Science Update

Potato Nemesis Found in Idaho!

A potato pest plaguing European growers for some time has now been confirmed in soil at a potato processing plant in eastern Idaho. Called the "pale potato cyst nematode," *Globodera pallid* was traced from the plant to a few nearby potato fields. To make a positive identification, scientists took both a morphological approach, relying on microscopic examination and measurement of anatomical features, and molecular analysis in which they compared DNA from suspect specimens with known reference material.

It was necessary to develop a new diagnostic test with specific PCR primers capable of recognizing minor differences in the DNA sequences of each nematode species. The test will be helpful in the conduct of a national survey to determine the extent of the potential spread of *G. pallida* in the United States. *Andrea Skantar, David J. Chitwood, USDA-ARS Nematology Laboratory, Beltsville, Maryland; phone (301) 504-5917 [Skantar], (301) 504-8634 [Chitwood], e-mail skantara@ba.ars.usda.gov, david.chitwood@ars.usda.gov.*

Irrigating Raspberries: What's Best?

Does it make a difference whether a raspberry plant receives water from the top down or from the bottom up? Irrigation methods used in producing this fragile fruit vary regionally in the Northwest, where 80 percent of the popular berries originate. So researchers have evaluated two often-used methods in terms of plants' yield and susceptibility to root rot. They watered Meeker and Coho plants from overhead sprinklers or subsurface drip. They also over- and underwatered specific plants to observe those effects, as well.

The scientists discovered that the amount of water received mattered more than the way it was delivered, with neither method significantly affecting yield. But the sprinkler system stimulated more fruit-bearing canes per plant and more (but smaller) berries per cane—especially on water-short plants. Drip irrigation produced larger fruit, with less water, and led to no root rot in either cultivar. *David R. Bryla, USDA-ARS Horticultural Crops Research Unit, Corvallis, Oregon; phone (541) 738-4094, e-mail brylad@onid.orst.edu.*

Spotting Insects in Stored Grains Electrically

A novel approach to detecting insect pests in stored grain has been tested and found effective. It relies on a specially adapted roller mill that can screen 1 kilogram (about 30,000 kernels) in 1 minute. In tests, researchers were able to spot 80 to 90 percent of wheat kernels with rice weevil and lesser grain borer larvae hidden inside. Best of all, the device costs substantially less than available technologies for detecting hidden insects, including x-ray and near-infrared systems.

The three-part system comprises a roller for crushing wheat samples, a voltage source that sends an electric charge through the sample, and a computer software program that measures each kernel's electrical conductance. Kernels with larvae inside cause a noticeable spike in electrical conductivity readings, likely because of their increased moisture content. *Thomas C. Pearson, USDA-ARS Grain Marketing and Production Research Center, Manhattan, Kansas; phone (785) 776-2729, e-mail tom.pearson@gmprc.ksu.edu.*

On the Horizon: A New Desert Science

A worldwide effort is afoot among environmental and social scientists interested in developing a template for a new desertification science that will incorporate human dimensions—as well as physical and biological ones. Part of the effort is what's called the "Drylands Development Paradigm" (DDP)—the product of a workshop held in 2001 in Berlin, Germany. It is a framework for actions to support United Nations efforts to combat desertification around the world. About 250 million people in developing countries live in arid regions that are undergoing some form of severe land degradation.

Two guiding principles of the DDP framework are that slow variables determine what happens on arid lands and that these slow variables are often associated with thresholds that, if crossed, can lead rapidly to irreversible change. Part of the DDP involves integrating local and scientific knowledge to anticipate such thresholds long before they are reached—while they can still be reversed. *Jeffrey E. Herrick, USDA-ARS Jornada Experimental Range, Las Cruces, New Mexico; phone (505) 646-5194, e-mail jherrick@nmsu.edu.*

Vaccine Could Offer FMD Control

Joint research between ARS, the Department of Homeland Security's Targeted Advanced Development Unit, and the Vector Science Group of GenVec, Inc., a biopharmaceutical company in Gaithersburg, Maryland, has led to development of a promising vaccine for protecting cattle, swine, sheep, and deer from foot-and-mouth disease (FMD). This vaccine—the first molecular-based FMD vaccine for cattle—was constructed and initially tested by ARS scientists. Though no FMD outbreaks have occurred in the United States since 1929, this highly contagious livestock disease could cause severe losses in domestic production and marketing of meat and milk.

The fast-acting vaccine—the first FMD vaccine produced in the United States—is administered in a nonreplicating adenovirus. It's been adapted to protect against two of the seven serotypes, or closely related forms, of the virus. Since the vaccine is made without infectious FMD, it can be safely made in conventional facilities. Tests have shown cattle to be protected within 7 days of vaccination and to maintain protection for at least 21 days. Further tests are expected to show that protection lasts at least as long as that achieved with current vaccines, which is 6 months. Still to be determined are the vaccine's effectiveness against other serotypes of FMD virus, as well as its commercial viability. *Marvin J. Grubman, USDA-ARS Foreign Animal Disease Research Unit, Orient Point, New York; phone (631) 323-3329, e-mail marvin.grubman@ars.usda.gov.*