Science Update

Termite Alates Succumb to Biopesticide

The formidable Formosan subterranean termite costs U.S. consumers hundreds of millions of dollars each year in control and repair bills. Usually, control efforts focus on eliminating worker termites in colonies, not on preventing formation of new colonies. Now a newly discovered strain of the fungus *Metarhizium anisopliae* has been found to effectively curb alates, the termites' winged, adult life stage.

While a strain of *Metarhizium* has already been commercialized for termite control, this new isolate is especially lethal to alates—killing them in only 3 days. Its fast action promises to knock down any newly winged termite alates before they can swarm and fly off to establish a new colony.

Collaborators are being sought to further develop a formulation to safely deliver the fungal spores to trees and buildings known to harbor termites—before swarming's in full swing. *Ashok K. Raina and Maureen S. Wright, USDA-ARS Formosan Subterranean Termite Research Unit, New Orleans, Louisiana; phone (504) 286-4290 [Raina], (504) 286-4294 [Wright], e-mail araina@srrc.ars.usda.gov, mswright@srrc.ars.usda.gov.*

A Test for Head Blight-Causing Fungi

Sixteen or more species of *Fusarium* fungi are known to cause the plant disease referred to as head blight. In cereal grains, this disease not only reduces yields, it can also contaminate crops with toxins that render the grain unsafe for use as food or feed. From 1998 to 2000, U.S. losses attributed to head blight reached about $2.7 billion.

Visual inspection has customarily been relied on to alert growers to the arrival of head blight-causing pathogens in their fields, but it can't identify the different kinds or predict which types of toxins they're capable of producing. The new test uses DNA probes to pinpoint nucleotide variations that genetically distinguish among head blight species. This makes it possible to unambiguously identify both the pathogen and its toxin-producing potential. The test is also designed to identify new head blight species. *Todd J. Ward, USDA-ARS Microbial Genomics and Bioprocessing Research Unit, Peoria, Illinois; phone (309) 681-6394, e-mail wardtj@mail.ncaur.usda.gov.*

Potato Defends Against Late Blight

The well-tested and superior potato Defender is the only commercial variety in the United States whose leaves and tubers are resistant to *Phytophthora infestans*. This funguslike organism is what causes late blight, one of the world's worst potato diseases. Defender's natural resistance allows growers to reduce or eliminate pesticide applications, making it ideal for either conventional or organic production.

Scientists scrutinized Defender's performance in test fields from Maine to Washington and from Idaho to Texas. It produced high yields of long, white-skinned potatoes for fresh consumption. Processors also evaluated its suitability for french fry production and found its starch/sugar proportions suitable for making into frozen potato products. *Richard G. Novy, USDA-ARS Small Grains and Potato Germplasm Research Laboratory, Aberdeen, Idaho; phone (208) 397-4181, e-mail rnovy@uidaho.edu.*

"Waxy" Wheat for Novel Products

Soft white wheat is the type suited for making foods such as cookies, cakes, noodles, and flatbreads. Its starch consists of two kinds of glucose polymer: amylose and amylopectin. Now a new wheat, Penawawa-X, has been developed that would be one of the first commercial soft white spring wheats available with 100 percent amylopectin starch—referred to as "full-waxy." It was developed using conventional plant breeding techniques.

Waxy starch gels form a paste at lower temperatures, swell with more water than regular or partially waxy starches, and don't lose water during freezing and thawing.

Samples of Penawawa-X have been sent to bakers, millers, food processing companies, and others to see how it might be used in novel food or industrial applications. One company is already exploring commercial use of the wheat's starch, flour, bran, and other components.

Multistate field trials are under way to generate yield and other data needed for registering Penawawa-X and publicly releasing it. *Craig F. Morris, USDA-ARS Western Wheat Quality Laboratory, Pullman, Washington; phone (509) 335-4062, e-mail morrisc@wsu.edu.*

Adjusting pH Boosts Plant's Metals Uptake

One of the most promising low-cost technologies for remediating soils contaminated by metals such as cadmium and zinc is cultivation of plants called "hyperaccumulators." Alpine pennycress *(Thlaspi caerulescens)* is one of these plants with a penchant for sucking up metals and storing them. It can concentrate cadmium in its leaves up to about 100 times the levels in soil.

Reducing soil contamination with the use of metal-storing plants is called "phytoremediation," or "phytoextraction," and it costs about $250 to $1,000 an acre per year. When the accumulated metal is recovered for industrial use, the process is called "phytomining," and it's already being done for nickel retrieval.

Now tests have shown that, for strains of alpine pennycress from southern France, slightly increasing the soil acidity—from the neutral pH of 7 to 6—raised the cadmium concentration in the plant's shoots. But at a pH below 6, soils were so acidic that the pennycress yields fell.

Most highly contaminated soils can be deemed safe after 3 to 10 years of plant-based phytoextraction. The University of Maryland filed a patent in 2000 on use of *T. caerulescens* for this purpose. *Rufus L. Chaney, USDA-ARS Animal Manure and Byproducts Laboratory, Beltsville, Maryland; phone (301) 504-8324, e-mail chaneyr@ba.ars.usda.gov.*