

UA Entomologists Employ Biological Weapon Against Foreign Invader

FAYETTEVILLE, ARK.

Entomologists at the University of Arkansas System's Division of Agriculture are enlisting a weevil from Asia in an effort to control the spread of an invasive plant species that threatens pastures and native plants.

Arkansas Agricultural Experiment Station entomologist Tim Kring said the knapweed seed head weevil (*Larinus minutus*) is one of 13 in-

the west arrived with it, Kring said. The tiny UV knapweed seed head fly thrives in Arkansas, but has not provided effective control of the knapweed here.

"This provides us with a great opportunity to determine which of the insects is providing the level of control needed to reduce the threat this weed poses for farmers and ranchers," Kring said.



Ph.D. student Carey Minter releases knapweed seed head weevils (*Larinus minutus*) in test plots of spotted knapweed at the Arkansas Agricultural Research and Extension Center in Fayetteville. She is conducting University of Arkansas System Division of Agriculture research on whether the insect is an effective control agent for the weed that invades roadsides and pastures.

sects imported to the United States in the 1990s to control the spread of spotted knapweed in Colorado, Montana and other western states.

The knapweed seed head weevil feeds exclusively on knapweeds, all of which are pests and none of which are native to the U.S., Kring said.

Knapweed, Kring said, most likely originated in eastern Europe. It probably came to the U.S. on freight ships entering ports in the Pacific Northwest. From there, it spread aggressively across western states and today covers some 7.5 million acres in the U.S. It displaces desirable forage in pastures, reduces native plant diversity, and increases surface water runoff and stream sediment.

"The weed has no natural predators in the U.S.," Kring said.

Knapweed spreads readily along roadsides and highways. Kring said it thrives on road shoulders and medians, in part, because mowing by highway and road departments helps spread the seed. It then enters pastures through fencelines.

Western scientists imported 13 species of insects known to feed on the plant in its native habitat. These insects feed specifically on knapweeds, not on plant species native to the U.S. They have provided effective control of the weed in those states, Kring said, but the species providing control varies in each area, and multiple species may be required.

Spotted knapweed first reached Arkansas in the 1940s, but in recent years it has expanded dramatically into at least 20 counties. Just one of the insects that may be helping control it in

By bringing them to Arkansas one at a time, Kring said, he should be able to identify the species that are providing the best control of the weed.

In 2008, Kring brought a limited number of knapweed seed head weevils to the state from Colorado to see if they would survive here over winter. Research technician (Jun) collected specimens of the weevil last spring, verifying that they had survived. In the next step of the research, graduate student Carey Minter is studying how effective the weevil will be in controlling the weed.

Minter and (Jun) went to Colorado in June, where they collected about 4,100 knapweed seed head weevils from fields around Colorado Springs. Minter said collecting the insects is a simple process.

"They have a dropping response," Minter said. "You just brush the weeds and the insects fall to the ground. Then you just pick them up."

Upon returning to Arkansas, Minter releases the weevils in test plots at the Division of Agriculture's Arkansas Agricultural Research and Extension Center in Fayetteville and in other sites around northwest Arkansas where knapweed is spreading.

Minter said the weevils lay their eggs in the knapweed flowers. "The larvae eat the seeds," she said, "and the adults feed on the plant."

Over the next two years, Minter will keep track of the weevils and the knapweed plots where they feed. Using biomass measurements and counting flowering stems, she will be able to evaluate how effectively the knapweed seed



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