survey of herbaria and literature revealed that garlic mustard spread exponentially in the last few decades in Illinois. Large, well established populations are difficult if not impossible to control with conventional methods, because of plant recruitment from the seed bank. Therefore, a biological control project was initiated in spring 1998. A literature review revealed 69 phytophagous insect species and 7 fungi to be associated with garlic mustard in Europe. Six insect species were selected as potential biological control agents due to records of their restricted host range: four curculionids, one flea beetle and one agromyzid. Emphasis will be placed on root-feeders and species that attack both phenostages, rosettes and bolting plants, to prevent garlic mustard from escaping attack. Therefore, the following three species are of special interest: *Ceutorhynchus alliariae* and *C. roberti* (Coleoptera, Curculionidae), and the flea beetle *Phyllotreta ochripes*. The two weevils mainly feed in the shoots of garlic mustard, but were also observed to mine in the petioles and root crown of rosettes. Larvae of *P. ochripes* mine in the root of bolting plants and the root crown and petioles of rosettes. During the first field surveys in Europe, the three species were common at all field sites investigated, and heavily attacked plants were observed to die prematurely. Another species of interest is *Ceutorhynchus scrobicollis*, which apparently develops in the plant over winter. A survey to find this species with a more eastern distribution will be carried out this spring. A preliminary test plant list was established and sent to some 150 interested parties in the US and Canada for comments. The revised list will be submitted to TAG in spring 1999, and host-specificity tests will start in 2000.

Leafy Spurge Biological Control Exploration for Natural Enemies from the Leaf Beetle Genus *Aphthona* Chevrolat (Coleoptera: Chrysomelidae: Alticinae)

A. KONSTANTINOV[1], M. CRISTOFARO[2], and M. G. VOLKOVITSH[3]

[1]Systematic Entomology Laboratory, USDA, ARS, PSI,
c/o National Museum of Natural History, MRC 168, Washington, DC 20560, USA
[2]c/o ENEA Casaccia, INN BIOAG-ECO, via Anguillarese 301, 00060 Rome, Italy
[3]Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia

Invasive weeds, such as leafy spurge, cause great economic losses each year in the United States. Control of such weeds by plant feeding insects holds great promise as a way to reduce or eliminate these losses. Flea beetles, particularly *Aphthona* species, are one group of insects that feed on these plants and have been useful in biological control. Six Palearctic species of *Aphthona* have already been released in North America, but additional species are needed to control the weeds in a variety of habitats. For the purpose of collecting new, potential biological control agents, field work was conducted in Russia in June and July of 1998. Three major regions were explored: Krasnodar (northwestern Caucasus), Novosibirsk (Western Siberia), and Irkutsk (Eastern Siberia). During this work, a new species of *Aphthona* was discovered and its larvae were reared by the Biological Control Group, Zoological Institute, St. Petersburg, Russia. Also, ten previ-

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)

ously described *Aphthona* species were collected. Six of them are locally abundant and have the ability to control leafy spurge in natural conditions. New distributional and host plant data for several *Aphthona* species was collected. To the best of our knowledge this was the first attempt to create a multidisciplinary team including (1) biological control specialist, (2) systematist, specialist in the group, and (3) field person. The team proved its effectiveness. Four weeks of explorations in Russia yielded six potential biological control agents from the leaf beetle genus *Aphthona*.

South African Rusts with Potential to Control Two Major Environmental Weeds in Australia

L. MORIN[1], P. B. EDWARDS[2,3], C. A. KLEINJAN[2], and A. R. WOOD[2,4]

[1]CRC for Weed Management Systems, CSIRO Entomology,
GPO Box 1700, Canberra, ACT 2601, Australia

[2]CSIRO Biological Control Unit, Zoology Department, University of Cape Town,
Rondebosch 7700, South Africa

[3]Current address: CSIRO Entomology, PMB 44, Winnellie, NT 0822, Australia

[4]Current address: Plant Protection Research Institute, Private Bag X5017,
Stellenbosch 7599, South Africa

Exotic weeds such as *Asparagus asparagoides* (bridal creeper) and *Chrysanthemoides monilifera* (bitou bush/boneseed) pose a major threat to biodiversity and conservation in Australia's temperate natural ecosystems. *Asparagus asparagoides* is a climber which establishes itself in relatively undisturbed vegetation, producing dense mats of rhizomes and tubers. *Chrysanthemoides monilifera* is a woody evergreen shrub growing up to 2-6 metres. During extensive field surveys in South Africa in the early 1990's, two rust fungi were identified as potential classical biological control agents for *A. asparagoides* and *C. monilifera*. The macrocyclic and autoecious rust fungus *Puccinia myrsiphylli* infects the cladodes (leaves) and stems of *A. asparagoides*. Severely diseased plants shed infected cladodes prematurely and produce few or no fruits. The rust is commonly found in the winter-rainfall, even-rainfall and summer-rainfall regions of South Africa, wherever *A. asparagoides* occurs. The microcyclic, systemic rust fungus *Endophyllum osteospermi* (formerly referred to as *Aecidium osteospermi*) infects the immature foliage and stems of *C. monilifera*. One to two years after infection, plants develop systemically infected witches' broom symptoms with multiple, swollen stems and short internodes, and small and slightly chlorotic leaves. Infected branches produce few or no fruit and usually die within 1-4 years. The systemic nature of *E. osteospermi* is a desirable characteristic for biological control purposes as, once the fungus is established within the host, the infection is retained until the death of the witch's brooms. The rust occurs widely in the winter-rainfall and even-rainfall regions of South Africa. The host-ranges of *P. myrsiphylli* and *E. osteospermi* are currently being determined experimentally. Should high specificity towards the target weeds be confirmed permission to release the rust fungi in Australia will be sought.