Reprinted with permission from: 1988 Proceedings of Leafy Spurge Annual Meeting. Rapid City, SD. July 13-14, 1988. pp. 23-26.

Published by GPC-14: Leafy Spurge Control in the Great Plains.

Noxious weed control in South Dakota

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Leafy spurge is one of six weeds designated as noxious statewide in South Dakota. Control programs include emphasis on each weed in areas or local situations where the weed is a problem. Leafy spurge ranks third in acreage following field bindweed and Canada thistle (Table 1).

Legislation established the noxious weed program in the early 1940's. Soon after enacting enabling legislation, funding soon followed to provide the first operational monies designated for noxious weed control and enforcement. The program includes coordinated enforcement, education, and organizational efforts. It is based on county financial support and is based on program development at the county level. Statewide policy is determined by the South Dakota Weed and Pest Control Commission. This provides statewide representation from agencies and producers.

Table 1. Noxious Weed Acres.

Field bindweed	1,767,000
Canada thistle	350,000
Leafy spurge	150,000
Perennial sow thistle	30,000
Hoary cress	9,000
Russian knapweed	4,000

Over 90% of the leafy spurge infestation is located in the eastern one half of South Dakota. The acreage of leafy spurge has shown a gradual but continual increase during the past 25 years. The increase in acres infested or mapped has been approximately 5000 acres each year. (Table 2).

Effectiveness of control programs initiated during the past years varies based on the site. Control has prevented spread, reduced the stand, and eliminated some infestations in certain situations; however, the acreage continues to expand in other sites where there is less commitment to control.

Table 2. Leafy Spurge Acres.

1986	1,500,000
1976	99,000
1966	54,000
1960	32,000

Rights-of-way, grass pasture/range

These areas receive the most attention and control efforts. Infestations are highly visible. Public demands for control are high. Herbicide programs have been most effective in these situations. Local governmental units have reduced control costs at least 90% where efforts have been continued for 5 to 7 years. This also includes an intensive herbicide program in pasture and rights-of-way to prevent seeding and to reduce the stand. Herbicide effectiveness is demonstrated from data presented in Table 3.

Pasture or range areas with environmental limitations or other restrictions that reduce the herbicide program remain a problem.

Table 3. Percent leafy spurge data control - annual treatments. 1978-82.

	lb/A act.		1979	1981	1983
Picloram*	(2)	Sp	86	94	88
Picloram+2,4-D	(.25+1)	Sp	55	78	94
Dicamba	(.5)	Sp&F	37	30	59
2,4-D ester	(1.5)	Sp	39	42	75
2,4-D ester	(1.5)	Sp&F	62	75	93
2,4-D ester	(3)	Sp	50	67	82

* 1978 only; 2,4-D 1979-82.

Cropland

Integrated approaches utilizing crop rotation, cultivation, and selective herbicides are one of the most practical control programs for leafy spurge. Crop rotations were evaluated at the South Dakota Agricultural Experiment Station. The level of competition is reduced as the result of adapting best practices.

These practices remain an option to individuals who have not yet initiated control programs in cropland. Continued educational efforts are needed to improve control in cropland. Examples of stand reduction with one-year and three-year rotations are presented in Tables 4 and 5.

Table 4. Leafy spurge - 1 year.

	% Control
Cult, alfalfa or brome	82
Oats, 1/3 lb 2,4-D, cult	68
Cult, sudan	79
Cult, sudan, rye	90
Oats, cult	19

SDSU F. S. 419

Table 5. The average percentage of leafy spurge killed in 3 years.

First year		Second year		Third year	
Treatment*	% kill	Treatment*	% kill	Treatment*	% kill
Cult-alfalfa	82	Alfalfa	81	Alfalfa	82
Cult-brome	82	Brome 1 lb & 1 lb	95	Brome 1 lb & lb	98
Cult-brome	82	Brome 1 lb & 1 lb	95	Wheat 1/2 lb & 1 lb	96
Oats-brome-1/3 lb.	-62	Brome 1 lb & 1 lb	24	Wheat 1/2 lb & cult	31
Oats 1/3 lb, cult	68	Cult-sudan	91	Wheat 1/2 lb & cult	94
Cult-sudan	79	Oats 1/3 lb, cult	96	Wheat 1/2 lb & cult	98
Cult-sudan-rye	90	Rye 1/2 lb, cult	94	Wheat 1/2 lb & cult	89

*"Lb." refers to pounds of 2,4-D ester applied per acre and "cult" to intensive cultivation.

Noncrop areas

The acreage in noncrop areas is relatively limited compared with other sites. However, the weed presents a serious problem where it exists. Infestation from these sites often include environmental or plant limitations. These sites often form a seed nursery to reinfest adjacent areas. Several herbicide treatments are available for noncrop areas with special limitations (Table 6).

Table 6. Non-Crop Herbicides and Site Limitation

Herbicide	Special Uses
Krenite	Near aquatic
Oust+2,4-D	Noncrop-trees
Oust+Tordon	Noncrop
Weedar 64A	Aquatic

Biological control offers a potentially effective and economically feasible approach to reduce infestations in many of these areas with sites restrictions. Initial release of the leafy spurge hawkmoth became established during the initial season, but have not been confirmed as established at this point.

Future needs

The acreage of leafy spurge continues to expand in spite of control efforts. New approaches must be designed if the trend is to be reversed. It is essential to develop effective and practical control options for infestations where limitations restrict the implementation of current technology. Certain of these sites and limitations include:

1) Forest, tree plantings – including grazing areas with trees present. This substantially reduces the herbicide options based on present products available. Herbicides for these sites must be selective for forage grasses and appropriate residue tolerances for these sites must be established. In addition, the inaccessibility and high cost of control limits herbicide application potential.

2) Aquatic sites – includes marshes, farm ponds, and public water that may have uses for irrigation, livestock watering, recreation and domestic use. There is need for research that will give new information regarding the plant's physiology, growth and development, as well as biological control and evaluation of new herbicides and management schemes that will implement all of these controls in an integrated approach.

Meanwhile efforts to educate the public both regarding the problem and in the use of current control technology must continue. This in the short term will reduce the rate of spread and increase control efforts in the public and private sector. The implementation of current technology can effectively reduce the rate of spread, reduce the infestation and reduce the cost on certain sites for private individuals and for governmental units.