

Feedstock development in switchgrass

A. What is this research project?

- Breeding new varieties of switchgrass for feedstock production.
- Developing deployment plans for switchgrass varieties on a regional basis.
- Conducting basic genetic research on breeding methods and objectives for switchgrass.

B. What problem does it address?

- There is no seed industry infrastructure in place to provide seed and agronomic expertise for producing billions of tons of biomass to fuel the next generation of renewable energy technologies.
- What species will be best under what circumstances?
- What varieties are best under different growing conditions and climates?
- Perennial crops offer a unique solution to this problem, offering multiple functions such as biomass production, soil and water conservation, and wildlife habitat. Because it can grow under most any condition east of the Rocky Mountains, switchgrass offers a potentially valuable solution to the problem of choosing appropriate crop plants.

C. How is the project different from or how does it enhance other projects?

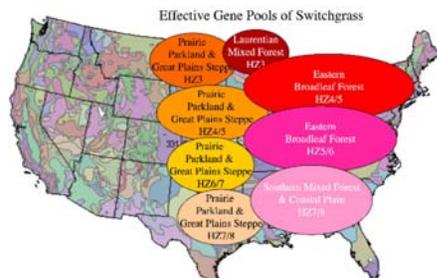
- This project is very similar to one in Lincoln, NE (K.P. Vogel, USDA-ARS). The two projects have similar objectives and work very closely together. Between the two breeding programs, new varieties of switchgrass have been or are currently being developed for use in USDA Hardiness Zones 2 through 7 (North Dakota to Kansas and Maine to North Carolina).
- The two projects collaborate by use of mutual testing programs in the Central Great Plains and the North Central USA, by exchanging potentially useful germplasm, and by frequent communication of new ideas and breeding methods. These two programs have also collaborated with non-ARS switchgrass breeding programs in South Dakota and Oklahoma.

D. What are the potential benefits of partnering with ARS on this research?

It is the intention to release the varieties produced from these efforts in order to make them available to the public. Access to seed and extensive field-trial data sets could be made available to Cooperators to assist in development of these programs. The varieties developed by the USDA-ARS switchgrass breeding program in Madison, WI are highly unique in their high biomass yields and adaptation to the northern USA east of the Great Plains region.

E. Who are the potential customers?

Customers of this research include seed companies, seed dealers, extension and outreach personnel, and producers interested in producing biomass crops.



Using DNA markers, the research group identified eight regions of the USA that form effective gene pools for switchgrass. The regional gene pool concept, based on USDA Hardiness Zones and historic soil and climatic variation, forms the basis for development of new breeding populations, variety recommendations for biomass production and prairie restoration, and new breeding initiatives in switchgrass.



Development of hybrid varieties, the next generation of high-biomass switchgrass varieties, requires field-scale crossing and progeny evaluation of combining ability for many candidate parent plants.



Genetic diversity within switchgrass is the foundation of a research program that breeds new varieties for use as bioenergy feedstocks and can do double duty as source-identified populations for use in tallgrass prairie restoration projects.

Stage of Development

Three new varieties (St. Croix, Hiawatha, and Polaris) are each in different stages of the seed multiplication phase. There are plans to formally release these three varieties in 2009-2011 (most likely at a rate of one per year), pending agency approval.

Moving Forward

Following the release of these varieties, we will begin searching for partners in the seed multiplication and marketing processes. We will need to identify partners with resources and expertise in seed production, seed distribution, and seed marketing.

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