep (15 feet or more) root system contains a large nutrient reserve, allowing it to withstand various types of damage — such as burning, grazing and mowing — and still regenerate.

## Gauging the Impact

One of the most destructive characteristics of leafy spurge is its ability to quickly overrun open fields and rangeland. The plant displaces all other vegetation by shading and taking available water and nutrients from native species. Leafy spurge is extremely aggressive and, if left untreated, will out-compete native plants and eventually dominate vegetation.

<sup>1</sup> USDA, NRCS. 2002. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874 USA.

<sup>2</sup> Randall S. Sell, Dean A. Bangsund, and F. Larry Leistritz, Research Scientist, Research Scientist, and Professor, Department of Agricultural Economics, "Perceptions of leafy spurge by ranch operators and local decision makers: an update." North Dakota State University, Fargo, ND 58105-5636, 1998.

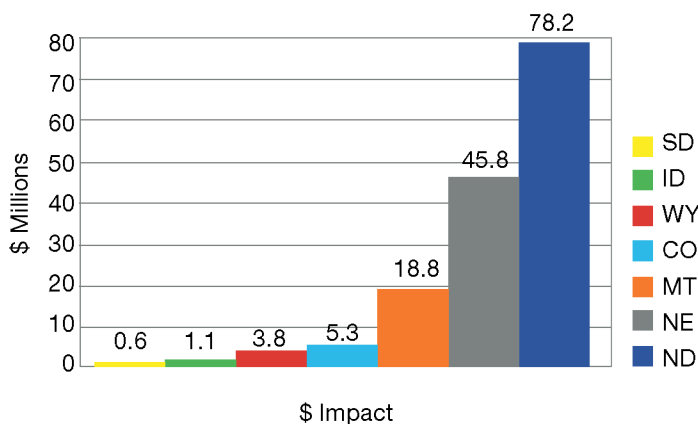


Leafy spurge is present throughout the U.S. except in the Southeast. The most widespread and heaviest infestations are in the northern and central Great Plains, with the most extensive coverage in Montana, North Dakota, Nebraska, South Dakota and Wyoming. According to a report from Team Leafy Spurge, a USDA/Agriculture Research Service program, leafy spurge has doubled its acreage every 10 years since the early 1900s.

While leafy spurge is primarily a problem on rangelands, it is capable of invading open forests and woodlands and displacing understory vegetation. By dominating and displacing diverse native vegetation with a vast monoculture of leafy spurge, the plant robs wildlife of their habitat and food sources. In states with extremely high infestation rates, millions of dollars are lost annually due to diminished wildlife habitat and wildlife-associated recreational activities.

Leafy spurge is also invading grazing lands, and can reduce livestock carrying capacity by as much as 50 to 75 percent. Cattle and horses won't graze in heavily infested areas because the milky sap produced by the plant is a digestive irritant and causes lesions around their eyes and mouth. From a management standpoint, a range with 80 percent leafy spurge cover reduces the carrying capacity of the land to zero.<sup>3</sup> Consequently, landowners can suffer significant agricultural and economic losses as their livestock is threatened and their land value is drastically reduced (see chart below). In the four-state region of Montana, North Dakota, South Dakota and Wyoming, where the leafy spurge infestation is estimated to be 2.6 million acres, the annual economic impact is estimated at \$186 million.

### Loss to Cattle Industry & Ranchers



(Data from 2001 Section 18 Submissions)

### Damage Control

Twenty-two U.S. states list leafy spurge as a regulated noxious weed, meaning that landowners are required to control the species. However, identifying a way to control leafy spurge has been especially challenging, because the plant has the ability to recover due to its deep

root system. As a result, a number of solutions have been explored including mechanical, biological and chemical.

Mechanical control methods, such as mowing, hand-pulling and tilling, are typically not successful because the entire root system must be excavated. Mechanical methods may actually increase the number of plants if any plant remnants remain in the soil. Biological controls have shown limited promise. The introduction of insects such as flea beetles (*Apthona* spp.) has resulted in up to 80 percent control in some areas, reducing the economic impact. Grazing animals such as sheep or goats (which can tolerate the plant) can help contain leafy spurge so that it doesn't spread as rapidly.

There is now a new standard available for leafy spurge control. **Plateau**<sup>®</sup> herbicide, developed by BASF, is the first product to provide successful long-term control of this noxious weed. While other herbicides only control the above-ground portion of the weed through spring applications, **Plateau** uses a fall-applied solution that moves deep into the roots as the plant is storing nutrients for winter.

Because **Plateau** translocates to both the roots and shoots, it provides long-term control to prevent resprouting of auxiliary buds from the roots. Soil residual of **Plateau** stops germinating seedlings the following spring. According to a study conducted by BASF and university specialists from Colorado, Utah, Idaho, South Dakota and North Dakota, fall-applied **Plateau** provided 95 percent leafy spurge control 12 months after treatment, compared to just 56 percent control from picloram plus 2,4-D. With this high level of control, landowners can escape the costly annual treatment cycles common with other herbicides and achieve effective long-term control.

Application of **Plateau** should take place in the fall after good soil moisture is present, but prior to the leafy spurge losing its milky sap. The herbicide can be applied by ground, aerially or as a spot treatment, as long as it's done uniformly and without overlaps. The recommended rate is 8 to 12 ounces per acre and the addition of a methylated seed oil (MSO) adjuvant at one quart per acre is recommended. The MSO is necessary to aid in herbicide penetration through the waxy cuticle of the leaf and stem. **Plateau** is rainfast one hour after application.

**Plateau** is the only product that can selectively control leafy spurge in areas with desirable broadleaf species. It effectively controls annual weeds, while releasing desirable perennial grasses and many tree, brush, wildflower and legume species. **Plateau** is a nonrestricted-use pesticide, which means landowners do not have to obtain a state-issued pesticide license to purchase or apply this product. With restricted-use pesticides, such as picloram, ranchers and landowners would need to hire someone to purchase and apply the product, or they would have to incur the additional time and expense necessary to complete the certification test and obtain a license.

<sup>3</sup> Westbrooks, R. "Invasive plants, changing the landscape of America: Fact book." Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW), Washington, D.C. 109 pp, 1998.

**Plateau** also is not volatile and has no grazing restrictions. In addition, **Plateau** has been found to be an effective component in integrated weed management programs that utilize biological controls.

## Gain New Ground

Although leafy spurge continues to aggressively attack the environment by infesting millions of acres of land and displacing native habitat, the development of innovative solutions, such as **Plateau**, is finally enabling landowners and wildlife managers to take firm control of the problem. The result is the ability to reclaim precious acres – saving ecosystems, wildlife and livelihoods.

## Efficacy Results for Plateau® Herbicide Control of Leafy Spurge in Pasture/Rangeland

Dr. Robert Masters, former USDA-ARS rangeland scientist, Lincoln, Neb., conducted leafy spurge control trials with **Plateau** beginning in 1994. He published an article with his results in *Weed Technology, 1998, Volume 12:602-609*. The following tables show the leafy spurge control results in Nebraska from Dr. Masters' trials.

### Summary Results

#### Location: Midwest and West

APPLICATION TIMING	RATING DATES:	
		1 year after treatment % leafy spurge control
<b>Plateau</b> 8 oz/A	Fall	90%
<b>Plateau</b> 12 oz/A	Fall	95%
Picloram 1 qt/A + 2,4-D 1 qt/A	Fall	56%

*Results averaged over 7 trials*

## Results of Individual Research Trials

**Single-Year Application.** After a single application of 8 oz or 12 oz of **Plateau**, leafy spurge control was greater than the control achieved by picloram at 1 qt/A plus 2,4-D at 1 qt/A. The following year after application, leafy spurge control was greater than 80% for both the 8 oz and the 12 oz rates of **Plateau** at all locations. At this same rating date, control had dropped below 60% at four locations, necessitating re-treatment under actual production conditions.

### Single-Year Application

#### Location: Ansley, NE

APPLICATION TIMING	RATING DATES:		
	June 1998	September 1998	
% leafy spurge control			
<b>Plateau</b> 8 oz/A	Fall 1997	83%	97%
<b>Plateau</b> 12 oz/A	Fall 1997	82%	98%
Picloram 1 qt/A + 2,4-D 1 qt/A	Spring 1998	---	60%

#### Location: Tilden, NE

APPLICATION TIMING	RATING DATES:			
	June 1995	July 1995	August 1995	
% leafy spurge control				
<b>Plateau</b> 8 oz/A	Fall 1994	100%	97%	82%
<b>Plateau</b> 12 oz/A	Fall 1994	100%	100%	88%
Picloram 1 qt/A + 2,4-D 1 qt/A	Fall 1994	70%	10%	3%

**Multiple-Year Applications.** Due to the hardiness, depth and mass of leafy spurge reproductive rhizome structures, multiple herbicide applications are often needed for complete control. Dr. Masters conducted multi-year treatment studies, simulating typical control programs.

At five of the seven locations, **Plateau** at both 8 oz and 12 oz/A provided greater control than the treatment of picloram 1 qt/A plus 2,4-D 1 qt/A. At the remaining two locations, Clearwater and Springview, Neb., leafy spurge control with **Plateau** was still greater than 80% one year after treatment.

Applications made at the Tilden, Neb. sites in the fall of 1995 and 1996 (see table below) demonstrate the residual control of leafy spurge from **Plateau** through the fall of 1998, while picloram plus 2,4-D failed to provide adequate residual control.

### Multiple-Year Applications

#### Location: Tilden, NE

APPLICATION TIMING	RATING DATES:		
	June 1998	September 1998	October 1999
% leafy spurge control			
<b>Plateau</b> 8 oz/A			
Fall 1995 + Fall 1996	93%	98%	89%
<b>Plateau</b> 12 oz/A			
Fall 1995 + Fall 1996	98%	100%	98%
Picloram 1 qt/A + 2,4-D 1 qt/A			
Fall 1995 + Fall 1996	50%	59%	41%

#### Location: Tilden, NE

APPLICATION TIMING	RATING DATES:	
	June 1998	September 1998
% leafy spurge control		
<b>Plateau</b> 8 oz/A		
Fall 1995 + Fall 1996	88%	93%
<b>Plateau</b> 12 oz/A		
Fall 1995 + Fall 1996	98%	98%
Picloram 1 qt/A + 2,4-D 1 qt/A		
Fall 1995 + Fall 1996	25%	23%

## Additional Data from Surrounding States

Additional studies have been conducted in low-rainfall areas and under a variety of weather conditions. Research was conducted by BASF agriculturists and university cooperators in Colorado, Utah, Idaho, South Dakota and North Dakota.

At one year after treatment, 8 oz and 12 oz/A of **Plateau**® herbicide controlled leafy spurge 90% or greater. Only two trials included picloram or picloram plus 2,4-D. At Laporte, Colo., two applications of picloram were required to give control equal to one application of **Plateau**. At Burke, S.D., picloram + 2,4-D gave 80% control, while **Plateau** provided 98% control of leafy spurge.

## Additional Data from Surrounding States

**Location: Laporte, CO**

**105163**

**APPLICATION TIMING**

**RATING DATES:**

		Fall 1998 % leafy spurge control	Fall 1998 % crested wheatgrass injury
<b>Plateau</b> 8 oz/A	Fall 1997	93%	0%
<b>Plateau</b> 12 oz/A	Fall 1997	98%	0%
Picloram 1 qt/A + 2,4-D 1 qt/A	Fall 1997 + Spring 1998	100%	68%

**Location: Burke, SD**

**APPLICATION TIMING**

**105032**

**RATING DATES:**

		Fall 1998 % leafy spurge control
<b>Plateau</b> 8 oz/A	Fall 1997	98%
<b>Plateau</b> 12 oz/A	Fall 1997	98%
Picloram 1.5 pts/A + 2,4-D 1 qt/A	Fall 1997	80%

## Application Rate and Timing

For control of leafy spurge, apply **Plateau** in the fall at 8 to 12 ounces per acre, plus one quart MSO per acre.

**Plateau** should be applied after good soil moisture is present but prior to the leafy spurge losing its milky sap. Applications can typically start around mid-August.

**Plateau** is nonvolatile and a nonrestricted-use herbicide. There are no grazing restrictions.

**Plateau** is the recommended herbicide for the most effective weed and grass management program. For specific recommendations, call your local distributor or visit [www.vmanswers.com](http://www.vmanswers.com) for more information.

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For more information, please call  
**1.800.545.9525.**

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