

# WYO-BIO

## Biocontrol News and Views for Wyoming

### Editor's Update: the Latest From UW

In this edition of WYO-BIO you'll find a summary of the minutes of some of the recent Wyoming Biocontrol Steering Committee Meetings, a review and editorial about leafy spurge biological control and some announcements about upcoming collections of biological control agents in Wyoming. Here, I'll also give a brief update on what is happening at UW. I am happy to announce the upcoming arrival of Stephen Enloe, the new weed specialist at UW in June of this year. He'll certainly be busy settling in but I'd encourage you all to make contact and welcome him. Stephen's a great guy and I think he will be a real asset to the state of Wyoming.



sites like this. Lastly, I'd like to say thanks once again for the support that the Weed and Pest Council provides me for summer research.

*Tim Collier*

Summer is upon us and this means fieldwork for myself, Marge Rayda and a crew of undergraduates. I expect that we will be in the field often this summer, especially doing recovery surveys for biological control agents. We'll be determining whether and where biological control agents have established. I hope to also meet up with W&P supervisors on these trips. I would especially like to visit counties I missed last year – Carbon, Johnson, Niobrara, Sheridan and Weston – and do surveys in counties where leafy spurge biocontrol agents – *Apthona* especially – have not done well. Please think about whether you have

#### **INSIDE WYO-BIO**

News Update of the Wyoming Biocontrol Steering Committee . . . 2

*Apthona* and the Successful Control of Leafy Spurge . . . . . 3

Agent Collections . . . . . 4

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# News Update on the Wyoming Biocontrol Steering Committee

by: *Tim Collier and Josh Shorb*

A number of new developments have occurred at Wyoming Biological Control Steering Committee (WBSC) meetings this winter and spring. In February, the committee met in Douglas in part to discuss the Memorandum of Understanding (MOU) between the Wyoming Weed and Pest Council and the University of Wyoming with regard to the Biological Control Entomologist Faculty Position, currently held by Tim Collier. A major point of emphasis in the discussion was the importance of having an annual work plan for the position, and a mission statement of the long-term goals of the WBSC. A few minor changes were suggested on the MOU. The revised version was sent out for approval of the WBSC and then forwarded to the Weed and Pest Executive Council. WBSC also discussed T. Collier's work plan for 2003, which was approved by the Committee. A third issue on the agenda was additional funding for the Central Wyoming College Herbarium for reference materials. The additional funding was discussed and approved. Next, a computer purchased by the WBSC for the Wyoming CAPS program was donated to UW (T. Collier) for biological control research.

Finally, it was decided that WBCS should develop its own by-laws in addition to the mission statement. Josh Shorb, Lindsay Cawthra and Brett Richardson were appointed to draw up a first draft of the by-laws to be discussed at the Spring Workshop.

In March, the WBSC met in Jackson during the Wyoming Weed and Pest Council Spring Workshop. On the agenda were updates on each of the biological control consortia and funding needs for the following year. In addition, Mark Schwarzlaender from the University of Idaho presented an informative talk on his research on white top. Next, the draft of the WBSC by-laws written by Josh Shorb, Lindsay Cawthra and Brett Richardson was discussed at length. After a number of suggestions, it was agreed that a revised draft of the by-laws would be discussed at the next WBSC meeting in Riverton. Also on the agenda would be the mission statement, which was to be drafted by Brett Richardson.

In May, the WBSC met in Riverton to make decisions about proposals submitted to Committee, and to further discuss the mission statement and by-laws. Projects proposed by Crook and Johnson Counties were funded, as were the houndstongue, whitetop and Russian knapweed consortia projects. The Committee discussed and approved a motion that a written report, which should outline the results of the project, will be required on all future funded proposals. Also on the agenda was a presentation that Lars Baker had also given in Australia at the International Symposium on the Biological Control of Weeds. Lars presented data documenting that effects of *Aphthona nigriscutis* on a native *Euphorbia* were transient; in fact, the native plant population increased following biocontrol of leafy spurge at the site. The paper version of the presentation will be published in the proceedings from the symposium, and will be very important in future TAG petitions for new agents. Next on the agenda were the by-laws and mission statement. After some discussion and revision, the by-laws and mission statement were approved. Copies were to be sent to the Secretary of the Wyoming Weed and Pest Council. Finally, Roy Reichenbach discussed a request for letters of support for APHIS' plan to release *Diorhabda elongata* against salt cedar in the Northern Plains states in the very near future. In addition to letters written by Roy and Tim Collier, the WBSC also agreed to submit a letter of support to APHIS. WBSC decided to meet again at the Fall Conference in Cheyenne.

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## ABOUT WYO-BIO

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Published three times yearly, *WYO-BIO* is intended to keep individuals concerned with weed control in Wyoming informed about the latest in biological control news. Free to interested parties, *WYO-BIO* includes upcoming insect collection dates, the latest finds in biological control research, and other news as it relates to biological control in Wyoming.

*WYO-BIO* is a joint effort of the Wyoming Biological Control Steering Committee, the University of Wyoming Department of Renewable Resources, and the Wyoming Cooperative Agricultural Pest Survey (CAP) program.

Suggestions on content and submissions for features are welcome at the above addresses.

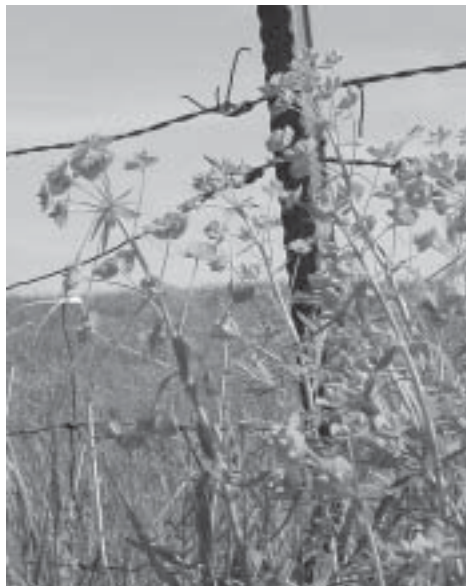
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# *Aphthona* and the Successful Control of Leafy Spurge

by Tim Collier

Leafy spurge might be considered one of the great success stories in weed biological control. Pictures of leafy spurge infestations before and after release of one or more of the *Aphthona* beetle species are testament to the control that can be achieved. There are, however, areas of spurge infestation where control has been less than successful; *Aphthona* have not become established at every release site, and in some locations where they have become established, leafy spurge densities appear to be unchanged. In Wyoming, this seems to be especially true in the eastern counties, though poor control of leafy spurge has occurred in other counties as well. Why have *Aphthona* worked in some areas and not others? A considerable amount of research has been done on this issue and there are some reasonable hypotheses or conjectures. But the question remains. In this article, I review research relevant to this topic and summarize hypotheses that might relate to spurge biological control, or lack of control, in parts of Wyoming. The review will hopefully provide a background and justification for experiments on control of leafy spurge by *Aphthona* beginning this fall.

In nature, environmental variability is the rule, not the exception. Perhaps we should be surprised that biological control works in as many different environments as it does. Environmental variation among the leafy spurge sites in Wyoming includes different elevations, rainfall, soil type, and plant communities, among other things. Such variation also exists in Europe, where both spurge and *Aphthona* species originate. Bob Nowierski and his colleagues (2002) conducted a huge study of the connection between environmental conditions, several species of spurge (*Esula* spp.) and *Aphthona* species in Europe. Their findings suggest two things that may be relevant to leafy spurge biological control in Wyoming. First, *Aphthona nigriscutis*, a species widely released in Wyoming, tended to be associated with somewhat sandy soils and environments that were not too wet. Two other beetle species, *Aphthona lacertosa* and *Aphthona czwalinae*, which also have been released in Wyoming, tended to be associated with environments that were not too dry and soils that were somewhat more clay than average. These findings support the recommendations of biological



control experts here in the U.S. The results from Europe also suggest generally that soil and/or habitat type might have something to do with establishment of *Aphthona* species, however, we might expect *A. nigriscutis* to establish at sites where *A. lacertosa* (or *A. czwalinae*) has failed to establish and vice versa. Failure of all species at individual sites is somewhat surprising.

Another twist in the story comes from two studies in North America. A North Dakota study by Lym (1988) suggested that sandy soils may have prevented three *Aphthona* species (*A. nigriscutis*, *A. czwalinae* and *A. lacertosa*)

from establishing; failed sites had soils with an average of 80% sand, while soil at sites where establishment occurred had only 45% sand. Another study, done by Jacobs and colleagues (2001), showed that in Montana there seemed to be no relationship between soil type and abundance of *A. nigriscutis*, though soil at all of their sites had less than 80% sand. Could it be that only extreme soil types, either too sandy or too clay, affect all species of *Aphthona*? Does variability in soil type explain whether or not *Aphthona* become established and impact leafy spurge in Wyoming? Possibly, though it seems to me that this question is still unresolved.

While intuition suggests that the natural environment is highly variable, a large body of scientific evidence suggests that plant and animal populations are quite genetically variable as well. Genetic variability among populations or 'biotypes' might explain why biological control agents successfully establish or are effective against one weed population and not another. A recent paper by Lym and Carlson (2002), suggested that genetic variation in leafy spurge exists, as might be expected, and that *Aphthona* species 'perform' better on some biotypes than others. In their study, a biotype from Nebraska produced more *A. nigriscutis*, *A. lacertosa* and *A. czwalinae* than biotypes from other Plains States. Biotypes from other sites clearly varied as host plants, and a biotype collected from Crook County, Wyoming appeared to be among the worst host plants for *Aphthona* species. Could biotype differences explain the failure of biological control in eastern Wyoming? If so, biotypes from eastern counties must be even more resistant to *Aphthona* than the biotype collected in Crook County, where some of the most dramatic suppression of leafy spurge has occurred.

Certainly, a host of other variables might explain establishment and impact of *Aphthona* beetles on leafy

spurge in Wyoming. Certainly, soil moisture and/or proximity to riparian zones seem to play a big role. My feeling, however, is that we currently have two promising potential explanations – soil and genotype – and that a good first start is to evaluate whether these variables might explain failures of leafy spurge biological control in Wyoming. A crucial experiment remains to be done: manipulate soil and genotype, and follow the responses of

both spurge and beetles to the experimental manipulations. Based on our current hypotheses, we might expect that *Aphthona* should perform very poorly on eastern Wyoming spurses, or they may perform poorly on eastern Wyoming soils. Or both outcomes may occur. In either case, understanding the reasons for failed biological control of leafy spurge will hopefully better guide future management of this weed throughout Wyoming. **WB**

### Agent Collections, Summer 2003

Summer is the time of year to collect and release biological control agents. There are no formal, organized collections this summer, however, a number of Wyoming counties are offering assistance and/or collection sites this year for a few agents. Call the specific counties if you are interested:

<i>Spurgia esulae</i> <b>(Leafy Spurge)</b>	Fremont County	<b>Nancy Webber/Lars Baker</b> <b>(307)332-1052</b>
<i>Aphthona</i> species <b>(Leafy Spurge)</b>	Crook County	<b>Dick Sackett</b> <b>(307)283-2375</b>
<i>Agapeta zoegana</i> <b>(Diffuse/Spotted Knapweed)</b>	Teton County	<b>Brett Richardson</b> <b>(307)733-8419</b>
<i>Ceutorynchus litura</i> <b>(Canada Thistle)</b>	Teton County	<b>Brett Richardson</b> <b>(307)733-8419</b>
<i>Trichosirocalus horridus</i> <b>(Musk Thistle)</b>	Goshen County	<b>Steve Brill</b> <b>(307)532-3713</b>



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