

## Noxious weeds reunite with exotic enemies

FREDERICK, Md. — Each year, noxious weeds cut U.S. crop yields, reduce use of pastures, and cost millions of dollars in expensive weed control measures.

Most of the culprits, ironically, are not native North American weeds at all, but species accidentally introduced from other countries. Having left their natural enemies behind, these exotic plants often spread unhindered through U.S. crop and pasture land, especially where conventional control by herbicides and tillage is inadequate or infeasible.

Help, however, is on the way. Leafy spurge, curly dock, yellow starthistle, musk thistle, and other serious weed pests are being reunited with their disease-causing enemies at a unique U.S. Department of Agriculture quarantine facility in Maryland. Agricultural Research Service scientists William L. Bruckart and Dennis R. Johnson and project associates Demetrios J. Politis and Sherry K. Turner of the USDA Plant Disease Research Laboratory in Frederick, Md. are importing pathogenic "rust" fungi into the United States to attack these exotic pests.

A rust fungus introduced into the environment should spread in area and concentration, markedly reducing the infestation of a particular weed for years to come, according to the four scientists.

For farmers who find herbicides and cultivation too expensive or infeasible, biological control may mark the difference between productive and virtually useless land, plant pathologist William Bruckart said.

Finding a safe, yet highly effective rust to fit that bill, however, is a time-consuming task, according to Bruckart. Fungal pathogens must first be collected in the countries where they co-evolved with exotic weeds.

After being gathered as dried spores or infected plant parts, the

fungi are shipped to Frederick and stored in liquid nitrogen. Then begins the patient process of discovering which fungi are the most deadly to spurge, thistle, and other weeds, and yet pose no threat to U.S. crops.

"We spray the spores onto weed plants grown in our containment greenhouse," said Demetrios Politis, whose yellow starthistle research is funded by the state of California. "It can take as long as three weeks to determine if a particular strain of fungus is effective against the weed." Once the most potent strain of pathogen is identified and found to be safe near U.S. crop plants, great quantities of the fungus can be reared for release.

"Before a promising isolate of rust can be released, however, it must be tested on at least 56 closely related or economically important plants," said Sherry Turner, who studies leafy spurge on a cooperative grant from Montana State University. "We can't introduce a rust that attacks crops as well as weeds."

Fortunately, most rusts are "host specific" and won't attack plants other than their host weed. Yet because of the potential risk in bringing unknown plant pathogens into the United States, physical security at the Frederick Plant Disease Lab is tight. The Frederick lab, in fact, is the only USDA facility authorized by APHIS, the USDA's Animal and Plant Health Inspection Service, to import such agents.

Turner and her colleagues work in double-walled "containment" greenhouses kept at slightly negative air pressure (air flows in, not out) to prevent fungus spores from escaping. Scientists entering the greenhouses must don gowns and caps similar to those worn by hospital doctors. Personnel exit through a shower, and all materials leaving the greenhouse must be sterilized beforehand.

Biological control's potential for success, however, eases the tedium of these necessary procedures. Frederick scientists led by R. G. Emge (now retired) recently used an introduced rust to decimate Eurasian "rush skeleton weed," *Chondrilla juncea*, a serious wheatland pest in the Pacific Northwest.

Following the lead of Australian scientists at the Commonwealth Science & Industrial Research

Organization in France and Australia, the Frederick scientists isolated a potent strain of the exotic fungus *Puccinia chondrillina* and applied it to skeleton weed in greenhouse and field tests. The results were astounding.

As reported in the 1981 Phytopathology article by Emge and colleagues J. Stanley Melching and C. H. Kingsolver, "rusted" skeleton weed produced 65 percent fewer seeds the first year and 94 percent fewer the second year.

During the second season, two-thirds of the rusted plants died prematurely. An thus weed control resulted from only one application of the fungus.

"We are very encouraged by our major success with skeleton weed," said William M. Dowler, director of the Plant Disease Laboratory. "Work underway now should lead to equally significant improvements in the control of leafy spurge, thistle, and other noxious weeds."

## Governor signs Noxious Weed bill into law

HARRISBURG — Gov. Dick Thornburgh has signed legislation creating a special committee with broad authority and strong enforcement powers to control noxious weeds that pose a threat to public health, crops and livestock, agricultural land, gardens and lawns.

The governor said H.B. 1429, sponsored by House Majority Leader Sam Hayes (R., Blair), establishes the Noxious Weed Control Committee, composed of the secretaries of the departments of Agriculture and Environmental Resources, the executive director of the Pennsylvania Game Commission and the chairmen of the state House and Senate agricultural committees.

He said the committee is charged with developing a noxious weed list, which must include Canada thistle, chicory, Johnson grass, marijuana and multiflora rose. Landowners who have noxious weeds growing on their property are required to destroy them to prevent reproduction and spread.

"Our current law controlling noxious weeds has been regarded by some as ineffective," Thornburgh said. "Several plants considered injurious to agriculture are not regulated. A \$15 penalty for property owners who fail to destroy weeds is insufficient, and local officials are hesitant to enforce the law."

The governor said that under the new law:

\*The Noxious Weed Control Committee can revise the noxious weed list whenever necessary.

\*Violators can be charged with either a summary or misdemeanor offense, facing up to a \$2,500 fine and/or one year imprisonment.

\*The state Department of Agriculture has broad law enforcement powers.

"While most property owners comply with requests to destroy noxious weeds, this stronger authority is necessary because of the harm these weeds can cause our agricultural community," the governor said.

## Milk referendum opponents to meet

LANCASTER — Dairy producers opposed to the Pennsylvania milk referendum will hold meetings in Blue Ball, Lancaster County, on Monday and in Myerstown, Lebanon County, on Wednesday.

The Lancaster County meeting will be held Monday at 7:30 p.m. at the Blue Ball Fire Hall, near the

intersection of Rt. 23 and Rt. 322. The Lebanon County meeting will be held Wednesday at 7:30 p.m. at Friedens Lutheran Church, Myerstown, at the intersection of Rts. 422 and 645.

The meetings are sponsored by a group of concerned dairy producers, who have formed the No Milk Tax Committee.

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