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New Technology Improves Native Grass Seed Harvest

by Stacy Kish, CSREES

Native grasses may be the fuel necessary for the burgeoning biofuels industry and for restoration of reclaimed or disturbed lands. Producers in the native seed industry have responded to increased commercial demand, but current harvesting techniques for many grass species have not been up to the task. >>

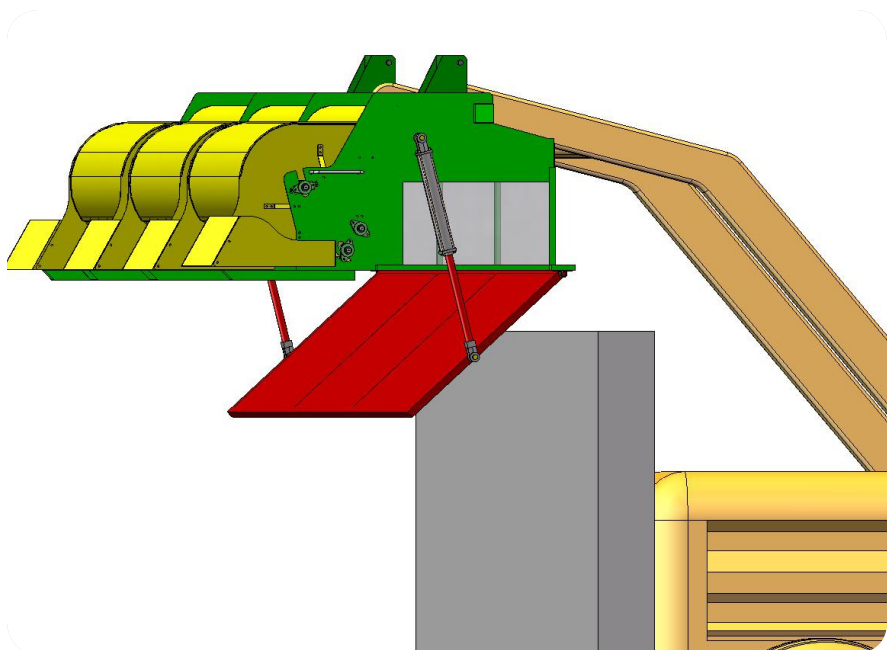
With funding from the USDA Small Business Innovation Research (SBIR) program, a project team in Montana has developed new equipment to efficiently harvest grass seed.

The structure of native grass seed makes harvesting with current equipment complicated, because the equipment is unable to effectively dislodge, separate, convey and off-load grass seed. As a result, the industry is faced with low harvests, limited supplies and high prices.

Lee Arbuckle and colleagues at Arbuckle Ranch, Inc., received SBIR Phase I and Phase II funding to develop technologies in a breakthrough grass seed harvester, called the Arbuckle Native Seedster.

Arbuckle developed the patented counter-rotating combs and brushes to effectively dislodge, or "pluck," the seed from difficult-to-harvest grass species. This cost-effective technology is easy to manufacture and maintain.

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Right: Schematic
of the Seedster-FH.

Credit: Wade Wolf

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Above: Seedster PCS-Vac.
Credit: Bruce Morrison

References

New Seed Harvester Eases Collection of Difficult-to-Harvest Native Grass and Forb Seed. *Ecological Restoration*. Vol. 24, No. 2, June, 2006.

Larsen, William E., P.E.; Seedster, Native Plant Seed Harvester; Presented at The Pacific Northwest Meeting of the American Society of Agricultural Engineers; September 25-27, 2003, Clarkston, WA.

The Seedster collects a higher percentage of standing seed with minimal impurities, which eliminates the need for in-field separation of seed and chaff. The Seedster effectively harvests at higher ground speed for increased efficiency.

The second SBIR-funded project dealt with transporting seed without plugging the Seedster's internal system. Arbuttle's group developed two systems to achieve this goal. First, the Pneumatic Conveyance System (PCS) uses a vacuum fan and cyclone separator to transport seeds through tubing for collection in a standard seed tote bag situated on a trailer.

The second system uses the integrated dislodgement, conveyance and collection hopper in a single loader mounted unit on a tractor. A simple mechanism supplements the air flow produced by the brush and combs to thrust dislodged seed into a collection hopper. A load of up to 1,500 pounds of seed easily dumps into a truck or trailer. This design was developed in 2007 and is particularly appropriate for tall grass species, such as switchgrass.

In 2007, the PCS model was released commercially. One customer stated, "I believe your machine is probably the best harvester available for native seed that I've found."

In January 2008, Native Seedster entered a contractual agreement with Ceres Inc., an energy company,

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to design and produce a seed harvester to harvest upland and lowland switchgrass. Ceres will manufacture switchgrass, high-biomass sorghum and other crops from thousands of acres near St. Joseph, Mo., to support a next-generation bio-refinery engineered by ICM, Inc., a leading biofuel process technology provider.

Dr. Ken Vogel of USDA's Agricultural Research Service also reported in January 2008 the results of a three-state, five-year study showing that switchgrass ethanol produces 540 percent as much energy as it consumes and reduces greenhouse gases by 94 percent compared with petroleum.

CSREES funded this research project through the SBIR program. Through federal funding and leadership for research, education and extension programs, CSREES focuses on investing in science and solving critical issues impacting people's daily lives and the nation's future. For more information, visit www.csrees.usda.gov.

Visit www.nativeseedsters.com for more information on the Arbuttle Native Seedster. ■