



# Leafy Spurge *News*

Agricultural Experiment Station  
NDSU Extension Service  
North Dakota State University, Fargo, ND 58105

**Volume XXI, Issue 3    September 1999**

## From The Editors Desk

**Spurgefest '99** is now history. From my perspective it was a great success as over 200 persons participated, listened to some excellent educational sessions, and went on tours. Unfortunately your editor was unable to attend all the sessions and missed the last day. He was one of seven individuals who got an achievement award, see this issue for further details. I congratulate the people who organized and ran the show, all went very smoothly and was enjoyed by all. Included in this issue are two photos taken at the field trips.

Since only a very small portion of our readership was fortunate enough to come to Medora, a summary of the presentations given there will be published in this and future issues of **Leafy Spurge News**. As was done in the past only one author will be listed after each abstract, even though most presentations had multiple authors. The main reason is to save space and still allow the reader to contact the person for additional information.

Once again I am asking you to provide me with information about your leafy spurge problems so they can be shared with our readers. By the way, over 40 persons signed up to get the **Leafy Spurge News** at Spurgefest.

The 12<sup>th</sup> Annual Nebraska Leafy Spurge Conference & Tour was held at Broken Bow, Nebraska August 11 and 12, 1999. More information on what transpired will be included in future issues. By the way, the person we are honoring in this issue is Gene Lehnert who was instrumental in getting the folks in Nebraska on the leafy spurge bandwagon. Gene relays that all he did was to provide the opportunity for **local people** to make decisions based on **their need** and support them in **their effort** to make a difference.

Since we live in a time of change, your editor thought it was high time that a new section be added to **Leafy Spurge News**, so with a wave of the wand, we inaugurate, in this issue, **Letters to the Editor**. Our first letter is from Russ Lorenz, the previous editor of this news letter. He has some thoughtful words on Spurgefest 99. Now that we have this new section, I sincerely hope that many of you, who may not be adventurous enough to write me a small article, may be willing to send me a letter on your thoughts about leafy spurge. I sure hope so, let's communicate!

### **Claude Schmidt**

Editor

(701) 293-0365, Fax (701) 231-8474  
e-mail [cschmidt@ndsuxt.nodak.edu](mailto:cschmidt@ndsuxt.nodak.edu)

## Leafy Spurge Honoree

### **Gene Lehnert**



Gene graduated from the University of Nebraska, Lincoln in 1977 with a BS degree in Range Management and Wildlife Biology. He began his career as a Range Conservationist trainee with the Soil Conservation Service in 1976. Gene has worked throughout Nebraska as a range management specialist for SCS and NRCS in

Neligh, Burwell, North Platte and Broken Bow, Nebraska. In 1986 he was transferred to the North Central Nebraska RC&D office in Bassett as the RC&D Range Conservationist to coordinate the North Central Nebraska RC&D's six county Range, Forage and Livestock

Program. In 1992 he was selected as the North Central Nebraska RC&D's Program Coordinator.

In 1987, the Range Forage and Livestock Committee of the North Central Nebraska RC&D brought forward the issue of Leafy Spurge control in the six county area. These local people with a concern for their environment decided that something needed to be done to check the expansion of Leafy Spurge in the region. After lengthy discussions the group decided that the first thrust would be on information and education. Therefore, in 1987 the North Central Nebraska RC&D's, Range Forage and Livestock Committee hosted two workshops in O'Neill and Ainsworth on Leafy Spurge Control with a follow-up meeting the next day in Bassett to address the question of 'where to we go from here'? At that follow-up meeting the **Nebraska Leafy Spurge Working Task Force** was created and election of officers was held. The idea was to create an organization that would have a voice for the landowners, weed control specialists and people concerned about weed control. At that first meeting, fifty people started an organization that now twelve years later, has a statewide mailing list of over one thousand with an additional two hundred plus nationwide. The Nebraska Leafy Spurge Working Task Force now enjoys statewide credibility as the voice for concerned citizens for not only Leafy Spurge but also noxious weed control in general.

Each year the Task Force holds an annual meeting with the highlight meeting being their Tenth Annual Meeting held in North Platte where they gave away 500,000 bio-control insects to fifty lucky winners from Nebraska, South Dakota and Montana. Now in its twelfth year the task forces continues to hold quarterly and annual meetings to assist and educate people in the need for Leafy Spurge and other noxious weed control.

Gene says that the success of the task force could not have happened with out the support of many people from Texas to North Dakota and Montana to Maryland. Knowing that (sure as the world he will forget someone) he wanted to thank those he remembers that have supported this group's efforts, Russ Lorenz, Lloyd Wendel, Bob Richard, Bob Masters, Norm Rees, Ray Frank, Dennis Johnson, George Beck, Tom Whitson, Claude Schmidt and Barte Smith. The task force has tried it all, from chemical to cultural and biological (insects and pathogens), and none of it would probably have happened unless someone believed that local people supported by a local organization could make a difference.

**Gene Lehnert**

North Central RC&D  
Bassett, NB 68714  
(402) 684-3346  
E-mail: ncnercd@huntel.net



**Bob Richard, director, of the USDA-APHIS Biocontrol pf Weeds Laboratory in Bozeman, MT, explains biological control to a crowd of Spurgefest '99 tour participants. The biocontrol demonstration gave onlookers a chance to sweep and count flea beetles and ask questions about how the flea beetles work to control leafy spurge.**

## **Spurgesfest Recognition page**

# Letters to the Editor –

## Thoughts by an Old Long-time Spurge Fighter:

I wish to express my thanks and appreciation for the “Outstanding Achievement Award” presented to me at Spurgefest '99. Those of you in attendance witnessed one of the few times that I have been at a loss for words! You need to know that I did none of the actual research and development that brought us to our present status of leafy spurge control. But I did a lot of drum-beating and promotion that led to the 1979 **Leafy Spurge Symposium** in Bismarck, ND. After I retired from ARS in 1985, I was asked to coordinate all aspects of leafy spurge research, education and control in a multi-state area. I soon learned that facilitating was more effective and easier to do than coordinating. So I changed my title! Others did the actual productive work. All I did was to facilitate.

As facilitator, I helped to make things happen to provide support from legislators, administrators, and policy makers for advancement of the leafy spurge control and management programs. This provided the support to those doing the research, education, and applied control. All of those people are deserving of praise and thanks for their combined efforts in making leafy spurge control more effective and less costly than it was in 1979.

We have come a long way in 20 years, but don't forget to use **all the tools** in the box. The current success with biological control may cause some to depend too heavily on it. It will take biological control agents many years to catch up with all the leafy spurge we have now. So to help the “bugs” catch up, we need to continue to use herbicides, sheep or goat grazing and all the other less glamorous leafy spurge management tools to prevent further spread and infestations of clean land by this highly aggressive, persistent weed.

Some of the slogans developed through the years are still valid:

- Spraying leafy spurge is expensive, but you can't afford to *not* spray if you want to keep clean land, clean.
- No patch of leafy spurge is too small to spray.
- It is never too late to start a leafy spurge control program.
- It is only too late to start to control leafy spurge if you don't start now.
- Leafy spurge is here to stay – learn to manage it so you can live with it.

## Russ Lorenz

Leafy Spurge Fighter – Retired  
(701) 233-3421



**The highlight of Spurgefest '99 was a flea beetle giveaway. TEAM Leafy Spurge distributed more than 20 million flea beetles at Spurgefest and tours in Sundance, WY, Buffalo, SD, and Ekalaka, MT. Some people drove for hundreds of miles to get flea beetles.**

# Proceedings

from the Leafy Spurge Symposium, June 26-27, 1999

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## Foreword

In 1999, we celebrate the 20<sup>th</sup> year of the annual Leafy Spurge symposium and the most aggressive battle ever waged against a weed in the Northern Great Plains. On June 26 and 27<sup>th</sup> of 1979, more than 125 scientists, legislators, land managers, farmers and ranchers met in Bismarck, North Dakota to discuss the increasing threat of leafy spurge to the land and livelihood of people in the Northern Great Plains.

Leafy spurge had a good foothold by the time the first symposium was held. Introduced into North America from Europe and Asia, it had no natural enemies. A heavy seed producer and an aggressive root system allowed it to easily invade and become established on many sites. For about the first 50 years after introduction, it was primarily a problem in cropland, often spread to new areas in seed grain. It did not cause much concern, particularly after WWII when herbicide use became common on cropland. Use of herbicides plus annual tillage generally kept leafy spurge from becoming an economic problem in cropland. It did become of concern in the 1960's and early 1970's when it began to appear in grasslands. Landowners found that the herbicides were not very effective on leafy spurge. But the attitude was that soon a new herbicide would be developed that would be the "magic bullet" for leafy spurge. In time, a "magic bullet" was available, but it was considered, by most landowners, to be too costly to use on low-value rangeland, and it did not always eradicate the treated plants. Landowners and public land managers did become concerned, in the 1970's. In response to their concerns, a multi-state/multi-agency steering committee was formed, which organized the 1979 symposium. The symposium consisted of technical papers on everything that was known about leafy spurge, followed by group discussions on the leafy spurge plant, chemical control, cultural control, biological control, and social and economic impacts. The reports from these discussion groups served as the basis for beginning an organized plan for research, education, and control of leafy spurge.

The first 5 years after the 1979 symposium were not smooth sailing. General support for the program often slacked when funding was needed, particularly for research. Some agencies and institutions redirected funds to enhance or start programs. Legislators and administrators had to be convinced that the new funding was needed. The annual leafy spurge symposium brought researchers and others together to report on and discuss needed research and to report to potential

users any positive results. Attendees included representatives of federal and state agencies, chemical companies, and private landowners.

To insure continuation of the symposium, a petition was sent to the Great Plains Agricultural Council (GPAC) requesting that they establish a Leafy Spurge Task Force (LSTF) as part of their program for addressing problems in the Great Plains. The proposal was accepted. The LSTF was the longest standing task force in GPAC, and the symposium has continued after GPAC was disbanded several years ago. (The symposium is now affiliated with the Weed Science Society of America).

In 1985, a proposal was prepared and submitted by LSTF to USDA-APHIS to enlist their help in the development of a biological control program on leafy spurge. The proposal was accepted and additional funding was provided by congress to enhance the APHIS program.

The Proceedings, published following each symposium, are an excellent history of the development of the leafy spurge control program. Early proceedings included work on evaluating the problem and on advances in chemical control. A real breakthrough was the finding that a small quantity of Tordon mixed with 2,4-D was a very effective herbicide at a lower cost. Best time of application and long-term plans for herbicide use were also very important. Use of sheep and goats as leafy spurge grazers and eventually the biological control program became a large part of the reporting in the Proceedings. Farmers, ranchers, and other users were many times part of the symposium.

The Leafy Spurge News has been published for over 20 years. It is another outlet for symposium reports and it has a large circulation, about 1700 at this time.

The 1999 combined symposium and Spurgefest is testimony that the leafy spurge research, education, and control programs are making a difference. Leafy spurge is still here, and it will probably always be here, but two things are certain; 1) we can control leafy spurge to keep it below a disastrous economic level and; 2) there are far less acres of leafy spurge now than there would have been without the dedicated efforts of everyone the past 20 years.

### **Russell J. Lorenz**

USDA-ARS/NDSU-retired

Also past Leafy Spurge News editor,  
and past CPAC-LSTF facilitator - retired!  
(701) 223-3421

# Proceedings (cont.)

from the Leafy Spurge Symposium, June 26-27, 1999

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## Perceptions of Leafy Spurge by Ranch Operators and Local Decision Makers: an Update

This study focused on a four-county area in North Dakota (Bowman and Slope counties) and Montana (Fallon and Wibaux Counties) represents an update to a similar study, using the same survey that was conducted in 1998. A total of 521 ranch operators and local decision makers (LDM) were surveyed, and 177 completed questionnaires were obtained (34%). The previous questionnaire was distributed to 515 ranchers and LDM in a five-county area in North Dakota (Billings and Golden Valley Counties), Montana (Carter County), South Dakota (Harding County), and Wyoming (Crook County). The survey focused on weed management in general and specifically on the perceptions and attitudes of ranchers and LDM, who may have been directly and indirectly affected by leafy spurge.

Leafy spurge was recognized as the most important weed problem for ranchers and LDM in the four-county area. However, ranchers and LDM in the 1999 survey were less likely to indicate that weeds, in general, were a major problem for them, or in their area, than respondents to the 1998 survey. The percentage of ranchers in the 1999 survey who indicated having leafy spurge on their ranch was less than the 1998 survey, 41 percent versus 56 percent, respectively. Ranchers in the updated survey area had leafy spurge on approximately 2 percent of operated acreage.

Reasons for not using herbicides included environmental restrictions, inadequate funding, and too large infestations. Biological control was often not used because the biological agents take too long to work, there was limited access to biological agents, and respondents did not know how to properly use agents. The main reason that ranchers and LDM were not using sheep or goat grazing, as a control mechanism, was that they lacked the equipment or expertise to include them in their grazing strategies. Other methods such as tillage, planting competing grasses, burning, and mowing were not used because land is not suitable for these methods.

Overall, a vast majority of the respondents were concerned about controlling weeds on rangeland and understood leafy spurge is a long-term management problem. The LDM were more likely than the ranchers to believe that the weed problem in their area was a major problem and that leafy spurge was the most important weed.

The results of this survey indicate that financial constraints on weed control are prevalent. Also, the amount

of knowledge needed to adopt various treatment programs appears to be a constraint for both ranchers and LDM. Education and awareness on how to use and where to find biological controls could facilitate more adoption of biological agents to control leafy spurge. Likewise, assistance in obtaining equipment and knowledge of sheep/goat management might enable some managers to use sheep and/or goats to curb further leafy spurge expansion.

The TEAM Leafy Spurge project could enhance adoption of all leafy spurge control methods by addressing concerns exhibited by each of the groups surveyed. By facilitating cooperative efforts between managers of adjoining lands and by pooling resources, perhaps many of the hardships created by leafy spurge can be reversed.

### Randall S. Sell

Dept. of Agricultural Economics, NDSU  
Fargo ND 58105-5636 (701) 231-7441

## "Know Thine Enemy" – Understanding Weed Management Through Biological Research

Leafy spurge (*Euphorbia esula L.*), an invasive perennial weed, infests more than 3 million acres of range land in the United States and prairie provinces of Canada. In the U.S., 36 of the 50 states report infestations with the Dakotas, Montana, Nebraska and Wyoming suffering the greatest environmental and economic impact. In the four-state area of the Dakotas, Montana and Wyoming, reports estimate the loss due to leafy spurge infestations of grazing land and wild land to be \$129 million annually. Leafy spurge is a major concern to ranchers and environmentalists because left unchecked, leafy spurge can quickly out-compete native vegetation in pastures, rangelands, and native habitats. In fact, The Nature Conservancy has termed leafy spurge as "one of the dirty dozen of America's least wanted invasive species of U.S. ecosystems."

Plants classified as weeds possess 12 or more unique characteristics that collectively impart a weedy growth habit. Several of these characteristics deal with reproductive behavior. Most annual weeds reproduce by seeds; however, perennial weeds, like leafy spurge, also have the ability to reproduce from vegetative root buds. It is the variable growth and development of reproductive organs (seeds and root buds) that allows weeds to avoid conventional weed control measures. Dormancy is a term used to denote variation in the growth and development of seeds and root buds and is a characteristic of most weeds. Reports have indicated that seeds of

# Proceedings (cont.)

from the Leafy Spurge Symposium, June 26-27, 1999

leafy spurge can remain in a dormant state for 5 to 8 years; however, most germinate within the first 2 years. Unfortunately, the fundamental basis for dormancy in plants is still poorly understood. To address this problem, the Plant Science Research Staff is currently investigating many facets of dormancy in leafy spurge, wild oats and red rice. To paraphrase the ancient Chinese philosopher Sun Tzu - 'know thine enemy and victory will be forthcoming'. The impact of understanding dormancy in weeds, as well as the physiology, biochemistry, and genetics of weeds, will improve our knowledge and help us to develop new and useful strategies for weed management.

## James V. Anderson

USDA/ARS, Biosciences Research Laboratory  
1605 Albrecht Blvd, Fargo ND 58105-5674  
(701) 239-1255

## Imazapic for Leafy Spurge Control

Imazapic has shown promise for leafy spurge control in North Dakota, but some injury to grasses has been observed. The objectives of this research were: a) to determine the effect of various adjuvants in combination with imazapic to maximize leafy spurge control and minimize grass injury, b) to determine the most cost-effective rate of imazapic for leafy spurge control when applied alone or with various adjuvants, c) to determine the most effective timing of imazapic application in the fall to maximize leafy spurge control and herbage production, and d) to evaluate the combined effect of imazapic and biological control agents on leafy spurge control. Imazapic applied alone or with various adjuvants injured grasses in greenhouse studies; however, imazapic did not decrease herbage production in field studies. Imazapic provided similar or better leafy spurge control than the standard treatment of picloram plus 2,4-D in the field. Imazapic at 0.14 kg/ha applied with a methylated seed oil (MSO) alone or with 28% N averaged 72% leafy spurge control 12 months after treatment (MAT) compared to 40% control with picloram plus 2,4-D. Imazapic provided maximum leafy spurge control when applied at 0.14 kg/ha with a MSO either alone or with 28% N. Imazapic applied with a MSO in mid-September provided the best leafy spurge control 12 MAT compared to application in August or October.

For instance, imazapic at 0.14kg/ha applied with a MSO in mid September provided nearly 70% leafy spurge control 12 MAT compared to 50% or less leafy spurge control when applied in August or October. Imazapic applied over *Aphthona* spp. biological control agents

improved leafy spurge control compared to the insects alone, but reduced *Aphthona* density from 25 or 35 adults/m<sup>2</sup> by picloram plus 2,4-D or the control, respectively, to 15 to 20 adults/m<sup>2</sup> by imazapic. These results are based only on one location and one year, further research needs to be conducted to determine if imazapic has a detrimental effect on *Aphthona* spp. flea beetle population. Imazapic will be a useful addition to a long-term leafy spurge control program.

## Rodney G. Lym

Dept of Plant Sciences, NDSU  
Fargo ND 58105 (701) 231-8996  
Lym@plains.nodak.edu

## Plateau (Imazapic) for Leafy Spurge Control in Wyoming

Leafy spurge continues to be a major problem in Wyoming. It's spread has been limited but has not decreased. There are infestations in every county. However, major infestations occur in the northeast corner of the state. The objective of these studies was to compare the efficacy of imazapic (Plateau) for leafy spurge control at two locations. One study was located in Crook County, Wyoming miles south of Devils Tower: while the other was in Cheyenne, Wyoming on Warren Air Force Base. The studies were a randomized complete block design with four replications. Crook County leafy spurge was 16 to 24 inches tall and Cheyenne leafy spurge was approximately 20 inches tall.

In Crook County imazapic, regardless of rate, provided excellent leafy spurge control 297 days after treatment (dat). (Table 1). Picloram at 0.5 lb/A also provided excellent control. Grass damage was severe especially at

**Table 1. Leafy spurge control and grass damage in Crook County.**

Treatment <sup>a</sup>	Rate	Shoot control <sup>b</sup>	Grass damage <sup>b</sup>
	lb/A	%	%
Imazapic	0.125	84	13
Imazapic+mso <sup>c</sup>	0.125	95	35
Imazapic	0.1875	95	23
Imazapic+mso	0.1875	99	31
Imazapic	0.25	100	43
Imazapic+mso	0.25	100	53
Picloram	0.5	98	0
LSD (P=0.05)		7	19
CV		5	44

<sup>a</sup>Treatments applied Sept. 3, 1997.

<sup>b</sup>Evaluated June 27, 1998.

<sup>c</sup>mso = methylated seed oil at 0.25% v/v

Claude Schmidt  
 Agricultural Experiment Station  
 North Dakota State University  
 Fargo, ND 58105

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the higher rates of imazapic. The addition of methylated seed oil seemed to increase grass damage.

In Cheyenne leafy spurge control 288 (dat) found imazapic providing little or no control, however there was considerable shoot suppression at the 0.25 lb/A rate (Table 2). None of the other treatments were effective. Leafy spurge control 590 dat found imazapic providing little or no control, or shoot suppression. Grass damage 288 dat was severe where 0.25 lb/A of imazapic were applied. Grass damage 590 dat was not as evident but

was still very noticeable where 0.25 lb/A of imazapic had been applied. The addition of BAS-662 did not increase control. It appears that more research is needed in order to make more accurate predications for control of leafy spurge with imazapic as well as timing of application to reduce grass damage.

**Mark A. Farrell**

Extension Educator, Univ. of Wyoming  
 P.O. Box 3354, Laramie WY 82071-3354  
 (307) 766-5381

**Table 2. Leafy spurge control, suppression and grass damage in Cheyenne, WY.**

Treatment <sup>a</sup>	Rate	Shoot control <sup>b</sup>		Shoot suppression <sup>b</sup>		Grass damage <sup>b</sup>	
		1998	1999	1998	1999	1998	1999
	lb/A		%		%		%
Imazapic+mso <sup>c</sup>	0.125	0	0	46	3	21	3
Imazapic+mso	0.1875	5	0	55	4	31	3
Imazapic+mso	0.25	11	30	78	40	60	35
BAS-662	0.25	0	0	4	0	13	0
Picloram + 2,4-D amine	0.25+1.0	20	5	45	20	18	0
Imazapic+BAS-662+mso	0.125+0.25	0	0	46	10	53	5
Imazapic+BAS-662+mso	0.1875+0.25	0	0	46	15	39	10
Imazapic+BAS-662+mso	0.25+0.25	13	20	80	48	66	41
Picloram + 2,4-D amine+BAS-662+mso	0.25+1.0+0.25	0	0	18	5	0	0
LSD (P=0.05)		12	10	23	22	35	21
CV		169	130	39	106	79	148

<sup>a</sup>Treatments applied October 22, 1997.

<sup>b</sup>Evaluated Augus 6, 1998 and June 4, 1999.

<sup>c</sup>mso = methylated seed oil at 0.25% v/v