

Purpose

Evaluate biofuel crop productivity on various soils and microclimates across Michigan.

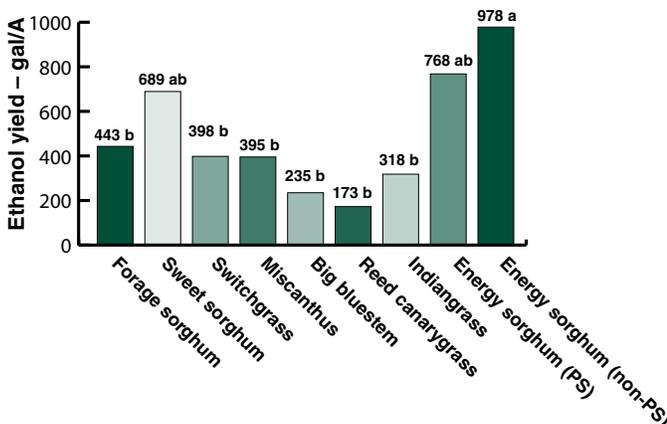
Materials and methods

This experiment was established as a randomized complete block design with four replications. Switchgrass, miscanthus, big bluestem, indian-grass and reed canarygrass were established in May 2009. Energy, forage and sweet sorghum were planted in May 2010. Whole sorghum plants were clipped off at 3-4 inches above ground and weighed for total biomass. Total biomass removed would be comparable to corn silage harvest. The grasses were harvested with a chopper mounted on the front of a tractor. The chopper had a Kemper head. The center four feet of each plot was harvested.

County	Kalamazoo
Cooperator	W.K. Kellogg Biological Station
Nearest town	Hickory Corners
Soil type	Kalamazoo sandy loam
Planting date	May 2009
Weed control Sprayed 06/03/10	Switchgrass, big bluestem, indiagrass: .5 lbs. quinclorac + .5 lbs. atrazine Sorghums: 40 lbs. (207 lbs. 19-19-19)
Exp. design	RCB, 4 replications

Biofuel crop	Biomass yield		Ethanol yield	
	tons/A	tons/A	gal/A ¹	gal/A ¹
Forage sorghum	4.9	tons/A	443 b	gal/A ¹
Sweet sorghum	7.7	tons/A	689 ab	gal/A ¹
Switchgrass	4.4	tons/A	398 b	gal/A ¹
Miscanthus	4.4	tons/A	395 b	gal/A ¹
Big bluestem	2.6	tons/A	235 b	gal/A ¹
Reed canarygrass	1.9	tons/A	173 b	gal/A ¹
Indiagrass	3.6	tons/A	318 b	gal/A ¹
Energy Sorghum (PS)	8.5	tons/A	768 ab	gal/A ¹
Energy sorghum (non-PS)	10.9	tons/A	978 a	gal/A ¹

¹ tons/A X 72 gal/ton = gal. of ethanol/A



Results

Means separation tests showed that the energy sorghum yielded the highest. However, it was not statistically higher than the other sorghums. Energy sorghum (PS) is a photoperiod sensitive crop that does not flower until the day length is less than 12 hours and 20 minutes. This doesn't happen until late September. It was the tallest sorghum, but it didn't out-produce its sister line. The non-PS variety flowered and produced a seed head like the other sorghums. The grasses all tended to yield higher in their second year of establishment. Big bluestem yields would have been higher, but the machine could not pick up all the biomass because it was severely lodged. The other grasses had some lodging also.

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