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NEW TECHNIQUE FOR REMOVING HEAVY METALS FROM SOIL

Alpine pennycress (*Thlaspi caerulescens*) can help remove cadmium and other heavy metals from the soil as part of a soil remediation process known as phytoextraction. A recent USDA Agricultural Research Service (ARS) study conducted by the University of Maryland found that this practice does not harm beneficial soil microbes.

Alpine pennycress is known to experience concentrations of up to 8,000 parts per million of toxic cadmium in its leaves. Harvesting the pennycress annually can reduce the concentration of cadmium in the soil to safe levels in 3 to 10 years. Phytoextraction costs about $250 to $1,000 per acre per year, as compared to about $1 million per acre for removal and replacement with clean soil.

The study's researchers at the University of Maryland found that when soil acidity was adjusted to a pH of 5.8 to 6, soil microbes experienced no lasting adverse effects, and alpine pennycress was shown to protect the soil microbes, compared to unplanted soils at the same pH levels.

According to the ARS, no other similar technologies exist for remediation of cadmium-contaminated soils using plants.

For more information, contact Sharon Durham at the USDA Agricultural Research Service (301-504-1611, sharon.durham@ars.usda.gov) or visit www.ars.usda.gov.

SOIL MOISTURE SENSORS EVALUATED, GUIDE DEVELOPED

Researchers have completed a five-year evaluation of commercial soil moisture sensors used for irrigation. The study was sponsored by the Food and Agriculture Organization of the United Nations and the International Atomic Energy Agency. Steven Evett, a soil physicist with the Agricultural Research Service (ARS) Soil and Water Management Research Unit in Bushland, Texas, and colleagues led the effort.

The study compared the neutron probe and several commercial soil moisture sensing systems, including some systems based on the electromagnetic properties of soil as influenced by its water content. The study also evaluated electrical resistance blocks and tensiometers. Tensiometers use vacuum pressure to sense soil water potential, which is related to the ability of plants to take up water from the soil.

While most of the devices worked well some of the time, researchers found that most also performed poorly in some circumstances. The electrical resistance blocks and tensiometers were identified as the most promising technologies in the short term to fill the gap for irrigation scheduling while improvements are made to the electromagnetic systems.

Only a field-calibrated neutron probe gave consistently accurate soil water content data. Use of the neutron probe is currently limited to researchers because of cost and regulatory issues related to the radioactive source used to count the hydrogen atoms in the water.

The research team has prepared a practical guide for irrigators and other researchers to show which probes work best under different circumstances and how to achieve the greatest accuracy with each probe. The guide, to be published by the United Nations, also includes recommendations to manufacturers for ways to improve sensors and make them more practical.

For more information, contact Don Comis at the USDA Agricultural Research Service (301-504-1625, donald.comis@ars.usda.gov) or visit www.ars.usda.gov.

MODELING THE ROOT ZONE FOR IMPROVED DECISION MAKING

The area immediately surrounding a plant's roots is the site of physical, chemical, and biological activities that govern the plant's growth and its influence on the environment.

In the early 1990s, the USDA Agricultural Research Service (ARS) Agricultural Systems Research Unit in Fort Collins, Colorado, created the Root Zone Water Quality Model (RZWQM) to help growers make a variety of well-informed decisions related to the root zone. Now ARA scientists have developed an enhanced version of the tool, RZWQM2, to serve an even greater user base.

RZWQM2 simulates plant growth and the movement of water, nutrients, and chemicals within and around the root zones of agricultural cropping systems. Growers can use the tool to estimate the environmental and economic impacts of a variety of management decisions, including tillage, crop residue management, crop rotations, and the timing and rate of chemical applications.

For more information, contact Laura McGinnis at the USDA Agricultural Research Service (301-504-1654, laura.mcginnis@ars.usda.gov) or visit www.ars.usda.gov.

U.S. SENATE AGRICULTURE COMMITTEE HEARING ON RESEARCH

On March 7, 2007, the U.S. Senate Agriculture, Nutrition and Forestry Committee held a hearing entitled "Investing in Our Nation's Future through Agricultural Research."

Committee Chairman Tom Harkin, a democrat from Iowa, provided the following statement at the hearing:

"So much of what we seek in our nation's future depends on the quality and quantity of our agricultural research, extension, and education programs.

"Because of agricultural research, we know that particular foods contain anti-cancer compounds, we have developed crop varieties that are resistant to particular diseases, and we know that conservation is important to keeping farmland productive.

"America's investment in agricultural research, extension, and education has fallen behind. That fact is clear when we compare agricultural research funding with other non-defense research and development funding."