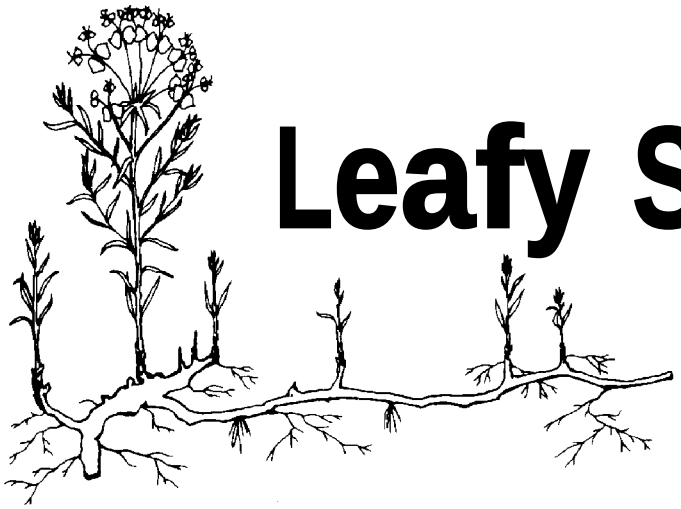

Leafy Spurge *News*

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

Volume XXIII, Issue 2 May 2001

From the Editor's Desk

Spurgefest II is almost upon us so I hope you have made you plans to attend. There is more information inside this issue about accommodations, and a bit about the program that is awaiting you in Medora. The last one was very informative and I am sure this one will be even better. So hope to see you there.

The Honoree this month is Dr. Neal Spencer who had done a great deal to help the leafy spurge program. He has been transferred and is no longer working on Leafy Spurge so this is a very appropriate time to pat his on the back for a job well done. You will enjoy the article.

The letters to the editor have nearly dried up, why the drought? There is one follow-up which you may find interesting. I am sure many of you have a lot to share with the rest of us, so send them in for the next newsletter.

Claude H. Schmidt
Editor
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Leafy Spurge Honoree
Neal Spencer, Ph.D.

No one ever said this month's Leafy Spurge News honoree lacked vision.

"In 1995, I started telling people that leafy spurge wouldn't be a problem in 15 or 20 years, that biological control and IPM (integrated pest management) would evolve and relegate it to a species of less concern," said Neal Spencer, an entomologist with the USDA-Agricultural Research Service. "Well, I really got hammered for those kinds of comments back then, but I still believe we're on track to fulfilling that goal."

Spencer's first involvement with leafy spurge came as director of ARS's European Biological Control Laboratory substation in Rome, Italy, from 1977-1981. There, he helped forge many of the partnerships that are still involved with leafy spurge research and the search for new biocontrol agents.

In 1988, ARS asked Spencer to move from its lab in Stoneville, Miss., to the Northern Plains Agricultural Research Laboratory in Sidney, Mont., with the charge of establishing a leafy spurge biocontrol program for the northern Great Plains region.

"At the time, there was no clear concept of what to do," Spencer said. "Most of the research was plot-oriented, and no one had really moved beyond that and into real, on the ground kinds of stuff that our constituents wanted to see."

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Honoree continued from page 1

Spencer thus directed his efforts at generating enthusiasm for leafy spurge biocontrol, then channeling that enthusiasm into working relationships. Within a year or so of arriving in Sidney, Spencer had joined forces with other leafy spurge biocontrol pioneers to build a list of partners that included several counties in Montana and North Dakota, state departments of agriculture, Theodore Roosevelt National Park, and several private ranchers and landowners.

"People were a little skeptical at first," Spencer recalls. "Leafy spurge had always been perceived as this insurmountable problem — people had been using Tordon or sheep and goat for years with limited success, and it took a while to recognize that there were new alternatives."

"The real key," he said, "was successfully establishing some of the region's first flea beetle populations. "Being able to take a rancher out to the field and show them flea beetle craters made a big difference," Spencer said. "It helped us move biocontrol from concept to reality, and then we really started to see some buy-in."

In 1993, Spencer again looked forward and saw a need for information that could be easily used and shared. He responded with an effort to collect and collate leafy spurge data into a format that could be used by all. That effort resulted in the "Purge Spurge CD-ROM Database," which was recognized with a Federal Technology Leadership Award in 1995. The project paved the way for many similar CDs, which are now the standard for sharing large databases of information.

TEAM Leafy Spurge, the USDA-ARS's first area-wide program to focus on an invasive weed, was conceived in 1997, and Spencer again relied on partnerships to broaden the scope of the program's research efforts.

After more than 20 years of involvement with biological control of leafy spurge, Spencer says he's proud of the role he has played.

"The really neat thing, and the most rewarding, is looking back and seeing how everyone worked together to make this thing happen — it's the result of many different people, and I was just their cheerleader," Spencer said. "Not all that long ago, no one could see any light at the end of the tunnel. Now, it'd be difficult to find anyone who doubts that role that biological control will play in the ultimate outcome of leafy spurge."

Spencer can be contacted at:
USDA-ARS/PPRU, Plant, Soil & Nutrition Lab, Tower Road, Ithaca, New York 14853 (phone: 607/255-2179; e-mail: nrs23@cornell.edu).

Letters To The Editor

Dear Leafy Spurge News:

A capsule of conclusions on ERADICATION as well as CONTROL of Leafy Spurge. Leafy Spurge can be eradicated chemically.

Its density on site can be reduced by 75% or more by simply mowing at full bloom before the seeds mature. It can be subsided and nearly controlled by simply covering patches at full bloom with 6 mil black plastic and allowing it to remain covered for one season.

It can be controlled for grain crop in field by rototilling of seed bed in preparation for planting. (I used winter wheat and winter rye fall planted) My conclusion. Chemical rogueing prior to harvest with available Broad leaf herbicide would allow harvesting of the grain crop without fear of contamination of harvested grain with Spurge seed.

First year seedlings and poorly established 2nd year are easily killed with a variety of broad leaf chemicals. Long established stands must be monitored on a 4-6 week schedule during the entire growing season for several years. The viability of Spurge rhizomes is absolutely remarkable.

Sincerely,

Allan H. Fackenthall
ahfack@aol.com

Applicator Credits *Available at Spurgefest*

SIDNEY, Montana — TEAM Leafy Spurge has announced that officials in Montana, Wyoming and North Dakota have approved chemical applicator certification/re-certification credits for license-holders who attend Spurgefest II, scheduled for June 19-21, 2001, in Medora, N.D.

"We're pleased that licensing authorities in the three states are recognizing Spurgefest II for its informational and educational value," said Chad Prosser, TEAM Leafy Spurge coordinator. "It shows that the agricultural community really values this type of event."

The three-day event will feature a symposium, tours of TLS research and demonstration sites, hands-on flea beetle collecting, a flea beetle distribution and more.

"If you're interested in controlling leafy spurge, it's an event you won't want to miss," Prosser said. "People who attend will leave with a lot of new information, and some flea beetles as well."

Following are details on applicator credits for the three states:

Montana — The Montana Department of Agriculture has approved applicator credits for private, commercial and government applicators who attend the event.

Private applicators will receive three (3) certification/re-certification credits for attending the June 19 symposium and two (2) certification/re-certification credits for attending the June 20 field tour. Private applicators must sign in each day of the event to receive full credit.

Commercial & governmental applicators with licenses in Agricultural Plant Pest, Right-of-Way, Governmental/Regulatory Weed, Demonstration & Research, and Dealer will receive six (6) certification/re-certification credits for attending both the June 19 symposium and June 20 field tour. Commercial & governmental applicators must sign in for both days of the event to receive full credit.

Wyoming — The Wyoming Department of Agriculture will allow four (4) hours of re-certification credits to holders of valid Ag Weed Control or Right-of-Way Pest Control license holders for attending the June 19 symposium and June 20 field tour. Applicators must sign in both days (name, license account number and expiration date) to receive full credit.

North Dakota — The North Dakota Cooperative Extension Service will recognize attendance of the entire event for certification/re-certification in the Right-of-Way category. Interested individuals must sign-in for all three days of the event, then submit copies of their receipt for Spurgefest II, current certification card, photo identification and financial responsibility documents (if applicable) along with a $53 re-certification fee to Andrew Thostensen, Pesticide Program Specialist, NDSU Extension Service, 166 Loftsgard Hall/PO Box 5051, Fargo ND 58105-5051.

Society of Range Management — The Society for Range Management will recognize attendance of the event for certified professionals in range management seeking continuing education units (CEUs). SRM will award eight (8) CEUs for attending the June 19 symposium, two (2) CEUs for attending the June 20 field tours, and one (1) CEU for attending the June 21 flea beetle collection/redistribution demonstration. Interested individuals must sign for each day of the event attended to receive full credit.

Spurgefest II is a production of TEAM Leafy Spurge, an integrated pest management program funded and led by the USDA-ARS in partnership with the USDA-Animal & Plant Health Inspection Service. It's goal is providing ranchers, landowners and land managers with effective, affordable and sustainable leafy spurge

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Mark Your Calendar!

Spurgefest II is set for June 19-21, 2001, in Medora, N.D.!

Credits continued from page 3

control management strategies. The schedule of events includes:

- Day 1/June 19 — Team Leafy Spurge Symposium, 8 a.m.-5 p.m. TEAM Leafy Spurge program participants will present their research and be available to answer questions. Fee: $15 (includes snacks and catered noon lunch).
- Day 2/June 20 — Tours of TEAM Leafy Spurge research and demonstration sites. An all-day tour of biological control, herbicide, herbicide+biocontrol and multi-species grazing demonstration sites. Fee: $15 (includes bus tour, snacks and BBQ lunch).
- Day 3/June 21 — Hands-on flea beetle collecting, flea beetle distribution, speakers and Medora's famous Pitchfork Fondue luncheon. Fee: $20 (includes lunch).

Additional information about the event can be found on the TEAM Leafy Spurge website at www.team.ars.usda.gov/spurgefest2.html. An electronic registration form is available at www.team.ars.usda.gov/spurgefest2/register.html. Mail-in registration forms are available by calling Theodore Roosevelt National Park at 701/623-4466, by writing to Spurgefest II, Box 7, Medora ND 58645 or by sending a request to teamls@sidney.ars.usda.gov.

For additional information on TEAM Leafy Spurge, Spurgefest II or applicator certification/re-certification credits, contact TEAM Leafy Spurge program manager Chad Prosser at 406/433-9403 (cprosser@sidney.ars.usda.gov).

Steve Merritt
TEAM Leafy Spurge technology transfer specialist
USDA-ARS Northern Plains Agricultural Research Laboratory
1500 N. Central Ave., Sidney MT 59270
406/433-9440; smerritt@sidney.ars.usda.gov

Hotel & Motel Information

Spurgefest II registrants are responsible for making their own hotel/motel reservations! If you plan on attending, please make your reservations as soon as possible to ensure that you have a room. Rooms for Spurgefest participants have been reserved in Medora at the Badlands Motel, the Medora Motel and the Sully Inn.

Following are phone numbers for hotels and motels in the area.

Medora

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

Belfield (15 miles east of Medora)

- Belv-Vu Motel – 701/575-4245
- Trapper's Inn Motel – 800/284-1855

Beach (25 miles west of Medora)

- Buckboard Inn – 888/449-3599
- The Outpost – 701/872-4717
- Westgate Motel – 701/872-4521

Dickinson (36 miles east of Medora)

- Call the Dickinson Convention & Visitors' Bureau at 800/279-7391 or see its web site at www.dickinsoncvb.com for information about lodging, dining and camping in the Dickinson area.

Additional Information

- For information on Theodore Roosevelt National Park or camping facilities in the Medora area, call 701/623-4466 or see the park's web site at www.nps.gov/thro
- For information on Medora, call the Theodore Roosevelt-Medora Foundation at 701/223-4800 or the Medora Chamber of Commerce at 701/623-4910, or see the Medora web site at www.medorand.com
- For general information on North Dakota, call the North Dakota Department of Tourism at 800-HELLOND or see its web site at www.ndtourism.com

Leafy Spurge Field Research *in Manitoba*

In 1999, the Leafy Spurge Impact Assessment estimated that 107,000 acres of public/nature land in Manitoba were infested with leafy spurge (*Euphorbia esula* L.). The report also indicated that there were potential gaps in the survey of public/nature lands. In the summer of 2000, WESTARC Group Inc., under the guidance of the Leafy Spurge Stakeholders Group, contracted with the Rural Development Institute (RDI) of Brandon University to conduct a three-year field research project on leafy spurge.

During the summer of 2000, principal researcher Pauline Morton of RDI, with the assistance of Nathan Chubak and Jennifer Pachowski, began the field research by examining the effectiveness of the *Aphthona lacertosa* flea beetles. As well, Wildlife Management Areas (WMAs) in the province were visited to determine presence or absence of leafy spurge.

The beetle component of the research focused on the *Aphthona lacertosa* populations released by the Manitoba Weed Supervisor's Association (MWSA) in 1997. Morton chose a sample of 18 MWSA sites and two additional sites, one at Spruce Woods Provincial Park and the other on Manitoba Wildlife Federation land. These additional sites were chosen for comparison of beetle activity in a protected area versus a hayfield or other utilized land.

Morton assessed beetle populations for rates of survival through methodology outlined by Dr. Rob Bourchier of Agriculture Canada in Lethbridge, Alberta. Field results indicate that the beetle populations are not sufficiently established to impact the spurge. Even where the beetle populations were relatively high, the spurge was impacted only in a small area. In addition, just one of these sites exhibited a pronounced halo.

Results from the WMA survey indicated that five out of the thirty-four WMAs were severely infested with leafy spurge, while the other twenty-nine were relatively free of spurge. Morton also found leafy spurge in Riding Mountain National Park, Spruce Woods Provincial Park, Sandilands Provincial Forest and Stephenfield Provincial Recreation Area.

The leafy spurge field research also included *Aphthona lacertosa* release sites on Ducks Unlimited land known as Jiggens Bluff which is located approximately 9.5 miles south and 1.5 miles east of Oak Lake, Manitoba. This area has expansive native grasslands, aspen/oak forests, a large marsh and adjacent wetlands. It boasts a beautiful representation of native plant species and wildlife. Unfortunately, Jiggens Bluff has been threatened by the invasion of leafy spurge since the 1950s, and it now grows rampant in many parts of the property.

Control methods to date include chemical spraying of 2-4D Amine 80 and biological control using the Black dot flea beetle (*Aphthona nigriscutis)*, the Leaf tier moth (*Lobesia euphorbiana)* and the Black flea beetle (*Aphthona lacertosa*). The 2000 field research focused on the 1997 releases of *Aphthona lacertosa*.

The purpose of the research was to document the populations of the Black flea beetle, to evaluate the effectiveness of biocontrol measures and to determine whether there were enough beetles to harvest and redistribute to other areas on the property. Morton, Chubak and Pachowski also conducted a vegetative survey. Morton developed the survey methods in consultation with Rob Bourchier of Agriculture Canada.

The results of the field research indicate that spurge infests a large proportion of the area, and it continues to spread in spite of biocontrol efforts. Researchers found a few *Aphthona lacertosa* at 2 of the 16 sites, but the beetle was virtually non-existent at all other sites. The most visible indication of biocontrol success was the ties of the Leaf tier moth, which were found in a number of locations. On the whole, spurge is growing relatively unimpeded, and native grasses and forbs are struggling to compete.

Morton concludes that more investigation needs to be done on methods to increase the survival rates of the beetles in Manitoba. Research goals for the year 2001 include revisiting the MWSA and Jiggens sites based upon predictions of peak population; releasing more beetles to closely monitor their survival rates; developing a nurse site of 100,000 beetles or more; performing soil samples; and increasing public education and awareness. Morton is hopeful that methods will be developed to help improve the survival rates of

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Improving Food Quality *Through Leafy Spurge Research*

In the last several years, researchers in the USDA-ARS's Plant Science Research unit in Fargo, ND have expanded knowledge about the growth and development of leafy spurge, particularly about dormancy in root buds. During this time, members of our team have written several articles in this newsletter discussing our expanding research program and the physiological, molecular, and genomics approaches we are employing. The time we have invested in developing a genomics-based approach to identify genes that regulate the dormancy status of root buds is beginning to pay off. This approach has increased the number of cloned leafy spurge genes from six to well over 2,000. In the last newsletter, Dr. Wun Chao described how we will use these leafy spurge genes, in conjunction with DNA microarray technology, to unravel the characteristics that make leafy spurge such an invasive and noxious weed. Genes, which are identified on DNA microarrays as either being up- or down-regulated in dormant or growing root buds, will become candidate genes. Candidate genes could ultimately be useful in identifying genes that might be useful as DNA-based "bio-herbicides." Techniques describing the process of designing such bio-herbicides will be expanded upon in future newsletter articles.

Our newsletter articles have generally described how advancing our knowledge about the growth and development of leafy spurge can help us to develop alternative integrated pest management systems. However, at this time, I would like to share some interesting thoughts on how leafy spurge research can also be beneficial to improving food quality and nutrition in developing and third-world countries. Likewise, it is also important to understand how efforts to improve the quality and production of a related crop can be beneficial in our efforts to control leafy spurge.

Cassava is a major food staple in developing and third world countries having a direct impact on the diet and income of more than 500 million people (approximately one-sixteenth of the world population). Cassava is valued for its starchy root and its tolerance for poor growing conditions. Like many crops, cassava is prone to disease, pests, and post-harvest storage concerns, but unlike many crops, can also have potentially toxic cyanide levels. Of course, by now, you must be asking yourself why would we be interested in cassava and how does it relate to leafy spurge research? The answer, cassava is the only cultivated food crop that is related to leafy spurge and is in the same family tree (both belonging to the family *Euphorbiaceae*). In the last issue of this newsletter, Dr. David Horvath described how microarrays made using DNA isolated from an annual weed like *Arabidopsis thaliana* could be used to screen for differentially-expressed genes from a perennial weed like leafy spurge. Dr. Horvath's research suggests that >60% of the genes from *Arabidopsis* are similar enough to leafy spurge genes that we could use them to study the expression of their leafy spurge counterparts. Although a 60:40 chance of detecting genes expressed in leafy spurge is good, we think we can do better. We believe that there is even a greater possibility (>90%) that cassava DNA microarrays would identify candidate genes from the closely related leafy spurge genome or that leafy spurge DNA microarrays would identify candidate genes from cassava.

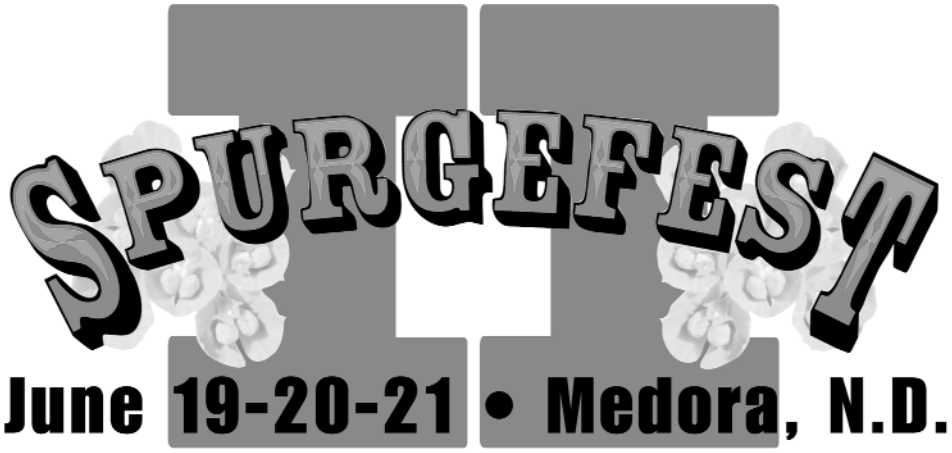
To exploit genetic resources for cassava to solve problems with leafy spurge, we have initiated a collaborative research project with the International Institute for Tropical Agriculture (IITA) in Ibadan, Nigeria. A two-year grant issued by USAID will help to fund a visiting scientist from IITA who will work with our leafy spurge research team in Fargo. This project will be beneficial to both research institutions. Since cassava is a food crop, some research has already been accomplished on mapping of its genome (a virtual road map to the genes encoding specific quality traits). It is likely that the markers used for the mapping of cassava may also be useful for mapping traits in leafy spurge. Since our research unit has a head start on the development of an expressed sequence tag (EST)-database for genes in the *Euphorbiaceae* family, scientists from IITA will be able to benefit by screening leafy spurge microarrays for genes involved in enhancing food quality and nutrition. In summary, the main point of this article is that leafy spurge research is not just limited to problems associated with agriculture in the Northern Plains, and cassava research is not just limited to problems in developing countries. However, by sharing limited resources, we have the potential to enhance the quality and nutritional value of a crop valued by one-sixteenth of the world's population, while at the same time, finding novel ways to control leafy spurge.

Dr. James V. Anderson
USDA-ARS
Plant Science Research
Fargo, ND 58105

Spurgefest II, a follow-up to TEAM Leafy Spurge's popular Spurgefest '99, will highlight the most effective and affordable Integrated Pest Management strategies for managing one of the region's toughest and most costly noxious weeds: leafy spurge.

The three-day event, scheduled for June 19-21 in the scenic badlands of Medora, N.D., will feature tours of TEAM Leafy Spurge research & demonstration sites, a TEAM Leafy Spurge Symposium, and a hands-on demonstration of leafy spurge flea beetle collection techniques.

TEAM Leafy Spurge partners will also be teaming up to collect and distribute several million leafy spurge flea beetles to ranchers, landowners and land managers.



TEAM Leafy Spurge hopes Spurgefest II will help fulfill two important goals:

• Increase awareness about the problems caused by leafy spurge.

• Emphasize the benefits of using ecologically based IPM strategies to contain this exotic invader.

If you're interested in learning more about leafy spurge and how to keep it from costing you money, you won't want to miss Spurgefest II!

• Please register by mailing in this form with your check, or by using the electronic form on the WorldWideWeb at: **http://www.team.ars.usda.gov/spurgefest2.html**

• All attendees must check in at the Spurgefest II registration center and pay any unpaid registration fees prior to attending any Spurgefest events!!! The registration center will be located at:

- Pre-registration, June 18 – Medora Community Center, 5-8 p.m.
- June 19 – Medora Community Center, 7 a.m.-7 p.m.
- June 20 – Tjaden Terrace, 7-9 a.m.
- June 21 – Tjaden Terrace, 7 a.m.

Make checks payable to Spurgefest II and send to:
Spurgefest II
Box 7
Medora, ND 58645

For additional information...

• Call the Spurgefest II hotline at 701-623-4466

• Visit the Spurgefest II website at:
http://www.team.ars.usda.gov/spurgefest2.html

• E-mail your question, comment or request to:
teamls@sidney.ars.usda.gov

We'll see you in Medora for Spurgefest!!!

Please submit the following registration form along with your payment

Name *: _____
Address 1: _____
Address 2: _____
City: _____ State: _____ Zip: _____
Phone: _____ E-mail: _____

Day	Description	# x Cost	Amount
• Day 1/June 19	TEAM Leafy Spurge Symposium *Includes breaks/refreshments, lunch & printed symposium proceedings.*	___ x $15 =	$_____
• Day 2/June 20	Tours of TEAM Leafy Spurge research & demonstration sites *Includes breaks/refreshments, lunch, speakers & transportation to/from field tour sites.*	___ x $15 =	$_____
• Day 3/June 21	Flea beetle collection demonstration & flea beetle distribution *Includes breaks/refreshments, Pitchfork Fondue & hands-on flea beetle collection demonstration.*	___ x $20 =	$_____
GRAND TOTAL			**$**_____

***NOTE:** If you are registering for more than one person, please print the names of everyone you are registering for in the following space: _____

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

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Mark Your Calendar!

Spurgefest II is set for
June 19-21, 2001, in Medora, N.D.!

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Aphthona lacertosa. This will be an important task in the development of a successful biocontrol strategy to aid in the fight against spurge in Manitoba.

The leafy spurge field research project is funded, in part, under the Matching Industry Initiative program of Agriculture and Agri-Food Canada. The Leafy Spurge Stakeholders Group, WESTARC Group, MWSA and the Manitoba Cattle Producers Association also provided in-kind and financial assistance. The Covering New Ground Program, administered by Manitoba Agriculture and Food, supports the Leafy Spurge Stakeholders Group, which also benefits from the in-kind contribution of time and expertise by its member organizations.

Beth Peevs
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