Southeast Harvests First Sorghum Test Plot;

Crop Expected to Become Future Biofuel

CAPE GIRARDEAU, MO

The first test plot of sorghum harvested at Southeast Missouri State University's David M. Barton Agriculture Research Center indicates it could be a viable renewable energy source and soon could replace corn as the preferred ethanol fuel crop. Dr. Wesley Mueller, professor of agriculture at Southeast, said he and several students harvested 6.5 percent of the Center's sorghum plot, generating 135 gallons of sorghum juice. Had they harvested the entire plot, it could have generated 2,100 gallons of sorghum juice, he said. In the future, sorghum grown at Southeast's Barton Center could produce 800 gallons of ethanol per acre if they maintain this year's yield, he said. These figures rapidly outpace corn, which could yield 440 gallons of ethanol per acre with 200-bushel corn.

"So we've almost doubled the yield of ethanol per acre, and we think we can do it with a lot less water and fertilizer" than that used to produce corn, Mueller said. "I think we're looking at the preferred crop for biofuels in the future just because of its efficiency and yield. "The vision is that this will be the next big biofuel crop," he said.

Mueller discussed his research at David M. Barton Agriculture Research Center Field Day held recently, 1.5 miles south of Gordonville, Mo., along Highway 25. Mueller said he and several students planted eight tenths of an acre of sorghum May 10, which grew 12 to 15 feet tall before it was harvested Sept. 18. He and a group of students harvested the crop by hand, using pruners and chain saws. Simplifying sorghum harvesting is a big obstacle to it replacing corn as an ethanol fuel crop, he said. A major machinery company is currently developing a prototype for sorghum harvesting and testing it in Tennessee and Arkansas. If it proves to be successful, "within five to 10 years, sorghum could replace much of the ethanol now being produced from corn," Mueller said.

Sorghum can be converted to ethanol more efficiently than corn, he said, because ethanol is produced directly from sorghum's sugar. On the other hand, starch in corn, must first be converted to sugar and then to alcohol, he said.

Mueller says the development of sorghum at the Barton Center is primarily for fuel alcohol, and the residue may be returned to the field directly, to increase organic matter or it may be converted to bio-char, since it is almost all cellulose. Bio-char can be made from it by burning it with low oxygen, creating a charcoal that can be returned to the fields where it will last for hundreds of years. How does this work? Plants remove carbon dioxide (CO_2) from the atmosphere through photosynthesis. The CO_2 serves as the building blocks in the plant for the sugar and cellulose in the stems. When we burn biofuel, we are not adding CO_2 to the atmosphere, because that is where we got it to begin with. We can actually reduce the amount of CO_2 in the atmosphere by producing the bio-char, which effectively removes the CO_2 from the air permanently, Mueller said.

Alternatively, the sweet sorghum juice could be converted into molasses. The research this season was funded by a $24,000 WIRED grant awarded to Southeast.

The sorghum harvested was taken to John Lorberg's farm, west of Gordonville, Mo., where a roller press was used to squeeze juice from the stems. Mueller says the University is in the process of purchasing a press of its own for this purpose, but it has not arrived yet. The juice harvested will eventually be used to run an ethanol-powered water pump at the Center as part of a demonstration, he said.

Sorghum also can be converted to molasses by boiling the water off. Although this is a lengthy process, Mueller says student organizations may try their hand at this venture in the future as a possible fund-raising activity.

Sorghum production could provide farmers in this region with many new opportunities, he said. "It's an alternative crop for farmers to rotate with the regular crops they normally plant," he said.

Interest in sorghum production is growing, Mueller says.

"There is a lot of interest in this very work," he said, adding Southeast is currently coordinating its efforts with Memphis Bioworks. The University of Missouri has also conducted research in this area, as well as Oklahoma State University, the University of Tennessee, the University of Kentucky and Louisiana State University. Sorghum has the potential to be grown in all of the Plains states and even the deep South, Mueller said. "Sorghum can be grown in a variety of places, which makes it attractive."

Mueller believes there is the potential for 200 small sorghum cooperatives to spring up in this region. Small ethanol plants may be necessary, he said, because of the sorghum's sheer mass which prohibits it from being shipped great distances due to cost constraints.

"I am very excited about it," he said. "I think this has the potential to be the alternative fuel of the future." Δ

Photo Courtesy Of Southeast Missouri State University

Students insert stalks of sorghum from the first test plot of sorghum harvested at Southeast Missouri State University's David M. Barton Agriculture Research Center test plot into a press to harvest juice from the crop.

Dr. Michael Aide, (left), and Dr. Wesley Mueller, with the department of agriculture at Southeast Missouri State University at the first test plot of sorghum at Southeast Missouri State University's David M. Barton Agricultural Research Center.