

ACTION IN AGROFORESTRY

monthly newsletter of The Center for Agroforestry at the University of Missouri

March 2011

Michael Gold and Michelle Hall, editors

Vol. 2, No. 3

Research on MRSA-fighting compound makes waves

Research started years ago at The Center for Agroforestry has found a compound in the needles of the Eastern Red Cedar (ERC) tree that can kill staph “superbug” MRSA. Now, news outlets around the region and country are hearing about this ground-breaking research.

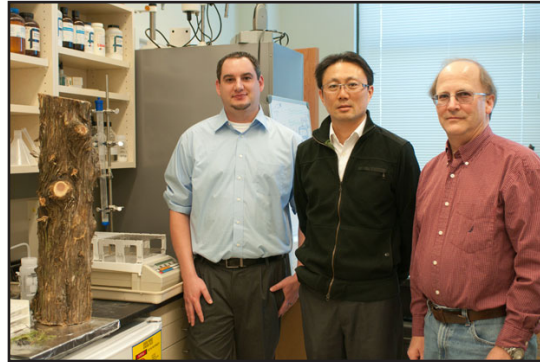
Most people would never suspect a “trash tree,” one often removed by farmers due to its ability to destroy farmland, could be the key to fighting a deadly bacterium. Now, University of Missouri researchers have found an antibiotic in the ERC that is effective against methicillin-resistant *Staphylococcus aureus* (MRSA).

The MU research team includes (*in photo above, left to right*) Brian Thompson, Bond Life Sciences Center; Chung-Ho Lin, The Center for Agroforestry; and George Stewart, pathobiology.

“I wanted to find a use for a tree species that is considered a nuisance,” said Lin, research assistant professor, UMCA. “This discovery could help people fight the bacteria as well as give farmers another market.”

MRSA is an evolving bacterium resistant to most medications. For most people, the infection is isolated to the skin. However, it can spread to vital organs causing toxic shock syndrome and pneumonia. The incidence of disease caused by MRSA bacteria is increasing worldwide. In 2005, more than 94,000 people developed life-threatening MRSA infections in the U.S., according to a CDC report. Nearly 19,000 people died during hospital stays related to these infections.

A resilient tree with either needles or narrow leaves, ERC survives in even the poorest soils. Once used widely by Native Americans, ERC berries today are a desirable food for birds. Unfortunately, birds spread the seeds widely and it is



invasive on farm, forest and pasture land; farmers actively destroy the trees. ERC trees contain chemicals that burn readily and were blamed for the rapid spread of Oklahoma and Texas wildfires in 2005 and 2006. ERC’s range extends from Kansas to the eastern U.S. An estimated 500 million trees grow in Missouri.

A study to determine uses for ERC trees was conducted a decade ago by another team of researchers from UMCA, led by forestry research professor and Center Associate Director Mike Gold. The study demonstrated ERC trees have a wide array of economic uses with an estimated national market value exceeding \$60 million. Their findings uncovered intriguing studies that led to the current work on the medical uses of ERC.

Lin, Stewart and Thompson identified, isolated and tested 17 bioactive compounds and have plans to analyze more. The team tested the compound’s effectiveness against many versions of MRSA in a test tube with promising initial results.

In addition, researchers found that some chemical compounds in the tree are able to fight and kill skin cancer cells present in mice. It might also be effective as a topical acne treatment. Stewart said the compounds are years away from commercial use, as they must go through clinical trials. The team’s research was presented recently at the International Conference on Gram-Positive Pathogens.

Articles on this research have appeared in the Columbia Daily Tribune, Science Daily, The St. Louis Post-Dispatch, and Medical News Today.

The MU News Bureau/CAFNR Communications contributed to this article. Photo by Keith Montgomery, CAFNR Communications.

RED CEDAR PROCEEDINGS NOW ONLINE

More than 170 people from five states attended the Red Cedar Workshop, Aug. 9-11, 2007, in Springfield, Mo. Sessions included managing natural cedar stands, utilizing every part of the tree, and marketing those products on the world stage.

The proceedings of that conference are now online at The Center for Agroforestry’s Web site.

Go to <http://www.centerforagroforestry.org>, click on Conference Proceedings (under Publications) and then select “Redcedar: Challenge or Opportunity.”

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KUDOS

Core and associated faculty of The Center for Agroforestry have been awarded the following Mizzou Advantage grants:

Chung-Ho Lin (PI), "Exploring the Health Benefits and Economic Opportunities of the Bioactive Compounds Isolated from Eastern Redcedar in Missouri," \$49,750.

Bill Folk (PI), **Chung-Ho Lin** (Co-PI), "Use of Botanicals in Chronic Pain Research," \$50,000.

Shibu Jose (PI), "Bio2Cor: The Biomass/Biofuel Corridor along the Mississippi/Missouri River," \$20,000.

Mark Ryan (PI), **Francisco X. Aguilar**, **Shibu Jose** and **Hank Stelzer** (Co-PIs), "MU Environmental Policy Network to Enhance the Stature and Impact of Mizzou Advantage Strategic Areas," \$15,900.

♦♦♦

Johann Bruhn, Dave Emmerich, and Mary Hendrickson have been awarded a Mizzou Advantage Undergraduate Research Team award to give a small interdisciplinary team of undergraduate students research exposure into all facets of truffle biology and cultivation and the implications for Missouri's food and agriculture industries in the Fall 2011 semester.

♦♦♦

John Dwyer was awarded a \$13,698 grant from the Wurdack Advisory Committee for two years to continue research on both hardwood and pine silvopasture demonstrations.

COMING SOON...

June 4-9 12th North American Agroforestry Conference
University of Georgia, Athens, Ga.
<http://hosting.caes.uga.edu/2011NAAC/>

June 8-9 Comprehensive Elderberry Workshop
June 10-11 Elderberry Festival
Eridu Farm, Hartsburg
<http://elderberrylife.com/index.html>

June 24-26 Chestnut Growers of America annual meeting
Louisiana, Mo.
<http://www.wcga.net/>

OUTREACH

UMCA was well represented at the recent Missouri Natural Resources Conference, "The Human Element: People, Politics and Conservation," Feb. 2-4, 2011, Lake Ozark, Mo.:

Ranjith Udawatta organized and moderated the workshop "Agroforestry Entrepreneurship and Environmental Benefits," Feb. 4. Presenters included **Udawatta**, **Shibu Jose**, **Wendi Rogers**, Allen Powell and **Larry Godsey**.

UMCA collaborators presented six papers, including:

"Woody Biomass Bioenergy: Opportunities and Challenges for Missouri," **Francisco X. Aguilar**, Patrick Miles, **Michael Goerndt**, **Stephen Shifley**, **Nianfu Song**, and **Hank Stelzer**.

"Missouri Family Forest Landowners' Willingness to Participate in a Biomass Crop Assistance Program," **Hank Stelzer**, **Marissa 'Jo' Daniel**, and **Francisco X. Aguilar**.

UMCA collaborators displayed nine posters, including:

"A User-Friendly Spatial Analysis Tool for Assessing Standing Woody Biomass in Missouri," **Hank Stelzer**, James H. Cutts III, Richard J. Charrier, and Chris Barnett.

RESEARCH

Ranjith Udawatta is collaborating with **David Burner**, USDA-ARS, Booneville, Ark., on a biomass study; and Thomas Sauer, USDA-ARS, Ames, Iowa, on the development of a decision support tool/model to simulate changes in soil properties following conversion from tilled cropland to grassland (prairie).

IMPACT

Chung-Ho Lin has applied for the following patent:

"Development of a spore-based biocatalyst for remediation of environmental pollutants and biofuel production (Fast Track)." The target application: Biofilter and Biofuel Production.



UMCA researcher **Chung-Ho Lin** was prominently featured in the *St. Louis Post-Dispatch's* article about his collaborative research on an *MRSA*-fighting compound in Red Cedar (see front). The newspaper article, "MU researchers turn 'trash into cash' with tree compounds," ran Wednesday, March 2. Lin's colleagues for the project are George Stewart, professor and department chair of pathobiology in the College of Veterinary Medicine, and Brian Thompson, postdoctoral fellow in the Bond Life Sciences Center.



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