

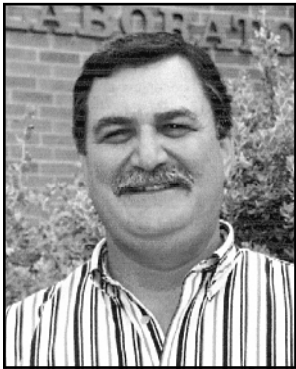
Leafy Spurge *News*

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

Volume XXI, Issue 2 May 1999

Leafy Spurge Honoree

Dr. Lloyd E. Wendel



A Texan by birth, Lloyd grew up pulling and spraying weeds, and doctoring “wormies” on a family ranch in the Hill Country of Texas. This early introduction to weeds and insects, i.e., screwworms, convinced him that attending college would be a ticket away from these seemingly endless tasks and pests. After obtaining a BS

from Texas Tech University and a MS and Ph.D. from Texas A&M University in entomology, and opportunity to work again on screwworms and weeds, in a different capacity was waiting.

Lloyd started his career in the USDA with the Screw-worm Eradication Program located in Mission, TX in 1977. The screwworm is the larval stage of a blow fly that feeds entirely on warm-blooded animals. This was the most devastating pest to the livestock industry from Florida to California and throughout all of Mexico. The strategy for eradication was the release of sterile males that competed for the wild females thereby reducing the number of offspring produced. The fly release was augmented by the production and aerial distribution of a solid bait toxicant that was essential in the reduction of sporadic outbreaks that would occur. As the Section Head for the Methods Development Unit, he had an opportunity to work in both the rearing of insects and the field delivery components of the program. In 1982 the success of the program was phased out of the states and moved to Mexico. During this time the Animal and Plant Health Inspection Service (APHIS) was building a new facility at the Mission, TX site to house the National Biological Control Center. The selection of Lloyd at this

location provided an opportunity to expand the knowledge gained from the eradication program to new strategies for managing insects utilizing biological control agents.

This was soon to change, when APHIS received a proposal from Dr. Russ Lorenz ARS-USDA, to work on Leafy Spurge utilizing biological control strategies against weeds utilizing insects, and not the requirement of pulling weeds. During this same time the Bozeman Laboratory, MT, was initiated to provide an extension of the Mission location to the field for managing weeds. After about one year with little fiscal support and fewer insects to work with, Dr. Don Anderson, NDSU, ND, inquired during a planning meeting if the project needed dollars. Within one year Lloyd had a new challenge, administer a significant increase in fiscal resources while managing a multi-state program against leafy spurge. With the help of some dedicated colleagues, insects were soon on the way from Europe. This launched APHIS into the most successful weed biological control program to date. Some of the highlights of the leafy spurge program, in addition to the removal of spurge from rangeland and the regrowth of grasses, is the landmark economic analysis done on both rangeland and wildland by the group at NDSU. The lessons learned in releasing insects and how to improve the matching of insects to the weeds utilizing DNA technologies as is now being done in the Russian Knapweed project, will provide scientists a better understanding of the origin of a weed and the insects associated with the plant in its native country. As co-author of the grant that launched the TEAM Leafy Spurge demonstration project Lloyd has had an opportunity to facilitate the integrated approach to weed management similar as the successful approach in the eradication program of the screwworm in the southwest.

Currently Lloyd is responsible for the Bozeman, Mission and Niles, MI laboratories developing and delivering biologically based strategies against the knapweed complex, toadflax, purple loosestrife, aquatic weeds, brown citrus aphid, cereal leaf beetles, mexican fruit flies and sweetpotato whitefly.

Even though Lloyd's career in the USDA took him from those long hours on the ranch, he has come full circle and enjoys battling weeds and insects with a different

approach. He greatly enjoys the weekends when he can return to the ranch and relax, digging post holes, building fence, and waiting for the day to move back permanently.

Lloyd E. Wendel

USDA-APHIS-PPQ

P.O. Box 2140

Mission TX 78573-2140

(956) 580-7301, Lloyd.e.wendel@usda.gov

Signaling — Going to the Root of the Problem and Beyond

The main factor responsible for making leafy spurge and other perennials such as invasive weeds is their ability to regenerate from underground adventitious shoot buds (also referred to as root buds). These buds form early and continuously during development of the root system and remain in a "dormant" state until signaled to resume active growth. If a growth signal is not received during the active growing season, changing environmental conditions will signal the root buds to acclimate to withstand the harsh winter conditions experienced in the Northern Great Plains. Last fall, leaf spurge root buds probably received the signal to resume growth as soon as the first frost killed the above ground vegetation. Researchers hypothesize that fall soil temperatures are a key factor leading to the acclimation of root buds to harsh winter condition. Changes in soil temperatures and photoperiod are also likely involved in signaling leafy spurge crown and root buds to resume growth in the spring. This year, leafy spurge crown buds around the USDA/ARS Biosciences Research Lab in Fargo resumed growth prior to April 1st (no fooling).

Just as traffic lights signal vehicles and pedestrians when it is safe to proceed, signaling systems in plants regulate the growth of buds and other tissues. In leafy spurge, the presence or absence of signals from the shoot cause root bud growth or dormancy. For example, when signals or signaling systems are removed by decapitating leafy spurge plants, the root buds resume growth. Dr. Horvath, with the Plant Science Research group in Fargo, has recently shown that there may be several signaling systems in the shoot that regulates root bud growth. Researchers have recognized that shoot apical meristems produces a hormonal signal (called auxin) that controls the growth of performed buds, such as root buds. Horvath has good evidence that mature leaves of leafy spurge produce another signal that prevents root bud growth when as few as seven to twelve leaves remain on the shoot. Dr. James Anderson, a Research Chemist also with the Plant Science Research group in Fargo, has been working with Horvath

to verify and explain the second signaling system. Dr. Mike Foley, research leader of the group, explains signal transduction and Anderson's work this way. Anderson is a hybrid between Ben Franklin, who discovered electricity (a signal), the people who design complex electrical appliances (signal transduction pathways), and an appliance repairman who looks at the problem, reads wiring diagrams, and explains why your appliance is acting in some particular way. Researchers have to discover the signal, figure out how the signal(s) travel around pathways in the plant, determine the biological switches in the pathway(s), and figure out how signals turn these switches on and off. Anderson and Horvath do not yet know what the second signal is but they do know that the signal affects growth of cells. For root buds to grow, their cells must go through a finely orchestrated pattern of cell cycle progression in which arrested-growth is removed leading to cell division and elongation. Anderson has shown that if several leaves are left on the shoot of leafy spurge, and all other auxin producing shoot buds are removed, the cell cycle of root buds do not advance to the stage of cell division.

Biological research such as the studies by Anderson and Horvath must be accomplished before we can manage perennial weeds in new and more effective ways. Even if luck prevails and someone discovers a practical, safe, and cost effective chemical or biological control measure for leafy spurge, basic knowledge on signal transduction and root bud dormancy relates to other hard-to-control perennial weeds. By understanding the basic metabolic characteristics of leafy spurge, researchers can begin to suggest and target specific sites which influence the viability and invasiveness of perennial weeds.

James V. Anderson

USDA-ARS, Biological Research Laboratory

Plant Science Research

Fargo, ND 58105-5674

(701) 239-1263, fax (701) 239-1252

Email: andersjv@fargo.ars.usda.gov

Team Leafy Spurge Slates Free Flea Beetle Give-aways

Ranchers interested in biological control of leafy spurge can get free flea beetles, and plenty of information, at a series of TEAM Leafy Spurge tours set for June. The tours and flea beetles give-aways will be held in Ekalaka (Montana), Buffalo (S.D.), Sundance (Wyoming) and Medora (N.D.).

TEAM Leafy Spurge coordinator Chad Prosser said the tours and flea beetle give-aways are part of an effort to get more people involved with alternate methods of controlling leafy spurge.

“Biological control is an important part of Integrated Pest Management (IPM) strategies for leafy spurge, and this is our way of making sure ranchers and landowners have all the resources they need to start or increase flea beetle populations on their property,” Prosser said.

The flea beetle give-aways will be held in conjunction with tours of TEAM Leafy Spurge research and demonstration sites designed to give ranchers a “first-hand look at IPM in action,” Prosser said. “The tours will give ranchers a chance to see results produced by IPM tools like multi-species grazing, herbicides and biological control as well as combinations of different tools being used together,” Prosser said. “We’ll also have plenty of information available and will hopefully be able to answer any questions ranchers and landowners might have.”

Prosser advised ranchers who want flea beetles to come prepared.

“We recommend that you come equipped with a cooler and some blue ice,” he said. “That will allow you to keep the flea beetles cool and alive until you can get them back to your release site.”

Following are details on the tours and give-aways:

- **June 21 — Ekalaka, Montana:** A tour of TEAM Leafy Spurge demonstration sites will be held in conjunction with the annual Range Days tour. Leafy spurge flea beetles will be distributed at 1 p.m. in the county weed shop; the tour departs at 2:30 p.m. from Carter County High School. Local contact: Larry Brence, Fallon & Carter County Extension agent, 406/778-7110.
- **June 23 — Buffalo, S.D.:** A tour of TEAM Leafy Spurge demonstration sites will leave from the Harding County Courthouse at 12:30 p.m. Leafy spurge flea beetles will be distributed after the tour at around 5:30 p.m. Local contact: Ken Nelson, Harding County Extension agent, 605/375-3412 (knelson@rapidnet.com).
- **June 24 — Sundance, Wyoming:** A tour of TEAM Leafy Spurge demonstration sites will depart from the Crook County courthouse in Sundance at 9:30 a.m.; local residents can also rendezvous with the tour at the Lazy Y at 10 a.m. The tour includes lunch; flea beetles will be distributed at the tour’s conclusion. Local contact: Dick Sackett, Crook County Weed & Pest supervisor, 307/283-2375, or Gene Gade, Crook County Extension agent, 307/283-1192.
- **July 1 — Medora, N.D.:** Three to six million flea beetles will be distributed on the afternoon of July 1 as part of a special three-day TEAM Leafy Spurge event called “Spurgefest ’99.” For more information, see the Spurgefest ’99 web site at <http://www.team.ars.usda.gov/spurgefest>. Contact: Chad Prosser, TEAM Leafy Spurge coordinator, 406/482-9403 (chad@mail.sidney.ars.usda.gov).

Prosser stressed that tour and insect distribution dates are tentative and may be influenced by weather or other factors. Additional information on the tours and give-aways will be publicized prior to the scheduled tour dates.

Steve Merritt

USDA/ARS NPARL Team Leafy Spurge
1500 N Central Ave., Sidney MT 59270
(406) 482-9440, FAX (406) 482-5038
Steve@mail.sidney.ars.usda.gov
Home (406) 482)-4848; smerritt@lyrea.com

1999 Leafy Spurge Symposium Participants Grouped by Subject Matter

BASIC

Responses of glutathione-S-transferase and glutathione reductase to environmentally and chemically-induced stresses; amelioration by polyamines in leafy spurge (*Euphorbia esula* L.).

David G. Davis, Harley R. Swanson, Kristi A. Biewer, James V. Anderson, and Donald R. Rusness, USDA/ARS, Fargo, North Dakota. (Poster)

AFLP analysis on individuals from leafy spurge populations characterized as resistant or susceptible to flea beetle bio-control agents. David P. Horvath, USDA, Agricultural Research Service, Fargo, North Dakota.

BIOLOGICAL CONTROL

Aphthona flea beetle establishment determined by soil composition and root growth pattern. Donald A. Mundal and Robert Carlson, North Dakota State University, Fargo, North Dakota.

Integration of *Aphthona* flea beetles and herbicides for leafy spurge control. Jeff A. Nelson, Rodney G. Lym, and Robert Carlson, North Dakota State University, Fargo, North Dakota.

Know thine enemy — understanding weed management through biological research. James V. Anderson, David G. Davis, Michael E. Foley, and David P. Horvath, USDA, Agricultural Research Service, Fargo, North Dakota.

Sex ratio effects on fecundity and fertility of a leafy spurge flea beetle *A. lacertosa*. Denise Olson and Don Mundal, North Dakota State University, Fargo, North Dakota.

CHEMICAL

Imazapic for leafy spurge control. Denise Markle and Rodney G. Lym, North Dakota State University, Fargo, North Dakota.

Wyoming's research on leafy spurge. Mark A. Ferrell, Extension Pesticide Coordinator, University of Wyoming, Laramie, Wyoming.

ECOLOGY

Above ground effects of flea beetle releases on leafy spurge infested rangeland. Don Kirby, North Dakota State University, Fargo, North Dakota.

Effects of prescribed burning and herbicide treatments on leafy spurge (*Euphorbia esula* L.)

Chadley W. Prosser, Kevin K. Sedivec, and William T. Barker, USDA, Agricultural Research Service, Sidney, Montana.

Impacts of leafy spurge on local and landscape patterns of plant species diversity in Theodore Roosevelt National Park. Dan R. Cogan, U.S. Bureau of Reclamation, Denver, Colorado and Jack L. Butler, Central Missouri State University, Warrensburg, Missouri.

Seed study of a leafy spurge infestation. John Sterling, Don Kirby, and Rodney G. Lym, North Dakota State University, Fargo, North Dakota.

ECONOMICS

Economic analysis of sheep grazing of leafy spurge: preliminary results. Larry Leistritz, Randy Sell, and Dean Bangsund, North Dakota State University, Fargo, North Dakota.

Leafy spurge (*Euphorbia esula* L.) perceptions by ranchers and land managers. Randy Sell, Research Scientist, North Dakota State University, Fargo, North Dakota.

GRAZING

Comparison of companion grazing and single species grazing on leafy spurge infested rangeland. Jack D. Dahl and Timothy C. Faller, Hettinger Research Extension Center, Hettinger, ND, Kevin K. Sedivec and Jerrold Dodd, Animal and Range Sciences Department, North Dakota State University, Fargo, ND, and James Karn and Don Stecher, Northern Great Plains Agricultural Research Center, Mandan, ND.

Sheep grazing with flea beetles to manage leafy spurge. K. G. Beck, L. J. Lamming, H. D. Fraleigh, and J. R. Sebastian, Colorado State University, Fort Collins, Colorado.

Removing the constraints of sheep as an alternative integrated pest management tool. Timothy C. Faller and Jack D. Dahl, Hettinger Research Extension Center, Hettinger, North Dakota.

Progress update on toxic compounds in leafy spurge for ruminants. Fathi Halaweish and Scott Kronberg, South Dakota State University.

TECHNOLOGY

Change detection of leafy spurge (*Euphorbia esula*) infestations using aerial photography and geographic information systems. G. L. Anderson and C. W. Prosser, USDA, Agricultural Research Service, Sidney, Montana and S. Hager and B. Foster, USDI, Medora, North Dakota.

Rod Lym

Dept of Plant Sciences, NDSU
P.O. Box 5051
Fargo ND 58105-5051

20th Annual Leafy Spurge Symposium Story

Is it possible that there is an event, any event, better suited for kicking off **Spurgesfest '99** than the 20th Annual Leafy Spurge Symposium? If there is, symposium planners Rod Lym and Don Kirby can't think of it.

"When I heard about **Spurgesfest '99**, the first thing I thought was What a great place for the Leafy Spurge Symposium" said Lym, a professor in the Department of Plant Sciences at North Dakota State University. "The fact that it is the symposium's 20th anniversary makes it even more fitting." Last year's symposium was canceled due to a lack of submissions, and Lym and Kirby hope this year will be different. They would like to see the same level of interest that helped make the symposium a success during the 1980s and early 1990s. "Participation has declined the past couple of years, and we want to turn that trend around," said Kirby, a professor in NDSU's Department of Animal & Range Science. "Everyone agrees that the symposium has been an extremely productive forum over the years, and we think it still can be."

In an effort to rekindle interest, Kirby and Lym said they'll be reaching out to past symposium participants as well as newcomers. "It doesn't matter what aspect of leafy spurge you're working on, where you're located or who you're affiliated with," Lym said. "There are a lot of leafy spurge researchers out there with a lot of valuable experience, and participating in this symposium would help benefit the cause we're all working on: improved leafy spurge management and control."

Claude Schmidt and Russ Lorenz, two retired USDA-Agricultural Research Service employees, said the symposium and **Spurgesfest '99** will be especially valuable for people from new areas or who have new programs. "Let's face it, leafy spurge is spreading

beyond our region, and that's forcing a lot of new people to get involved with management efforts," said Schmidt, who now serves as editor of the Leafy Spurge **News**. "This will be a great opportunity for them. It will be a good way to collect a lot of information and meet a lot of people without having to invest a lot of time." Lorenz said the recent decline in interest is somewhat ironic. "When we started the symposium, improving communications between all of the people who were working on spurge, be it at the local, state or federal level, was one of our top goals." He said. "We've managed to fulfill that goal, but that's no reason to sit back and let things deteriorate." Both Schmidt and Lorenz, the first editor of Leafy Spurge *News*, believe the symposium can still play a significant role in bringing researchers together to interact, exchange information and "help each other out." A lot of the dollars and support that now exists for leafy spurge programs at various levels were originally generated at the symposium." Lorenz said. There was always a lot of good cross-fertilization that occurred at the symposium, and that sort of thing will always be needed."

Lym pointed out that attendees don't have to be researchers. "The symposium has always been designed as a forum for scientists and this year will be no different, but we've traditionally had good attendance from non-scientists as well," Lym said. "We've had everyone from county weed supervisors, and other weed people to politicians, bankers and real estate agents." Schmidt agreed. "The discussion alone will make this event worth attending," he said. "If you've got a leafy spurge problem or want to prevent one from occurring, you'll want to be there."

The registration fee for the symposium is \$5, which includes refreshments and printed proceedings. To obtain additional registration information contact the person below:

Steve Merritt

TEAM Leafy Spurge Technology Transfer Specialist
USDA-ARS NPARRL 1500 Central Ave.
Sidney MT 59270
Phone (406) 482-9440, Fax (406) 482-5038
steve@mail.sidney.ars.usda.gov
HOME: (406) 482-4848; smettitt@midrivers.com

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

Non Profit Org.
U.S. Postage

Paid

Permit No. 818
Fargo, N.D.

From The Editors Desk

All signals are go for the **SPURGE FEST 99**, you can see that in the two page spread in this issue. Once again I urge you to come and see for yourself what is happening. Yes, I believe that you will be pleasantly surprised at what is being accomplished for the biocontrol of leafy spurge.

Yes, we have an Honoree in this issue, Dr. Lloyd Wendel who is with APHIS down in Mission Texas and has had a great impact on the control of leafy spurge. I am sure you will enjoy his story. Rod Lym has just told me that a sufficient number of persons responded to his appeal for papers so we will have a Leafy Spurge Symposium; details are in this issue. This is listed under 1999 Leafy Spurge Symposium Participants Grouped by Subject matter. So far we have 18 papers and poster. This is just another good reason why you should come to Medora. Rod Lym has instructed all presenters to send in their abstracts so they can be printed and distributed to all participants at the meeting.

I hope by this time you have made your reservations, for the tourist season will be in full swing and motel space will be tight. Looking forward to seeing you all there.

Claude H. Schmidt

Editor
1827 N3rd Street, Fargo ND 58102-2335
(701) 293-0365, Fax (701) 231-8474
e-mail: cschmidt@ndsuxt.nodak.edu