MICHIGAN STATE UNIVERSITY | Extension
Michigan State University
AgBioResearch

Cropping system
Other

Kalamazoo County

Biofuel productivity plots

Purpose

Evaluate biofuel crop productivity on various soils and micro climates across Michigan.

Materials and methods

The crops planted in the plot vary from year to year. Switchgrass, miscanthus, indiangrass, big bluestem, indiangrass and reed canarygrass were established in May 2009. Canola, oriental mustard, energy, forage and sweet sorghum were planted 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 Kemper head chopper mounted on the front of a tractor. 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
Weed control Sprayed 06/03/10	All sorghums: 1.67 oz/A Dual II Magnum Canola and oriental mustard: 12 oz. Intensity One + 8 oz. Stinger
Fertilizer	Sorghums: 186 lbs/A 46-0-0 + 173 lbs/A 19-19-19 (118-33-33 actual lbs. N-P-K) All grasses: 152 lbs/A 46-0-0 (70 lbs. actual N) Canola and oriental mustard: 153 lbs/A 46-0-0 + 224 lbs/A 19-19-19 + 58 lbs/A 0-0-60 (113-43-77 actual lbs. N-P-K)
Exp. design	RCB, 4 replications

	2009		2010		2011	
Species	Yield[1]	Ethanol[2]	Yield[1]	Ethanol[2]	Yield[1]	Ethanol[2]
Canola (lbs/A)	–	–	122	–	467	–
Oriental mustard (lbs/A)	–	–	–	–	179	–
Sweet sorghum	13	1,137	8	651	7	622
Energy sorghum (PS)	–	–	9	725	8	649
Energy sorghum (non-PS)	–	–	11	924	8	642
Switchgrass	–	–	4	376	5	451
Miscanthus	–	–	4	373	8	663
Indiangrass	–	–	4	301	5	391
Big bluestem	–	–	3	222	3	213
Little bluestem	–	–	–	–	2	126
Reed canarygrass	–	–	2	163	3	215
Forage sorghum	7	564	5	418	4	354
Corn grain	108	303	–	–	–	–
Corn stover	3	266	–	–	–	–

[1]tons of dry matter/A (corn grain = bu/A). [2]tons/A X 85 gal/ton = gal of ethanol/A (corn grain = bu/A X 2.8 gal/bu = ethanol/A).

Results

In 2011, sweet and energy sorghums produced similar yields to miscanthus. Energy sorghum (PS) is a photoperiod sensitive crop that does flower until the day length is less than 12 hours and 20 minutes. This doesn't happen until late September. This was the tallest sorghum, but it didn't out produce the sister line that flowered and produced a seed head like the other sorghums. The grasses all tended to yield higher in this 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 due to a wet snow event that occurred just prior to harvest.

Sponsored by Project GREEEN and the Great Lakes Bionergy Research Center. Thanks to Joe Simmons, Peter Hudy and Phil Robertson for assistance in planning and carrying out this trial.

Dennis Pennington
Extension Educator
3700 E. Gull Lake Dr.
Hickory Corners, MI 49060
Phone: 269-838-8265
Email: pennin34@msue.edu

FIELD CROPS TEAM