



Leafy Spurge *News*

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

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From the Editor's Desk

We have something new this year the **First Annual Leafy Spurge International Days**. This will occur June 26-27, 2000, west of Walhalla, ND. Further information is in this issue. Should be very interesting so plan on attending.

Last year a new feature appeared, **Letters to the Editor**. Well lo and behold, I got quite a few as a result of my trip to Nebraska last fall. For example, I heard from Kate Songer who just joined us last year. She, and several others, answered my plea for information. She hit the nail on the head when she stated "Awareness of landowners and education of the public, in general, is very important to accomplishing what the task force (Nebraska Leafy Spurge Task Force) hopes to accomplish." From these letters you will get a better idea how people are coping with the leafy spurge problem. Please feel free to contact them if you have some ideas that could help them.

Our **Honoree** for this issue is Dr. Russell Lorenz who has done so much in getting people aware of the leafy spurge situation and getting something done about it. I consider myself very fortunate in being able to work with him on it since 1979. In this article, which he wrote for us (one of the jobs of the editor is to delegate!) you will get for the first time in **Leafy Spurge News** the leafy spurge story as told by one who made it happen.

Claude Schmidt

Editor

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Leafy Spurge Honoree Russell J. Lorenz



More than 60 years of fighting leafy spurge has gained **Russell J. Lorenz** nicknames like "*Leafy Spurge Lorenz*", "*Mr. Leafy Spurge*" and "*Dr. Leafy Spurge*". Russ got his start in leafy spurge control when his Dad sent him out in the grain fields with an old black mare hitched to a stone boat loaded with a barrel of salt and borax solution. His Dad or his Grandfather then

mowed the spurge patches with a team of horses and a 5 ft mower. Russ then drenched the patches with the homemade solution. Leafy spurge was usually the first plant to grow back in the drenched areas. The farm is a few miles from Lake Ashtabula and it still has very little leafy spurge on it; an indication that the relatively inexpensive treatment must have done some good.

After a few years in the Navy during WW II, Russ returned to NDSU (then NDAC). He graduated in 1952 and took a job at the USDA Northern Great Plains Research Laboratory (then the U.S. Field Station) at Mandan, ND. He read everything he could find about leafy spurge during his college days. His research at Mandan was in forage and range management. By that time, leafy spurge was showing up in grasslands along the Heart River that ran through the Research Station. Russ became the unofficial leafy spurge "expert" and he talked to anybody and everybody about it.

By the early 1970s, Russ was getting phone calls and letters from people concerned about leafy spurge. Most landowners were waiting for the magic herbicide that would end the leafy spurge problem. The rapid increase

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in herbicide use had been very effective on other weeds. But the “magic bullet” for leafy spurge was very slow in coming. When an herbicide was found that appeared to be effective on leafy spurge it was very costly so many landowners did not think that they could afford to use on grasslands

Russ remained very active in advocating leafy spurge control. A new era in spurge control started when Russ, and a few others, encouraged land owners and land managers to write letters or call legislators, administrators, researchers and anyone else they thought could and should help solve the leafy spurge problems.

Directly and indirectly this action led to the **Leafy Spurge Symposium** held in Bismarck in June of 1979. This symposium brought together all of the people knowledgeable about leafy spurge and its social and economic impacts in the United States and Canada. In December 1979, the **Northern Regional Leafy Spurge Conference** was held in Billings, MT. This meeting was a presentation of the results of the Bismarck Symposium to administrators and policy makers, to solicit their help in developing a plan that would organize the research, education and control efforts in all of the states and provinces that were experiencing leafy spurge problems.

To ensure that the plan laid out at the Billings meeting was expedited, six people were appointed to a protem steering committee. A course of action was developed by the protem committee and they requested that Dr. Russ Lorenz head up a Working Task Force to develop a total program package involving research, extension-education and improved coordination among all entities involved in the leafy spurge program.

From that point on, Russ became even more involved. Through his efforts and guidance, the Task Force became part of the **Great Plains Agricultural Council (GPAC)** that added continuity and exposure to several more states. After his retirement from ARS in April of 1985, NDSU put him on a part-time appointment with duties including the leafy spurge project. To help gain support for the biological control of leafy spurge, he prepared the document on behalf of the GPAC-Leafy Spurge Task Force to petition USDA-APHIS to take on the bio-control of leafy spurge and then prepared supporting documentation to get Congress to

provide added funding for APHIS to speed-up the process. The GPAC Task Force appointed Russ to serve as coordinator and facilitator for all leafy spurge activity. Although he never did any actual research on leafy spurge he was the hub for sharing information for people in several states and provinces. Anyone writing a question or a need in their program, would contact Russ and usually he could help solve their problems.

Russ was involved in many other aspects of leafy spurge control through the years. A few of these will give you an idea of the wide variety of his involvement. He arranged for two ranchers, one from Montana, and one from North Dakota, to make a trip to Europe to visit the USDA and Commonwealth Labs where the screening of biocontrol agents was being done and to see first-hand what these insects do to leafy spurge*. He served as editor of the **Leafy Spurge News** for several years. He helped several states organize their weed control associations and he drafted the plan for organizing the biological control program at the state, county and landowner/manager level in North Dakota. This plan was also adopted in Nebraska. He discussed research needs with researchers and administrators and provided counsel for anyone requesting help.

Russ believes that leafy spurge is probably here to stay, but in the past 20 years we have come a long way in learning how to live with it and to manage the land so clean land can be kept clean. By using “all the tools in the box”, leafy spurge is not the threat it used to be, but it can be a sleeping dragon that requires constant vigilance.

Asked what his greatest contribution to the leafy spurge program he replied “I have no major contribution to the program, but my greatest satisfaction has been in working with hundreds of dedicated people – land owners, land managers, researchers, administrators, chemical company reps, educators, news media, legislators, county and state officers and workers and many, many others. They are the real heroes, they got us to where we are today”.

* For further information on this trip see Nov 1998 issue of Leafy Spurge News, Vol XX #4.

Dr. Russell J. Lorenz

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First Annual Leafy Spurge International Days

NDSU Extension Service and the Pembina County Biological Weed Control Office are sponsoring the first annual Leafy Spurge International Days on Monday and Tuesday, June 26 & 27, 2000 at Frost Fire Mountain, 7 miles West of Walhalla, ND, on County Road 55.

June 26 is **Researchers Day**. Activities will highlight leafy spurge research results from **Manitoba, Minnesota, Montana** and **North Dakota**. Leafy spurge control scientists who specialize in chemical and biological control methods will share research data and related displays with their fellow presenters beginning at 1:00PM on June 26. The day's activities will conclude with evening networking sessions for interested participants. Short order meals will be available during the day at the Frost Fire Lodge. The Walhalla Country Club with its restaurant, bar and golf course will be open to workshop participants following the day's program.

June 27 is **Leafy Spurge Information Day**. Farmers, ranchers, weed board members; government officials and other interested members of the public are invited to the educational sessions of Leafy Spurge Information Day. The morning public program will include information on chemical weed control research. The afternoon sessions about biological weed control will focus on insect use in controlling leafy spurge. Registration starts at 9:00 a.m. and educational sessions begin at 9:45 a.m. U.S. Customs Stations at Walhalla and Maida (North of Langdon) open at 9 :00 A.M.. The noon meal can be a buffet or short order burger and fries type prepared by Frost Fire.

Participants in the June 27 afternoon session will tour an established leafy spurge beetle crater near Walhalla. At the crater, beetle netting, separation, packaging and transportation will be demonstrated. Participants will be able to take home leafy spurge beetles by registering their requests to the sponsoring organizations by June 20, 2000. (Those transporting beetles home will require coolers with blue freezer containers to keep the beetles dry. Although ice can be used in beetle transportation, if necessary, the insects do not accommodate wet conditions well. The beetle containers are a little larger than a soda pop can.) Canadian residents note the Manitoba Biological Control Agent is applying for proper papers to enable transporting the leafy spurge beetles into Canada.

Registration fees for the conference will be at minimal cost depending on the cost of the beetle collection, labor, and transportation costs.

Frost Fire Mountain Ski Area and Theater is located 7 miles west of Walhalla on County Road 55 in the beautiful Pembina River Gorge. The summer theater weekend production at Frost Fire Mountain is **Big River**. Call (701) 549-3600 for information about seating and ticket prices.

The Following Towns have motel facilities:

Walhalla Motels:

Forest Wood Inn...549-2651

Hill View Lodge..549-3300

Cavalier Motel: 33 miles

Cedar Inn... 265-8341

Main Street Motel...256-2950

Landon Motels: 25 miles

Landon Motor Inn..256-3600

Requests for additional information and for ordering colonies of leafy spurge beetles can be made with Pembina County Extension Office at 301 Dakota Street West #7, Cavalier, ND 58220. The phone number is (701) 265-8411; Fax is (701) 265-4876. Registration forms will be available from weed boards, extension offices, and Manitoba Agriculture representatives this spring.

Leafy Spurge Molecular Genetics Program Begins in Fargo

(USDA-ARS-Red River Valley Agricultural Research Center, Fargo, ND). Dr. Wun Chao joined the Plant Science Research Unit as a Research Plant Molecular Geneticist. Dr. Chao received his Ph.D. in molecular biology from the University of California-Riverside in 1996 and has recently completed post-doctoral research at Washington State University. Dr. Chao replaces the late Dr. Richard Shimabukuro, a plant physiologist, renown for his research on herbicide mode of action. The goal of Chao's research is to develop a base of knowledge on genetic and molecular aspects of leafy spurge and other invasive perennial weeds. In the long-term, his research should lead to new management for perennial weeds.

Letters To The Editor

Dear Leafy Spurge *News*

My relationship with leafy spurge started about one year ago. An area rancher approached me about trying to find some beneficial bugs that might work on his leafy spurge, as he prefers not using herbicides. A few days later, I saw an advertisement for the quarterly meeting of the Nebraska Leafy Spurge Task Force. I attended the meeting mostly because I felt I needed some background on leafy spurge and to determine how much of a problem we have here in Nebraska. I learned so much, and felt so guilty since I was not aware that we have such a problem in Nebraska with leafy spurge, but with other noxious weeds.

I then became a member of the task force and have tried to keep up on what they are accomplishing and where they are struggling. It has certainly been an education for me.

I probably should back up and tell you something about myself and my business. My father, Jack Gothard, and I own a business called Gothard Inc. (insect raising). My grandfather started this business back in 1959 when the cotton boll worm was a huge problem in the El Paso, Texas area, and the pesticides they were using were no longer effective.

So, as people here know that we raise beneficial insects and might have an idea on how it all works, they have enlisted our help.

However, since we've not had experience in weed control, it is a new area for us, and we are trying to learn what we can so as to be as helpful as possible. Anything that deals with bio-control as opposed to chemicals, I find very interesting and exciting!

Our county is the largest county in Nebraska. It covers a huge area! We have a weed superintendent, Les Harms, who to my understanding is responsible for making sure the landowners are aware of any weed problem they might have, and from there, to offer them solutions to their problem and apply the chemicals or beneficials as requested by the landowners. I haven't had the opportunity to visit with Mr. Harms to find out what kind of a problem we have or what is being done. The few ranchers I have talked to, seem to feel we have a problem that is growing rather quickly.

I hope this information will help you out. Please keep up the good work! Awareness of landowners problems and education of the public, in general, is important goal that the task force hopes to accomplish.

Kate Songer

Gothard Insectaries
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Dear Leafy Spurge *News*

For the past 3 years, I have been involved in a leafy spurge control research project in Malin, OR (near Klamath Falls) in cooperation with a private landowner, Richard Sacchi, the Klamath Falls BLM, Oregon State Extension, and Klamath Experiment Station. Eastern Oregon has been problematic for biocontrol agent success on leafy spurge. Oregon, in general, has very little leafy spurge and unfortunately, it is not being taken as seriously as I believe it should be. The project I am involved with has looked at using goat grazing in conjunction with herbicide applications for leafy spurge control. At this point, the goat grazing has been the most successful treatment. In fact, our grazing only treatment is as good as our grazing/picloram spray treatment, and far better than the herbicide only treatments. Next year should see the addition of a competitive forage trial on top of the treatments.

Hopefully we will soon have a reasonable prescription/recommendation for landowners with leafy spurge infestations in the Klamath Falls area.

Keep up the good fight!!! I appreciate your efforts and the newsletter!!!

Lesley Richman

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Dear Leafy Spurge *News*

Thank you so much for adding me to your mailing list for the Leafy Spurge News. I apologize that I have not responded to your letter sooner. I have been working on your request. In October, I sent out a "weed information" form to the four counties which are parties to the Niobrara Council. I am slowly getting this information back and should have everything compiled soon. This will give the council an idea of what is and what is not being done to control Leafy Spurge.

From conversations with county officials, we do not have a widespread Leafy Spurge problem in the scenic river corridor. However, we do have some isolated pockets. By taking action now, we can hope to control the spread of leafy spurge.

Rodney L. Verhoef

Executive Director
Niobrara Council P.O. Box 208
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Dear Leafy Spurge News

I enjoyed meeting and visiting with you on the Nebraska Outback Tour. Related to Leafy Spurge infestation — Randall RC&D became involved in wood products development as a spinoff of our efforts to help control cedar invasion on grazing lands. Cedar is considered an invasive plant on hundreds of thousands of acres of grazing lands. Cedar has reduced available grazing about 75% on these acres. Control methods such as, herbicides and prescribed burning, are not workable on most of these acres for many reasons. If we can profitably harvest and market this “weed,” landowners can recover some lost income. And with good management this could be a second source of income over the long haul.

Problems we have to deal with in accelerating control of Leafy Spurge:

1. Land owners and operators reluctance to improve their knowledge, skills, and abilities to control noxious weeds (including Leafy Spurge).
 - a. Won't do any good if my neighbors don't act also.
 - b. High costs of control methods.
 - c. Not enough time available.
 - d. No Leafy Spurge on their land so not a concern.
2. Some county commissions not providing adequate financial support (2 of our 6 counties do not have weed board or supervisor). There is strong public pressure to keep local property taxes/county budgets down. At the same time inflation, demand for better schools, roads, increase in federal and state government dictated county expenditures, etc., place tremendous pressure on county commissioners to reduce spending where possible.
3. Some county weed boards will not put forth the effort needed. If the county commission or state won't provide the funds, there is no county program — no effort made to develop a non-property tax or state source of funding. Some boards are reluctant to invite others to partner with them. Some boards do not provide strong support toward public information and education, hiring and training quality employees, and enforcing existing noxious weed laws.
4. We lack good documentation of the extent of the Leafy Spurge problem and its economic impact.

In contrast 2 counties in Randall RC&D are doing an effective job. A third county has taken the lead on biological control methods in this part of South Dakota. This county is also developing a Geographic Information System project that will be used not only by the county weed board to better track noxious weeds, but also the highway department, the tax assessor, and extension office. Randall RC&D provided some “seed dollars” to help attract other funds to this project. A few years ago this RC&D Council made it possible for the Soils Survey information to be digitized and placed into a Geographic Information System format. That soils information will be used as the base for this county's Geographic Information System program.

Randall RC&D Council has an Objective in their Area Plan (5-10 yr. long-range plan) to reduce noxious weeds. In our Annual Plan of Work there is an Action Item to assist local sponsors (includes county weed boards) with noxious weed control Information and Education efforts.

Randall RC&D Council has been requested to help develop a multi-county biological control project for Canada Thistle, Musk Thistle, and Leafy Spurge. This request came from a conservation district that covers the 2 counties who feel they cannot afford a weed board or a weed supervisor. Our task will be to provide the forum for all stakeholders to interact and work toward a feasible project.

Les Labahn

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Proceedings (continued from September 1999 Leafy Spurge News)

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

Economic Analysis of Sheep Grazing of Leafy Spurge: Preliminary Results

Leafy spurge, a widely established exotic, noxious, perennial weed is a major threat to the viability of commercial grazing and to the beneficial outputs of wild lands in the Upper Great Plains. Treatments for leafy spurge are usually based on indicators of physical control, rather than economic criteria. A major benefit to land managers is the identification of economical control methods and an understanding of the economic factors influencing long-term treatment decisions.

The focus of this study was to evaluate grazing scenarios that would most likely be experienced by ranchers adopting sheep grazing as a control method for leafy spurge. The model starts with initial values describing the physical and economic characteristics of an infestation (e.g., infestation size, AUM value). The opportunity cost of no control is measured by estimating the loss of grazing from the initial infestation and the subsequent losses from expansion. The benefits of control include (1) recapturing grazing outputs from current infestations and (2) maintaining existing grazing outputs by preventing infestation expansion. The costs of control included either (1) material, labor, equipment, and lease expenses in the scenarios examining lease arrangements or (2) net returns from sheep enterprises. Net returns (revenues less expenses) from sheep enterprises could be positive or negative, depending upon profitability of the enterprise.

The model estimates the economic viability of using sheep to control leafy spurge by (1) comparing only treatment expenses with treatment returns (i.e., benefit-cost approach) and (2) comparing potential overall losses with sheep grazing versus losses without control (i.e., least-loss approach).

When a sheep enterprise produces positive net returns (enterprise revenues are greater than production costs), leafy spurge control will be economical. However, when a sheep enterprise has negative net returns (production costs exceed revenues), those costs (losses from the sheep enterprise) must be compared to the benefits of leafy spurge control. Likewise, costs of leasing sheep for leafy spurge control must be compared to the benefits of control.

To represent a reasonable range of production possibilities for a new sheep enterprise, eight enterprise scenarios were developed to consider different levels of enterprise performance, debt, and size. Initial budgeting analyses indicated that four out of the eight scenarios examined should/could produce positive enterprise net returns. The initial enterprise characteristics resulting in negative net returns included poor flock performance (e.g., low lambing percentage, light weaning weights) and enterprise debt (e.g., financing the purchase of breeding stock and equipment). Thus, analyses have focused on evaluating the feasibility of the scenarios with negative net returns.

With leafy spurge infestations of 50 to 250 acres, \$15/AUM, 0.2 to 0.4 AUMs/acre carrying capacity, and a 15 percent leafy spurge canopy cover, preliminary results indicate that annual sheep enterprise losses down to (\$2.30)/ewe would still result in control benefits exceeding control costs over a 10-year period. Adjusting for carrying capacity ranges of 0.4 to 0.6 and 0.6 to 0.8 AUMs/acre, annual enterprise losses down to (\$3.85) and (\$5.40)/ewe, respectively, would result in control benefits exceeding control costs.

Assuming the same initial conditions (50 to 250-acre infestations, \$15/AUM, 0.2 to 0.4 AUMs/acre carrying capacity, and a 15 percent leafy spurge canopy cover), annual sheep enterprise losses down to (\$4.70)/ewe would result in less economic loss than no control (i.e., doing nothing to control the infestation) over a 10-year period. Adjusting for carrying capacity ranges of 0.4 to 0.6 and 0.6 to 0.8 AUMs/acre, annual enterprise losses down to (\$7.90) and (\$11.00)/ewe, respectively, would result in less economic loss than no control.

Preliminary results indicate that using sheep to control leafy spurge can be economical in many situations found in the Upper Great Plains, even when net returns from sheep enterprises are negative. However, further refinement of the model is needed, as some model components are partially based on "best guesses" of range and weed scientists.

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Proceedings (cont.)

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

Impacts of Leafy Spurge on Local and Landscape Patterns of Plant Species Diversity in Theodore Roosevelt National Park

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Abstract. This study was conducted in the South Unit of Theodore Roosevelt National Park, North Dakota. Five grassland, ten shrubland, and six woodland community types were identified and evaluated in 1997 using the Field Methods for Vegetation Mapping and National Vegetation Classification System documents prepared by The Nature Conservancy (TNC) for the National Vegetation Mapping Program. Seven of the identified communities were found to be currently infested with leafy spurge and were evaluated using TNC procedures. Information on local patterns of diversity were evaluated from Trammell and Butler (1985, *J. Wildl. Manage.* 59(4):808-816). Because the invasion of leafy spurge into the Park is a relatively recent phenomenon, historical species richness for the seven communities was estimated from autecological and phytosociological studies conducted prior to 1985. A similarity matrix using species presence was calculated among 1997 sampled communities for both infested and non-infested communities and pre-1985 sampled communities. Percent foliar cover was used to calculate Shannon Diversity Indices for infested and non-infested communities sampled in 1997.

Similarity values averaged 74% (range = 68% to 90%) between 1997 and pre-1985 sampled communities at the

landscape level. This suggests that the TNC protocol used in evaluating infested and non-infested communities was adequate for detecting the majority of the species present in each community type. Mean species richness was significantly lower for the two woodland communities evaluated at the local level. However, no difference in mean Shannon diversity values between infested and non-infested communities was observed. These results indicate that species not recorded on infested sites were probably minor constituents of the community type and had little effect on the diversity index. In contrast, mean Shannon diversity values were significantly reduced by heavy infestations of leafy spurge for all seven communities evaluated at the landscape level. The loss of species on infested sites at this level is also reflected in reduced mean diversity values. Further, similarity values among 1997 sampled non-infested communities, pre-1985 sampled communities, and heavily infested communities was reduced to an average of 49%. Consequently, communities infested with leafy spurge are now compositionally less rich compared to their current non-infested counterparts and their historic (pre-1985) non-infested counterparts. Decreases in similarity and diversity values likely reflect a combination of the local extinction of infrequent species and a reduction in frequency and cover for the common species. Several species, identified as consistent components of several non-infested communities, were conspicuously absent from infested communities. Depending on the redundancy of species across the landscape, such a trend strongly suggests that some species may be reduced by heavy infestations of leafy spurge to the point of local extinction in the Park.

Table. Patterns of local and landscape levels of mean species richness and mean Shannon's diversity index in response to heavy infestations of leafy spurge in Theodore Roosevelt National Park. Effects of infestation on mean diversity and richness within each community type were compared using a 2-sample t-test (*= $P < 0.05$).

Community Type	Local Patterns				Landscape Patterns			
	Species Richness		Shannon's Diversity		Species Richness		Shannon's Diversity	
	Infested	Non-infested	Infested	Non-infested	Infested	Non-infested	Infested	Non-infested
Cottonwood	na ¹	na	na	na	15	22*	2.26	2.94*
Silver Sagebrush	13	15	1.96	1.89	8	29*	1.43	2.21*
Green Ash	26	31*	2.68	2.59	14	31*	1.86	3.09*
Juniper Slope	19	24*	2.24	2.18	15	26*	2.08	2.80
Buckbrush	na	na	na	na	6	13*	1.13	1.39
Needle & Thread	12	13	1.64	1.68	10	21*	1.83	2.78*
Western Wheatgrass	na	na	na	na	6	18*	1.08	2.28*

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Leafy Spurge and the Cold and Flu Season

(USDA-ARS-Red River Valley Agricultural Research Center, Fargo, ND). “Take two aspirin, drink lots of fluids and get plenty of rest.” How often have you heard that line from a doctor on TV? Quite a bit I would venture to guess. If you’re fighting weeds you’ve heard much the same thing: “Apply 1 quarts per acre in the spring and release at least 500 beetles in the patch”. There are similarities in how we manage these different pests. In both cases, you should avoid the pest if you do not have it or prevent its spread if you have the problem. Once you have the disease or weed infestation all you can do is treat the symptoms. For example, when you take aspirin for the flu you are treating the symptoms. The aspirin will not kill the “flu bug”. The disease will run its course as your body fights the infection. Next year you will probably get the flu again. When you treat a weed infestation, you generally attack the symptoms. To prevent loss of crop yield or quality you destroy the top growth. Even if you kill every last weed in the field or pasture, you can be fairly sure that you will have an infestation next year. Why?

With the day-to-day demands of management and production, most ranchers, farmers and land managers do not have time to contemplate such questions. However, there are some doctors of science that contemplate such questions for a living. This contemplation gives rise to scientists who work rapidly to discover practical and effective ways to manage weeds, often by treating the obvious symptoms. Others scientists are charged with providing long-term solutions or solutions to particularly difficult problems by focusing on the cause of the problem rather than attacking the symptoms. Both scientific approaches to solving problems in weed management, or other problems for that matter, are justified, necessary, and can be equally challenging. The USDA-ARS Plant Science Research unit in Fargo is charged with solving long-term problems in weed management. We are seeking solutions to the management of weeds like leafy spurge and wild oats by focusing on the cause of the problem. Since dormancy in seeds and root buds is the key reason why weeds persist despite our best efforts to control them, we have focused our research on discovering the mechanism that regulate dormancy in weeds. Meanwhile, until the time we have sufficient knowledge about dormancy to provide new solutions, either take two aspirin and go to bed or apply 1 quart per acre and release 500 beetles in the patch.