JOHN BERDAHL (D551-1)

Switchgrass, *Panicum virgatum.*

Switching to Switchgrass Makes Sense

This deep-rooted carbon-storing perennial has great biofuel production potential

A joint feasibility study by the U.S. Departments of Agriculture and Energy says that relief from soaring prices at the gas pump could come in the form of plants like the native prairie grass called switchgrass *(Panicum virgatum).*

Plant-based biofuels, such as ethanol, significantly reduce net emissions of greenhouse gases compared to petroleum-based fuels. The plants grown for biofuels also store carbon in soil, which acts to mitigate the effects of industrial greenhouse gas emissions.

Switchgrass has one of the highest potentials for use as a biofuel crop in the United States, mainly because it grows well under a wide range of conditions.

It's a perennial, so after establishment, it doesn't require annual tillage. This increases soil carbon at the surface, and reduces losses of soil, water, and fertilizer. It also provides excellent habitat for pheasants, ducks, and other wildlife.

Switchgrass is high-yielding over much of the country—from 7 to 16 tons an acre in the Southeast, to 5 to 6 tons in the western Corn Belt, to 1 to 4 tons in North Dakota. Each ton of dry switchgrass might yield as much as 96 gallons of ethanol.

Switchgrass could be economical with other crops, especially in the Northern Plains, and reduce U.S. dependence on foreign oil. It could also have the added advantage of helping to build a bioenergy industry in remote areas, thereby boosting rural economies.

This native perennial has been shown to store more soil carbon than the major U.S. farm crops. A study by soil scientist Mark Liebig, rangeland scientist Holly Johnson, and colleagues at the ARS Northern Great Plains Research Laboratory in Mandan, North Dakota, explained how.

They found that switchgrass stores most of its carbon deep underground. While previous studies only measured carbon retained in the top foot of soil, Liebig and Johnson sampled 4 feet beneath fields of switchgrass, corn, and wheat on 42 farms in North Dakota, South Dakota, and Minnesota.

The researchers found that switchgrass fields had much more soil carbon than nearby corn and wheat fields—about 7 tons more per acre, on average. This was true at all depths, but the advantage was most pronounced at 1 to 3 feet below the soil surface. And according to Liebig, "the deeper you store carbon, the less chance of its returning to the atmosphere as carbon dioxide."

The reason for this depth advantage lies in the fact that switchgrass has an extensive root system—with some roots as long as 8 feet—so much of the plant's carbon is in its roots and the belowground crown tissue just above them.

"The sites we studied are representative of about 74 million acres of the Northern Plains and northern Corn Belt," Liebig says. "Next, we need to conduct similar studies in other regions to better understand the quantity and depth distribution of carbon stored by switchgrass and see whether this deep carbon storage holds true elsewhere." There are plans to evaluate switchgrass at the Henry A. Wallace Beltsville (Maryland) Agricultural Research Center.—By **Don Comis,** ARS.

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