South Dakota Correctional Facility Supports Captive-Rearing Efforts for Biological Control Agent of Purple Loosestrife (*Lythrum salicaria* L.)

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Lythrum salicaria, an exotic wetland dependent plant, is listed as a noxious weed under several South Dakota and Nebraska weed laws. Originally from Eurasia, *L. salicaria* invades disturbed wetland sites, displacing native vegetation. *Lythrum salicaria* is currently found along most major river systems in Nebraska and South Dakota. Two species of leaf-eating beetles, *Galerucella calmariensis* (L.) and *Galerucella pusilla* (Duftschmidt) have been approved in the United States as biological control agents for the control of *L. salicaria*. Following established protocol, weed control personnel from Nebraska and South Dakota began a pilot project in 1996 to captive-rear both *Galerucella* spp. in a nursery setting. Project success led federal, state and local government agencies in 1998 to apply for and receive a National Fish and Wildlife Foundation grant to expand and improve the nursery. The Springfield State Prison became a cooperator in 1998, providing nursery space and inmate labor to rear beetles. Prison efforts also supported additional nurseries in Nebraska. Nursery efforts dramatically increased the number of beetles released at control sites and reduced overall noxious weed control expenditures. Project success, support, and professional interest for this project has led to 3 independent research projects, 6 additional nurseries in 1999, and continued cooperation with the Springfield State Prison.

Controlling Leafy Spurge Using *Aphthona* Flea Beetles: One Year After Mass Release

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Leafy spurge (*Euphorbia esula* L.) is one of the most important exotic weeds in the Western United States and it continues to expand its range. Many states, such as New Mexico, are at the edge of the leafy spurge expansion. Scattered populations of leafy spurge now occur in the state. Although it is commonly accepted that biological control agents acting alone cannot eradicate a host population, they can reduce a host population to very low levels, especially in the case of inundative strategies. The objective of this study was to determine the potential of using *Aphthona nigriscutis*, and *A. czwalinae/lacertosa* flea beetles to control isolated patches of leafy spurge. Two study sites (Barker and Tusas) were established in northern New Mexico in May 1997. At each site, twenty-four

Proceedings of the X International Symposium on Biological Control of Weeds
4-14 July 1999, Montana State University, Bozeman, Montana, USA
Neal R. Spencer [ed.]. (2000)

5m x 5m patches of leafy spurge were delineated. Five, 0.25m^2 subplots were permanently marked for estimating leafy spurge stem density and biomass in each patch. One of four treatments was assigned to each plot in a completely randomized block design. Treatments were 1) control (no beetles), 2) low density (1,000 beetles per plot), 3) medium density (2,000 beetles per plot), and 4) high density augmentations (4,000 beetles per plot). Leafy spurge stem density and biomass were estimated three times during each of the 1997 and 1998 growing seasons. Flea beetles established at both sites and resulted in visible, although variable, reductions in leafy spurge. At Tusas all three beetle densities resulted in significant decreases (30 to 51%) in the number of stems per plot and a reduction in biomass (53 to 61%) at the medium and high density treatments. At Barker only the high density treatment resulted in decreases in stem number (37%) and biomass (61%) after one year.

Mycobiota of *Centaurea cyanus* and *Ascochyta doronici* as a Probable Agent of the Biocontrol of this Weed

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In the territory of Russia *Centaurea cyanus* is a harmful weed in the grass, vegetable, and grain crops. The long period of flowering, large number of viable seeds (up to 6700 for one plant), high emergence, absence of period of rest, presence of a pappus for distribution by wind — all these allow the weed to be quickly distributed. The study of the micobiota of *Centaurea cyanus* was undertaken with the purpose of revealing pathogenic fungi, probable biocontrol agents of this weed.

The tax of plant samples, infected by fungi was made in 1993 - 1995 in the Leningrad area (Russia) and in the Ukraine (Sumy and Khmelnitsky regions). The pathogenicity of some micromycetes for *Centaurea cyanus* was confirmed by artificial inoculation of plants in a glasshouse. The impact of leaf spot caused by *Ascochyta doronici* on 1, 2 and 3-week *Centaurea cyanus* seedlings was investigated in small plots. Plants were inoculated by spraying with spore concentrations x1,000,000 spores/mL.

Five species of fungi were identified on *Centaurea cyanus: Ascochyta doronici, Bremia centaureae, Chaetomium globosum, Penicillium purpurogenum,* and *Puccinia cyani. Ascochyta doronici* is the causal agent of the *Centaurea cyanus* leaf spot. In a glasshouse the Ascochyta leaf spot latent period was 5-7 days. After 14 days the disease severity was 42%. In small plots the symptoms were identified after 10 days. The increase of the seedlings age from 1 to 3 weeks resulted in a decrease in the parameters of plant development. The average losses of dry biomass were 39.2%, 27.8%, and 24.4%; of plant height were 25.9%, 28.8%, and 12%; the bud numbers were 1.63, 1.59, and 1.36 times smaller accordingly for 1-week, 2-week, and 3-week plants. No significant differences in the plant development between 1- and 2-weeks seedlings were evident.

Ascochyta doronici has potential as a biocontrol agent for *Centaurea cyanus*. This pathogen is most effective for the control of 1- to 2-week old seedlings.

The work is carried out under the grant support of Russian fund of fundamental researches N 96-04-50287 and N 96-04-63099k.