

TEAM Leafy Spurge

Summary of the Summer 2000, Field Season

IN THE FIELD: OPERATIONS

Despite inclement weather and widespread reductions in leafy spurge infestations at traditional collection sites, TEAM Leafy Spurge collected 16.5 million *Aphthona spp.* flea beetles during a three-week period in June. The insects were used for distributions to ranchers and landowners at five locations in the four-state study area; incorporated into the distribution efforts were biocontrol training sessions and tours of TLS demonstration sites.

Of note were distribution efforts in three new areas – the Heart (North Dakota), Grand (South Dakota) and Powder (Wyoming) river drainages. TLS selected the three new drainages – which are all heavily infested with spurge – to supplement existing management efforts and increase interest in biological control and integrated pest management in those areas.

TLS has now collected and redistributed more than 40 million flea beetles – enough for more than 13,000 new release sites – during the past three years.

SPURGE REDUCTIONS

Of special interest this summer were significant reductions in leafy spurge infestations at many sites in the northern Great Plains, particularly in North Dakota. At some sites, reductions in spurge densities from 1999 to 2000 were dramatic, ranging from 50 to 90 percent or more. The rapid decline of infestations in some areas adversely impacted flea beetle collection efforts.

This brochure features a recap of TEAM Leafy Spurge research and demonstration projects for Summer 2000. Check it Out!

About TEAM Leafy Spurge

Headquartered at the **USDA-ARS Northern Plains Agricultural Laboratory** (<http://www.sidney.ars.usda.gov>) in Sidney, Montana, **TEAM Leafy Spurge** is a USDA-ARS area-wide



demonstration program focused on the Little Missouri River drainage in Wyoming, Montana and the Dakotas, and other spurge-infested drainages in the region.

TEAM's goal is to research, develop and demonstrate ecologically based **Integrated Pest Management** strategies that can be used to achieve effective, affordable and sustainable leafy spurge control.

Important Concepts

TEAM Leafy Spurge is built on three important concepts:

- IPM - Integrated Pest Management combines different management tools to provide more effective control than any single tool could produce. Biological control provides the foundation: Biocontrol agents like the leafy spurge flea beetle are used with other tools – grazing, herbicides, etc. – for effective, affordable and ecologically sustainable leafy spurge control. IPM offers the flexibility landowners and land managers need to devise different strategies for different situations.

- Teamwork - TEAM Leafy Spurge has assembled some of the nation's most experienced leafy spurge researchers into a focused, goal-oriented team. This collaboration allows participants to share expertise, data and resources to more effectively work toward a common goal. TEAM Leafy Spurge stresses that **EVERYONE**, from the private rancher/landowner to local, state and federal entities, **WORK TOGETHER** to solve the problem.

- Regional Approach - TEAM Leafy Spurge is an area-wide program, and as such, is evaluating the leafy spurge problem on a regional rather than a local, or place-by-place, basis.

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BEST SELLER

One highlight of the 2000 field season was the publication of “Biological Control of Leafy Spurge,” a full-color, 20-page how-to manual that provides step-by-step instructions for using leafy spurge flea beetles.



TLS program coordinator Chad Prosser gives a biocontrol manual to an interested rancher.

The manual was an overwhelming success. Demand quickly exceeded supply – 10,000 copies were distributed the first two weeks it was available – and forced a second printing. In a six-week span, TEAM Leafy Spurge distributed more than 14,000 copies to end users in 16 states and four Canadian provinces. Not included in that figure are 5,000 copies ordered by the Bureau of Land Management’s Montana State Office.

The manual is now being revised for the 2001 field season. TLS will supplement the biocontrol manual with similar manuals on multi-species grazing, herbicides and integrated pest management.

The biocontrol manual, and other informational and educational TLS materials, can be downloaded from the TEAM Leafy Spurge web site at:

<http://www.team.ars.usda.gov/aphis-man.html>

IN THE FIELD: CONTINUING PROJECTS

Data collection continued on several existing TLS projects, and program managers are especially pleased with the progress of multi-species grazing, grazing-biocontrol and biocontrol-herbicide demonstrations.

To sum it up, spurge reductions at multi-species grazing, grazing-biocontrol and herbicide-

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Multi-Year Projects

- Inventory & Assessment
- Multi-species Grazing, Grazing-Biocontrol
- Herbicides, Herbicides-Biocontrol; Integration of Emerging & Current Herbicide Technologies
- Soci-Economic Impacts
- Dietary Preferences of Different Sheep Breeds
- Ecological Barriers to Aphythona Flea Beetle Establishment
- Remote Sensing (GIS/GPS mapping); GIS Database; Early Detection System; Management Approach to Leafy Spurge
- Ecologically Based Support Decision Model
- Utilization of *Oberea Erythrocephala*

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Partnerships

TEAM Leafy Spurge is funded by the **USDA-Agricultural Research Service**, and managed in conjunction with the USDA-APHIS. Other TEAM members include the U.S. Forest Service, National Park Service, Bureau of Land Management and Reclamation, U.S. Geological Service, state departments of agriculture and other state agencies, Cooperative Extension Services, land grant universities, county weed managers, landowners and ranchers.

The Approach

TEAM Leafy Spurge research and demonstration projects are designed to build on existing data and explore promising new areas of leafy spurge research. These projects cover a range of topics, including biological control, multi-species grazing, herbicides, range management techniques, and the integration of various control tools.

Most research is conducted by weed specialists, range scientists and entomologists. Research is directed at gaining a better understanding of how and why biocontrol agents work, how biocontrol interacts with other management tools, and how different tools can be used alone and in combination to improve spurge control. Research is also being conducted overseas, where entomologists are looking for new biocontrol agents. Other research explores the economic and environmental damage caused by leafy spurge.

TEAM Leafy Spurge demonstration sites (Sentinel Butte, N.D.; Ekalaka, Mt.; Buffalo, S.D. and Devil’s Tower, Wyo.) give ranchers, landowners and land managers a first-hand look at results produced by various IPM strategies. Tours of the sites are periodically held to provide updates about new and improved management strategies.

The Bottom Line

Leafy Spurge is a formidable opponent that cannot be controlled or eliminated by any single entity or management practice – a collaborative, integrated and area-wide approach is essential to solving this costly problem. TEAM Leafy Spurge exists to promote these concepts, and to serve as a clearing house for proven management strategies.

For More Information...

...about the TEAM Leafy Spurge area-wide program or biocontrol/IPM of leafy spurge...

- Visit the TEAM Leafy Spurge web site at <http://www.team.usda.ars.gov/>
- Send you e-mails to: Co-PI Gerry Anderson at anderson@sidney.ars.usda.gov; co-PI Lloyd Wendel at lloyd.e.wendel@usda.gov; program coordinator Chad Prosser at cprosser@sidney.ars.usda.gov

biocontrol demonstration sites in the Sentinel Butte, N.D., area were dramatic. The sites, which have been established for just three years, are clearly showing that biologically based integrated pest management works and works well.

IN THE FIELD: NEW PROJECTS

In addition to work on continuing projects, several new TLS projects were initiated in 2000.

- *Prairie Fringed Orchid*: Two of the continent's largest remaining populations of the endangered prairie fringed orchid are being threatened by leafy spurge infestations. This demonstration, located at Sheyenne National Grasslands in southeastern North Dakota – where biocontrol generally does not work well because of wet, sandy soil – is showing how herbicides can be used to control leafy spurge without harming the orchid.



- *Native Euphorbias*: Some native *Euphorbias* are classified as sensitive species, but no field data regarding host specificity of *Aphthona spp.* flea beetles on native spurges exists. This project has three objectives: 1) Identify native *Euphorbias* that may exist in the TLS study area; 2) Locate and map native *Euphorbias* in the TLS study area, inventory site characteristics and survey for presence of *Aphthona spp.* flea beetles; and 3) Release *Aphthona spp.* flea beetles at some sites to monitor flea beetle impact on non-target, native *Euphorbias*.

- *Impact of Grasshopper Control Tactics on Aphthona Flea Beetle Populations*: A common question regarding leafy spurge biocontrol is, “Can I spray for grasshoppers without hurting my flea beetles?” This project will provide much needed answers. Several commonly used chemicals are being compared to quantify grasshopper control and flea beetle mortality, and to identify/investigate treatments that can effectively control grasshoppers while having the least amount of impact on flea beetle populations.



USDA-APHIS entomologist Nelson Foster's project is designed to identify insecticides that will control grasshoppers while having the least amount of impact on flea beetles.

In addition, two projects that were initiated last year are generating considerable interest.

- *Dietary Preferences of Different Sheep Breeds*: Results from the TLS multi-species grazing trial at the Sentinel Butte, N.D., demonstration site indicate significant dietary preferences for leafy spurge among different breeds of sheep. This research could potentially enable range managers to make breed recommendations specifically for leafy spurge control. In addition, data provided by the study could lead to a better understanding of how leafy spurge is metabolized, which could potentially be used to increase leafy spurge consumption by sheep.

- *Effects of Leafy Spurge on Nesting Grassland Birds*: This U.S. Geological Service-Biological Resources Division project is designed to evaluate the impact of leafy spurge infestations on grassland-dependent birds in the Sheyenne National Grasslands. Preliminary data indicates that some species are less common in heavily infested areas, and that fewer nests are present. Although not directly related to leafy spurge control, this project can potentially provide valuable information for resource managers. Grasslands birds have shown greater populations declines during the past 30 years than any other group of bird, and are of particular concern to the conservation community. Knowing if and how leafy spurge affects grassland birds in particular, and biodiversity in general, will help resource managers make intelligent, informed decisions regarding resource allocation for leafy spurge and noxious weed management. In addition, the project can potentially bring new players into the war on noxious weeds.



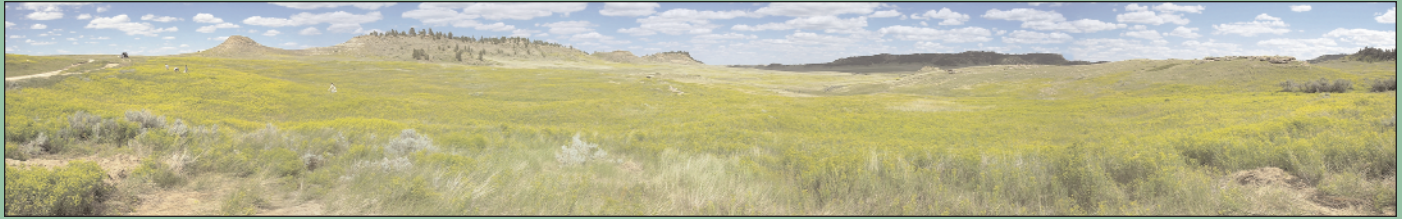
A USGS-BRD research assistant measures vegetation at a grassland bird nesting study site in the Sheyenne National Grasslands.

IN THE FIELD: FOREIGN EXPLORATION

Researchers are continuing with efforts to find new biocontrol agents for leafy spurge, and are focusing efforts on agents that originate from (and are thus well adapted to) cold, wet climates. Host specificity testing is now being conducted on four “new” species of *Aphthona* flea beetles: *A. nigriscutis*, *A. russica*, *A. chinchihii* and *A. abdominalis*.

Researchers are particularly optimistic about the *nigriscutis* and *russica* spp. *Nigriscutis* colonies now

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These panoramas, taken near the Mill Iron-Ekalaka area of southeastern Montana, show what unmanaged leafy spurge infestations can do to rangelands. TEAM Leafy Spurge released millions of flea beetles at the two sites – tune in next year to see the results!



established in the U.S. were originally obtained from dry, moderately cold climates in Hungary; the “new” strain was collected from colder, wetter climates in Russia and will hopefully have a broader range of tolerances. *A. russica* also shows promise as an agent that can establish quickly and is quite aggressive towards spurge.

Another potential agent, *Thamnurgus euphorbiae*, a stem feeding beetle, suffered a setback in host specificity testing when it was shown to feed on *Euphorbia inundata*, which serves as a substitute for the federally threatened *E. telephoides*.

TEAM WEB SITE REVAMPED

The TEAM Leafy Spurge website at <http://www.team.ars.usda.gov/> has received a major facelift.

USDA-ARS ecologist Gerry Anderson, co-principal investigator of the area-wide program, said the revised web site provides "a wealth of information for people interested in integrated pest management strategies for leafy spurge."

"The new site is extremely comprehensive, and we'll keep working to make it even better," he said.

The site includes summaries of TEAM Leafy Spurge projects, an extensive listing of contacts, a photo library of leafy spurge biocontrol agents, an archive of papers presented at leafy spurge symposiums, a frequently asked questions page, biographies of program participants, PDFs of TEAM's informa-

tional brochures, and more.

Almost all of the web site's content, Anderson said, is entirely new. All told, the site currently consists of 268 web pages (equivalent to about 400 pages of printed text), 2,256 total files in 55 folders, and nearly 700 megabytes of images.

The website also features links that can be used to e-mail questions and comments to TEAM Leafy Spurge personnel and other leafy spurge specialists.

RESEARCH SUPPORT

The area-wide TEAM Leafy Spurge program uses its funding from the USDA-ARS to support research and demonstration projects conducted by a multitude of local, state and federal entities and land grant universities. In fact, most of TLS's annual funding is allocated to non-ARS program partners.

In FY 2000, for example, 65 percent of TLS's funding went to 17 non-ARS partners. In 1999, 68 percent of its funding went to 24 non-ARS partners; in 1998, TLS allocated 73 percent of its funding to 13 non-ARS partners.

These fiscal agreements ensure teamwork, cooperation and the sharing of data and resources. And since TLS funds are often supplemented by funding from the researching entity or other sources, it helps "stretch" the research dollar.

LENDING A HAND

TLS regularly works with a varied and diverse group that includes ranchers, landowners, land managers, county Extension agents, weed officers and a multitude of local, state and federal entities. This

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Click **HERE** to have your web browser take you to the new & improved TEAM Leafy Spurge website.

Smile, You're on the BBC

A film crew working on a documentary about invasive species and biological control toured parts of Montana and North Dakota with TEAM Leafy Spurge this summer.

The two-person crew filmed leafy spurge infestations, a flea beetle distribution and biocontrol training session, flea beetle collections and releases, and interviews with several ranchers, land

managers and others who are waging the war on leafy spurge.

"Brilliant!" the two British film makers exclaimed every time they got a good shot.

"Everything went great," said TLS program coordinator



Chad Prosser. "In fact, it was just about perfect."

The film crew had originally scheduled a two-minute slot for TEAM Leafy Spurge in the 30-minute documentary. They were so impressed with what they saw, however, they ultimately decided to dedicate more than twice that amount of time to TEAM, flea beetles and spurge.

The documentary will be featured on the British Broadcasting Company's "Earth Report," which reaches an audience of more than 167 million people in 220 countries. The show is expected to air sometime in January; watch the TEAM web site for additional details.



Clockwise from upper right: **1) Sentinel Butte, N.D., rancher Dale Maus told the film crew that leafy spurge nearly forced him out of the ranching business. The success of leafy spurge**

flea beetles, however, has made it economically possible for Maus to continue ranching. 2) TLS program coordinator Chad Prosser watches as Don Mundal, North Dakota State University Department of Entomology, shows proper flea beetle sweep netting techniques. 3) Mundal, standing knee-deep in a sea of spurge, talked about his experiences with leafy spurge and flea beetles. 4) Butch Ziolkowski (inset to left), a biocontrol technician from the USDA-APHIS Biocontrol of Weeds Laboratory in Bozeman, Montana, was interviewed after conducting a biocontrol training session in Ekalaka, Montana.



year, TLS helped several new "customers."

- TLS provided field day planning advice and technical expertise to two national wildlife refuges and two Native American Indian reservations, and supplemented those efforts by providing the biocontrol how-to manuals and insect sorters.

- An educational coordinator for the Bureau of Land Management in California felt that TLS was a great example to teach kids about biology, weeds and biocontrol, and subsequently requested 500 copies of the biocontrol manual for classroom use.

- The North Dakota Department of Fish & Game, recognizing the potential impact of leafy spurge on wildlife habitat and wildlife-associated recreation, distributed 1,000 copies of the new biocontrol manu-

al. The department is concerned about management of the weed on lands set aside for wildlife.

- TLS personnel also participated in several field day activities sponsored by other agencies.

REACHING OUT

To promote public awareness of the problems caused by leafy spurge in particular and noxious weeds in general, TLS attended two major trade shows with its travelling TEAM Leafy Spurge display. The Marketplace of Ideas in Bismarck, N.D., and Montana Agri-Trade Expo in Billings, Montana, provided exposure to more than 60,000 people and an opportunity to host several informational/educational

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seminars (biological control, multi-species grazing, sheep cooperative feasibility).

TLS also attended several smaller, "hometown" events relating to agriculture. These events provide TLS personnel with one-on-one opportunities to interact with ranchers and landowners who are looking for solutions to spurge problems.

TEAM Leafy Spurge will be attending several similar events in the fall/spring of 2000-2001.

SPURGEFEST II

TEAM Leafy Spurge personnel are in the process of planning "Spurgefest II," a sequel to the successful "Spurgefest '99" event held in Medora during the summer of 1999.

"We're really excited about Spurgefest II," said Gerry Anderson, co-principal investigator of the TLS program. "We're confident it will be even bigger and more successful than the original Spurgefest, and that's a pretty tall order to fill."

Like its predecessor, Spurgefest II will be held in Medora, N.D., home to Theodore Roosevelt National Park. Included on the agenda will be tours of TLS research and demonstration sites, speakers, informational/educational seminars, and presentations of data collected by TLS program participants.

Watch the TEAM website at <http://www.team.ars.usda.gov> for updates about Spurgefest II. A pre-registration form should be posted by mid- to late-September, and additional details will be posted as they become available.

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additional resources

Here are a few additional informational resources about the USDA-ARS area-wide TEAM Leafy Spurge program. These items can be found on the TEAM web site.

- **BAposter.pdf** - A large format (16.5 x 23.4 inch, or A2 paper size) "before and after" biocontrol poster.
- **IPMtri.pdf** - Biological control is changing the way we think about pest management. This letter-sized (8.5x11 inch) poster shows how the traditional pest management pyramid has been inverted.
- **Manual.pdf** - An electronic, printable version of TEAM's popular biocontrol "how to" manual.
- **Press.pdf** - TEAM Leafy Spurge and partner Montana State University use press releases to distribute information and generate interest in the program. Here are two examples.
- **TEAM_map.pdf** - TEAM Leafy Spurge has partners scattered all across the four-state region. This large format (23.4x16.5 inch, or A2 paper size) map shows it all.

Technology transfer

Grass Roots Works

Grass roots efforts work and work well when transferring technologies to end users, says TLS program coordinator Chad Prosser.

"This is our third year on the ground, and it's now very clear that going out to talk directly with our customers is one of the most effective informational and educational tools we have," Prosser said. "You have to have good support materials, like our new biocontrol manual, to make it work, and when you do, it's a very effective way to communicate ideas."

TLS regularly participates in tours, seminars, symposiums, trade shows and "just about any outlet we can find to get the word out, get people interested and provide information," Prosser said.

Events like Spurgefest '99, which was held last summer in Medora, N.D., and will be repeated in the summer of 2001, are "time consuming but well worth the effort," he said.

TLS program coordinator Chad Prosser talks with ranchers at a biocontrol training session.



We saved the best for last!



The most rewarding highlight in a summer full of highlights was the incredible proliferation of *Aphthona* spp. flea beetles at some TEAM Leafy Spurge research and demonstration sites. Spurge reductions at some sites was dramatic, ranging from 50 to 90 percent or more between the summers of 1999 and 2000. **1)** Spurge plants at a study site near Sentinel Butte, N.D., were literally dripping flea beetles. The flea beetles were completely defoliating some plants within hours, and large patches of dense spurge disappeared in a span of weeks. **2)** A close-up of *A. lacertosa* and one lone *A. nigriscutis* working on a spurge plant. Note the ragged, pitted leaves and extensive stem damage. **3)** This plant died before it could produce seed due to larval activity. **4)** Another close-up. **5)** TLS program coordi-



nator Chad Prosser surveys a site where flea beetles were released in a grid pattern the previous year. All of the spurge seen in the picture will be completely gone next year.

