



Leafy Spurge *News*

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

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From The Editors Desk

The big news is that there will be a 1999 Leafy Spurge Symposium in Medora this summer, see article by Rod Lym, if **enough persons are interested**. So once again it is up to you. It will be part of a much larger event called **SPURGE FEST 99** which includes the Leafy Spurge Symposium, TEAM Tour, Bug Distribution Day, VIP Tour, etc. There will be more information in the May Issue of Leafy Spurge *News*. Also see a preview article in this issue.

The post office is clamping down. We have to have complete address, otherwise the mail is returned to the sender. In the past if you lived in small towns you did not need complete addresses, now you do, and many November issues of Leafy Spurge *News* and follow-up letters were returned.

There will be no **Honoree** in this issue as we did not get the information in time. Have no fear, this worthwhile feature will return, probably in the May issue. Once again I would like to remind my readers that I need input from **YOU** as I cannot make up the Newsletter from thin air.

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Editor

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Call For Papers For The 1999 Leafy Spurge Symposium

Don Kirby and Rod Lym are organizing a Leafy Spurge Symposium in conjunction with the Team Leafy Spurge Tour in Medora, North Dakota. The Symposium will be held on **Tuesday, June 29, 1999** in Medora, which is one day prior to the TEAM Leafy Spurge Tours. Don and Rod are trying to organize this symposium for people who are working in leafy spurge research to exchange ideas and present the latest information on chemical, biological and cultural control methods.

Last year the symposium was canceled because few people wanted to present a poster or talk. We would hate to see the annual meeting fade away when we know many people are conducting leafy spurge research. We certainly encourage your participation whether or not you are participating with TEAM leafy spurge. The presentations will be informal with plenty of time for discussion.

Persons intending to give a paper (Oral or Poster Presentation) at the 1999 symposium should send their titles to Rod Lym by **May 1**. An abstract or full paper will be due at the time of the meeting and will be published in the Proceedings. All participants should register for the symposium, which is included in the TEAM leafy spurge registration. More information will be provided later.

Rod Lym

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USDA-ARS's Team Leafy Spurge Plans "Major" Summer Event

TEAM Leafy Spurge will be in the spotlight June 29-30 when it hosts "Spurgefest '99" at Theodore Roosevelt National Park in Medora, ND. Featured will be field tours of TEAM Leafy Spurge research and demonstration sites, informational and educational presentations, a biological control agent give-away (all on June 30 & July 1) and the annual Leafy Spurge Symposium (June 29). TEAM Leafy Spurge coordinator Chad Prosser said Spurgefest will help educate people about the region's leafy spurge and invasive weed problem. "It's going to be a great opportunity to share information and focus some attention on leafy spurge in the Little Missouri River drainage," Prosser said. "It will also give us a chance to show people what TEAM Leafy Spurge is doing and tell them about the partnerships we've created to help solve the problem."

Although many of the details are still being worked out, Prosser said Spurgefest will be a "major event." Several prominent dignitaries and VIPs have been invited, and he hopes the event will help draw media attention to the leafy spurge/invasive weed problem. Prosser had one word of caution for those who plan to attend Spurgefest and/or the Leafy Spurge Symposium. "If you're planning

Dr. James Anderson New Leafy Spurge Worker at USDA/ARS Fargo

Dr. James V. Anderson joined the Plant Science Research unit of the USDA/ARS Biosciences Research Laboratory, Fargo, North Dakota, on February 16, 1998. Dr. Anderson is a native of Cadott, Wisconsin. He obtained a B.S. in Biology from the University of Wisconsin at Eau Claire, an M.S. in Chemistry from South Dakota State University, and a Ph.D. in Plant Pathology, Physiology and Weed Science from Virginia Polytechnic Institute and State University. He has done postdoctoral training with Dr. Charles Guy, Department of Environmental Horticulture, University of Florida; Dr. John Gronwald, USDA/ARS Plant Science Research unit, St. Paul, MN; Dr. Jeff Suttle, USDA/ARS Northern Crop Science Laboratory, Fargo, ND; and Dr. Craig Morris, USDA/ARS Wheat Quality Laboratory, Pullman, WA. Dr. Anderson will be doing research on cell cycle regulation and signal transduction in leafy spurge and other perennial weeds to find weak links in bud development that make the plant vulnerable to control mechanisms.

on attending, you'll want to make hotel or motel reservations as soon as possible," he said. "Summer is a pretty busy time for Medora and Spurgefest will make it even busier, so plan ahead to make sure you have a room." Phone numbers for hotels and motels in the Medora and surrounding area are listed at the bottom of this article.

Complete details on Spurgefest '99' which is being held by the USDA-ARS's TEAM Leafy Spurge in cooperation with the USDA-APHIS, National Park Service, Bureau of Land Management, U.S. Forest Service and North Dakota Department of Agriculture, will be featured in the next issue of the Leafy Spurge *News*. They will also be publicized in media outlets throughout the four state region. For more information on "Spurgefest '99" call Prosser at (406) 482-9403; e-mail: chad@mail.sidney.ars.usda.gov or Steve Merritt at (406) 482-9440; e-mail: steve@mail.sidney.ars.usda.gov. For more information on the Leafy Spurge Symposium, call Don Kirby at (701) 231-8386; e-mail: dkirby@ndsuxt.nodak.edu or Rod Lym at (701) 231-8996; e-mail: lym@plains.nodak.edu.

Hotels & Motels

Medora

Americinn Motel & Suites – 1-800-634-3444
Badlands Motel – 1-800-633-6721
Medora Motel – 1-800-633-6721
Rough Riders Motel – 1-800-633-6721
Sully Inn – 1-701-623-4455

Belfield (15 miles east of Medora)

Belv-Vu- Motel – 1-701-575-4245
Trapper's Inn Motel – 1-701-575-4261

Dickinson (36 miles east of Medora)

Americinn Motel & Suites – 1-800-634-3444
Best Western Dickinson Inn & Suites –
1-800-528-1234
Budget Inn – 1-701-225-9123
Comfort Inn – 1-800-452-5420
Hartfiel Inn – 1-701-225-6710
Nodak Motel – 1-701-225-5119
Select Inn – 1-800-641-1000
Super 8 Motel – 1-800-800-8000
Travel Lodge – 1-701-227-1853

Beach (25 Miles west of Medora)

Buckboard Inn – 1-701-872-4794
Westgate Motel – 1-701-872-4521

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Leafy Spurge Researcher Dies Unexpectedly

Dr. Richard H. Shimabukuro, Plant Physiologist of the Plant Science Research unit, USDA/ARS Biosciences Research Laboratory, Fargo, North Dakota, died unexpectedly in Fargo on Wednesday, March 25, 1998. Shim was a very active researcher involving basic research on leafy spurge under the project title "Biochemical and Physiological Mechanisms that Regulate Growth and Development of Adventitious Shoot Buds of Leafy Spurge and Other Perennial Weeds." At the time of his death, Shim was gearing up to vigorously attack the problem of oxidative stress and senescence in leafy spurge as a possible means of controlling growth of the plant.

Shim was born in Hawaii in 1933 graduating from the University of Hawaii. He was an officer in the U.S. Army Chemical Corps. Shim received a PhD at the University of Minnesota, St. Paul, where he met his future wife, Mary Abrahamsen, a fellow graduate student in Plant Physiology. In 1964, Richard joined the newly built ARS laboratory in Fargo to help determine the fate of pesticides in the environment where he made many significant discoveries regarding the fate of pesticides in plants. He identified *N*-dealkylation as an alternative pathway for atrazine detoxification in higher plants. In collaboration with his colleagues, he found a major pesticide degradation and detoxification pathway (glutathione conjugation) in plants that was responsible for some plant's ability to survive herbicide treatment. He found a genetic basis for atrazine resistance of corn, and that pesticide degradation varied within different plant organs. He determined that differential metabolism of diclofop-methyl was the biochemical basis for selectivity between resistant wheat and susceptible wild oat. Shim recently developed an active research program on the physiology and biochemistry of leafy spurge. At the time of his death, Shim and his co-workers were elucidating the details of a two-way antagonism between diclofop-methyl and auxinic compounds.

Shim received the following awards including the Japanese Government Research Award for Foreign Specialists, USDA Superior Service Award (a team award for pesticide degradation pathway), Weed Science Society of America Outstanding Research Worker Award, and the Ciba-Geigy Corporation Outstanding Agricultural Scientist Recognition Award. Shim cooperated with many foreign scientists and worked at or visited many foreign countries, including India, Spain, Japan, Sudan, Philippines, and Australia to assist those countries with their research programs.

Shim is survived by his wife, Mary and three children, Tom, Peter and Ann, one brother and five sisters. He will be greatly missed at the Biosciences Research Laboratory.

David G. Davis

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Dr. Michael Foley New Research Leader ARS/USDA in Fargo

Dr. Michael Foley assumed the position as Research Leader of the Plant Science Research unit, USDA/ARS Biosciences Research Laboratory, Fargo, North Dakota on 30 August 1998. Dr. Foley is a native of Minnesota, obtaining a B.S. in Agronomy from the University of Minnesota in 1977, an M.S. and Ph.D. in Agronomy from the University of Illinois with Dr. Loyd Wax in 1979 and 1982, respectively. Mike became an Assistant Professor in the Department of Plant Science, Montana State University, Bozeman from 1982 to 1986, moved to Oklahoma from 1987 to 1989, and to Purdue University, West Lafayette, Indiana, in 1989 as an Assistant Professor and in 1995 as an Associate Professor, Department of Botany and Plant Pathology. Mike is the investigations leader of five scientists determining basic physiological, biochemical and genetic processes in weeds, with a major emphasis on dormancy in leafy spurge and wild oat. Mike, with his wife Wanda and sons Jim and Patrick, lives in Moorhead, Minnesota.

Team Leafy Spurge Announces Projects for 1999

Several existing and new research and demonstration projects were recently funded by the TEAM Leafy Spurge ad hoc committee, paving the way for a second summer of coordinated and area-wide efforts at battling one of the region's most costly noxious weeds.

Team Leafy Spurge coordinator, Chad Prosser, said the ad hoc committee was pleased with results produced by existing projects which were implemented last summer and range from multi-species grazing demonstrations to herbicide studies, as well as with the overall quality of new proposals submitted for consideration. "We're impressed with the progress shown by projects that were begun last summer, and we're anxious to show ranchers and land managers what we've learned" Prosser said. "We were also pleased with the number and quality of new proposals we received. It shows that people are definitely interested in leafy spurge and in working together to help devise effective, affordable control strategies."

A total of 10 existing and seven new projects received funding totaling more than \$1 million. New projects approved for the upcoming season include:

- Tony Caesar, plant pathologist, USDA/ARS Northern Plains Agricultural Research Laboratory, (Sydney, MT) ~ Biological Control with Multiple Agents: A study and demonstration of naturally occurring, soil borne plant pathogens and their relationship with biocontrol agents.
- Bob Carlson, professor of entomology, North Dakota State University (Fargo) Utilization of *Oberea erythrocephala*: Regional distribution and demonstration of the long-horned beetle, a stem-boring biocontrol agent that has been shown to work well in moist soils.
- Diane Larson, research biologist, U.S. Geological Survey/Biological Resources Division (St. Paul, MN) ~ An evaluation of control efforts on leafy spurge: a cooperative project with Theodore Roosevelt National Park to evaluate the effect on native plant and animal communities, and the effect of leafy spurge on native plant and animal communities
- Chad Prosser, TEAM Leafy Spurge coordinator and TEAM Leafy Spurge Technology Transfer Team Leader, USDA/ARS NPARRL ~ Demonstration of Leafy Spurge Control with Herbicides: Demonstration of Various Herbicides.
- Tim Faller, director, North Dakota State University-Hettinger Research Extension Center ~ Feasibility of a Cooperatively Owned Sheep Grazing Operation: A study to determine the feasibility of a producer-owned sheep coop to provide sheep for leafy spurge control within a multi-species grazing program.
- Douglas Johnson, Grasslands Initiative Team Leader, U.S. Geological Survey/Biological Resources Division (Jamestown, ND) ~ Effects of Leafy Spurge Invasion on Grassland Bird Populations: Research to evaluate how leafy spurge disrupts native plant communities and how that disruption affects passerine bird population .
- Tom Steger, South Dakota field manager, Bureau of Land Management (Bell Fourche, SD) ~ Management Approach for Leafy Spurge Control: A Cooperative weed database and mapping project between the BLM, South Dakota Department of School and Public Lands, South Dakota Department of Game, Fish and Parks, U.S. Forest Service and National Park Service.

Existing projects funded include:

- Tim Faller, Multi-Species Grazing Trial: A multi-species grazing trial in Sentinel Butte, ND, to demonstrate how sheep can be used to compliment cattle operations by controlling leafy spurge, increasing forage production and increasing ranch profitability.
- Mark Ferrell, pesticide coordinator/weed specialist, University of Wyoming Cooperative Extension Service (Laramie) ~ Leafy Spurge Grazing Demonstration, Spring Grazing to Reduce Leafy Spurge: A study and demonstration of utilizing perennial, cool-season grasses to suppress leafy spurge establishment, and how grazing strategies can be used to increase range health and control the spread of leafy spurge.
- Steve Hager, GIS specialist, Theodore Roosevelt National Park ~ Developing a GIS Database: A cooperative project with the USDA/ARS and U.S. Geological Service to map leafy spurge infestations and biological control agent release sites and develop a Geographic Information System database for the entire Little Missouri River drainage.
- Scott Kronberg, associate professor of animal and range sciences, South Dakota State University ~ Grazing Research & Demonstration: A study of how four different breeds of sheep graze leafy spurge, and a demonstration of using stocking rates and rotational grazing to control leafy spurge.
- Larry Leistritz, professor of agricultural economics, North Dakota State University ~ Socio-economic impacts: A study to evaluate the socio-economic impacts of leafy spurge and the costs and benefits of IPM strategies, and to determine managerial, institutional and social factors that influence the use of various control strategies.
- Rod Lym, professor of plant sciences, North Dakota State University ~ Demonstration of leafy spurge control with various herbicides, different methods of application, and the integration of herbicides with biological control agents.

- Bob Nowierski, professor of entomology, Montana State University (Bozeman) ~ Ecological Barriers to *Aphthona* Establishment: A multifaceted project to identify factors that influence the establishment of *Aphthona* sp. flea beetles.
- Roger Sheley, noxious weed specialist, Montana State University Extension Service (Bozeman) ~ Ecologically Based Decision System: A project to develop and design an interactive, computer-based decision making tool for ranchers, landowners and land managers.
- Neal Spencer, research leader, USDA/ARS NPARL ~ Foreign Exploration: An international search for leafy spurge biological control agents.
- Leon Wrage, noxious weed specialist, South Dakota State University Extension Service (Brookings) ~ Integrating Current & Emerging Herbicide Technologies: A study and demonstration of long-term herbicide applications, new and developing herbicide technologies, and control alternatives for environmentally sensitive areas.
- Inventory & assessment: Extensive inventory and assessment work at TEAM Leafy Spurge study and demonstration sites will continue. This effort is geared at providing consistent, comparable baseline information about biocontrol agent establishment at the sites. Leaders of the assessment and inventory teams are: Roger Sheley, Noxious Weed Specialist, Montana State University; Don Kirby, Department of Animal & Range Science, North Dakota State University; David Kazmer, Department of Biology University of Wyoming; and Jack Butler, Department of Biology, Central Missouri State University.

Team Leafy Spurge is a five-year research and demonstration project funded by the USDA/ARS in partnership with the USDA-Animal & Plant Health Inspection Service. It's goal is providing landowners and land managers with proven leafy spurge control techniques based on sustainable integrated pest management strategies. For additional information on TEAM Leafy Spurge, biological control of leafy spurge or Integrated Pest Management, contact TEAM Leafy Spurge coordinator Chad Prosser at (406) 482-9403, e-mail at chad@mail.sidney.ars.usda.gov. A full color map of the projects is available at: http://www.montana.edu/wwwpb/ag/team_map.jpg

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DNA Evidence Outside the Beltway

The fact that DNA evidence can make or break a major case is obvious from recent political news out of the Washington, DC, beltway. Understanding DNA molecules and the genes they contain may help resolve some real problems in the Northern Great Plains. One DNA issue on the mind of Dr. Dave Horvath, a geneticist with the USDA-Agricultural Research Service in Fargo, ND, relates to the genetics of resistance to biocontrol agents in leafy spurge. Little is known about what genes help crops and weeds resist insect attacks. With a major focus of leafy spurge control based on the use of various insects, fundamental studies to identify specific chromosomal regions imparting resistance to this tenacious weed is critical. The need for such studies is demonstrated by the observations of localized populations of leafy spurge that appear to be resistant to some of the current insect bio-control agents.

In 1996, Dr. Rod Lym at North Dakota State University demonstrated that there are specific populations of leafy spurge resistant to the gall midge (*Spurgia esulae*). He went on to demonstrate that there is a significant genetic component to the observed resistance. Horvath cross-pollinated resistant and susceptible plants, and Lym characterized the level of resistance in the offspring from these crosses. Only some offspring are as resistant to the midge as is the resistant parent. By comparing the number of resistant, moderately resistant, and susceptible offspring from these crosses, they are determining how many genes are involved in controlling insect resistance in leafy spurge. The results from this initial experiment indicate that there are at least three genes that influence the level of resistance to the gall midge. Careful observations by Lym allowed Horvath to hypothesize that at least two genes control gall formation on plants after exposure to the insect. These genes may play a role in how the gall midge recognizes a given leafy spurge plant as a good place to lay eggs, and/or if galls form around the egg mass once eggs are laid. At least one other gene influences egg development as they grow inside the protective gall. The development of a population of genetically characterized individuals is the first step in locating regions on leafy spurge chromosomes that contain genes involved in insect resistance.

These experiments and others like it (such as the T.E.A.M. Leafy Spurge project on ecological barriers), should make it possible to develop tests for the presence or absence of particular resistance genes in a given stand of leafy spurge. This sort of test could be invaluable given the fact that many insect bio-control agents take three to four years just to get established. Time and money might be wasted if the spurge being treated is resistant to the insect. Such tests could also be used to follow the evolution of resistance genes in populations of spurge that have already had insects released in them. These "population genetic" studies might indicate how quickly leafy spurge is likely to develop resistance to a given insect bio-control agent. Finally, information gained by studying the genetics of insect resistance in leafy spurge may provide a road map to solve other weed management problems.

David Horvath

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Evaluation of Plateau[®] For Leafy Spurge Control

Plateau[®] has shown promise for leafy spurge control in North Dakota. However, grass injury especially to cool season species has been observed. The labeled rate for optimal leafy spurge control is Plateau[®] at 8 oz product/A applied 2 weeks before a killing frost, plus an additional 4 oz/A the following spring; or at 12 oz/A applied in the fall. The label also states that Plateau[®] should be applied with a methylated seed oil (MSO), such as Sun-It II or Scoil, and nitrogen fertilizer regardless of rate or timing. The objectives of this research were to evaluate Plateau[®] applied with and without adjuvants and at differing times of treatment to maximize leafy spurge control with minimal grass injury.

The first experiment evaluated Plateau[®] applied in the mid-summer or fall for leafy spurge control at locations near Valley City and Jamestown, ND. Mid-summer treatments were applied to the flowering stage of leafy spurge and fall treatments during regrowth. Visible leafy spurge control with Plateau[®] applied in mid-summer increased from 3 to 10 months after treatment (MAT) (Table 1). Plateau[®] did not visibly control leafy spurge topgrowth 3 MAT. However, Plateau[®] at 16 oz/A alone or 8 oz/A plus a MSO averaged 90% control the following spring, 10 MAT. Grass injury 10 MAT at Valley City averaged 28%, but was not visible at Jamestown. Plateau[®] provided better leafy spurge control when applied in the fall than mid-summer. All fall-applied Plateau[®] treatments averaged 99% leafy spurge control and 23% grass injury the following spring, 9 MAT. Plateau[®] at 16 oz/A alone or 8 oz/A plus a MSO maintained 96% control 12 MAT with no grass injury compared to 37% control with Tordon[™] plus 2,4-D.

A second experiment evaluated Plateau[®] applied at 2-week intervals from 15 August to 15 October for leafy spurge control at locations near Valley City, and Buffalo, ND. Plateau[®] at 4 oz/A plus MSO reached a maximum of 90% leafy spurge control when applied in mid-September (Table 2). Leafy spurge control with Plateau[®] at 8 oz/A plus MSO averaged 90% when applied throughout the entire month of September. The level of leafy spurge control was not as high when applied before September 1 or after October 1. Grass injury was minimal, but tended to increase with the later Plateau[®] application dates.

The third experiment evaluated Plateau[®] applied with or without adjuvants at locations near Walcott, Valley City, and McHenry, ND. Treatments were applied early to mid-September to fall regrowth at all three locations. Plateau[®] provided better leafy spurge control at 8 oz/A than at 4 oz/A, and application with a MSO was neces-

sary to provide long term control (Table 3). Plateau[®] at 4 or 8 oz/A plus MSO or plus MSO and 28% N averaged 95% leafy spurge control the following spring, 9 MAT, at all three locations. The Walcott location was established one year earlier than the other two locations; all treatments were reapplied the following fall and evaluated 12 and 21 months after first treatment (MAFT). Leafy spurge control was the best with Plateau[®] at 8 oz/A plus MSO or plus MSO and 28% N, which averaged 66% control before the second treatment (12 MAFT) and 88% control after the second treatment (21 MAFT).

In summary, Plateau[®] provided better control when applied in the fall compared to mid-summer, especially when applied in mid-September. Plateau[®] plus MSO provided better leafy spurge control than Plateau[®] alone or with 28% N. In general, grass injury was minimal by 12 MAT regardless of treatment.

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Table 2. Plateau fall applied on five dates, evaluated 9 MAT and averaged over Valley City and Buffalo, ND locations.

Treatment		Leafy spurge control			Grass injury
		Rate	%		
		oz/A	----	%	----
		(product)			
Plateau + Sunit	15 August	4 + 1qt	52	0	
Plateau + Sunit	15 August	8 + 1qt	66	0	
Tordon + 2,4-D	15 August	32 + 32	88	0	
Plateau + Sunit	01 September	4 + 1qt	55	1	
Plateau + Sunit	01 September	8 + 1qt	89	3	
Tordon + 2,4-D	01 September	32 + 32	90	3	
Plateau + Sunit	15 September	4 + 1qt	90	2	
Plateau + Sunit	15 September	8 + 1qt	94	12	
Tordon + 2,4-D	15 September	32 + 32	91	6	
Plateau + Sunit	01 October	4 + 1qt	75	3	
Plateau + Sunit	01 October	8 + 1qt	86	8	
Tordon + 2,4-D	01 October	32 + 32	83	12	
Plateau + Sunit	15 October	4 + 1qt	67	8	
Plateau + Sunit	15 October	8 + 1qt	82	18	
Tordon + 2,4-D	15 October	32 + 32	76	14	
Control		0	0	0	
LSD (0.05)			19	11	

Table 1. Leafy spurge control by Plateau applied two consecutive years in mid-summer or fall, averaged over Valley City and Jamestown, ND locations.

Treatment	Rate	Fall 1996		Spring 1997		Fall 1997	
		Leafy spurge control	Grass injury	Leafy spurge control	Grass injury	Leafy spurge control	Grass injury
	oz/A (product)	----	%----	-----	%-----	-----	%-----
Plateau (spring)	8	0	0	47	5	37	5
Plateau (spring)	16	8	7	96	14	82	5
Plateau + MSO (spring)	4 + 1qt	14	0	54	4	50	3
Plateau + MSO (spring)	8 + 1qt	9	2	86	14	59	16
Tordon + 2,4-D (spring)	16 + 32	60	2	57	0	64	0
LSD (0.05)		24	5	13	10	22	NS
Plateau (fall)	8			99	21	50	0
Plateau (fall)	16			100	36	98	0
Plateau + MSO (fall)	4 + 1qt			99	13	81	0
Plateau + MSO (fall)	8 + 1qt			100	23	94	0
Tordon + 2,4-D (fall)	32 + 32			97	7	37	0
LSD (0.05)				NS	10	22	NS

Table 3. Leafy spurge control by Plateau fall applied with or without adjuvants, with the treatments reapplied the following fall.

Treatment	Rate	9 MAFT*		12 MAFT**		21 MAFT**	
		Leafy spurge control	Grass injury	Leafy spurge control	Grass injury	Leafy spurge control	Grass injury
	oz/A (product)	----	%----	-----	%-----	-----	%-----
Plateau	4	51	0	1	0	40	0
Plateau	8	76	4	17	2	85	0
Plateau + MSO	4 + 1qt	94	5	11	0	83	0
Plateau + MSO	8 + 1qt	98	9	55	5	88	0
Plateau + 28%N	4 + 1qt	56	4	7	1	44	0
Plateau + 28%N	8 + 1qt	78	7	25	3	85	0
Plateau + MSO + N	4 + 1qt + 1qt	91	6	28	0	83	0
Plateau + MSO + N	8 + 1qt + 1qt	99	6	76	5	91	0
Tordon + 2,4-D	32 + 32	77	2	36	0	87	0
Control	0	0	0	0	0	0	0
LSD (0.05)		14	4	24	4	16	0

*Average of results from Walcott, Valley City, and McHenry.

**Results from Walcott only.

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Revision of Award-winning Purge Spurge CD

A revision of the award-winning Purge Spurge: Leafy Spurge Database CD is being undertaken as part of TEAM Leafy Spurge technology transfer program.

The CD, first released in 1994, features hundreds of research papers, articles, and book excerpts and graphics on leafy spurge and leafy spurge management. TEAM Leafy Spurge's goal is to update the CD with literature released since its publication and to incorporate improvements users would like to see.

"The CD has been extremely popular with ranchers, land managers, researchers, extension agents and weed supervisors; so popular, in fact, that we've had a difficult time keeping it on hand," said Neal Spenser, author of the CD and research leader of the USDA/ARS Northern Plains Agricultural Research Laboratory in Sidney, Montana. "But it's time for an update, and we'd like to do whatever we can to make improvements and increase its utility to end users."

Information on the CD will eventually be linked to the TEAM Leafy Spurge website, which also will be undergoing a major revision during the next few months.

If you have articles, images or other multi-media materials that should be included on the revised CD, please submit them to Purge Spurge CD, USDA/ARS NPARL, 1500 N. Central Ave., Sidney MT 59270; (406) 482-9427; e-mail at bredlin@sidney.ars.usda.gov. Any comments or suggestions regarding improvements to the CD would also be appreciated.

Steve Merritt

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