2024 Early Maturity Soybean Variety Trial

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For a seventh year, Michigan State University Extension received funding from the Michigan Soybean Committee to evaluate early maturing soybean varieties in Northern Michigan. Our objective was to inform farmers in the region about the performance of soybean varieties adapted to local conditions. This included yield potential of individual varieties, as well as gathering additional information on grain quality and relative deer preference.

Twenty-seven soybean varieties solicited from private seed companies and MSU were planted on a commercial farm in Hillman, MI on May 30, 2024. Our seeding rate was 175,000 pure live seed per acre accounting for actual seed size and assuming 80% germination. Growing degree-day accumulation from planting to harvest was slightly above normal for Hillman and total precipitation was near the five-year average. However, precipitation was concentrated in June and July leading to some stunting and moisture stress early in the season. The trial was harvested October 17th using a Wintersteiger plot combine. Seed was cleaned, weighed and yield corrected for moisture content to a standard 13%. Protein and oil concentration were estimated using a FOSS Infratec™ NOVA NIR. Data were analyzed using ANOVA and Tukey's HSD test (alpha = 0.05) in the Agricolae package for R.

Soybean population averaged almost 224,000 plants per acre, which is somewhat denser than normal due to our assumed low germ rate of only 80% (Fig 1). Despite heavy stands, grain yield was positively correlated with plant stand ($p=0.04$) and two varieties had significantly lower populations ($p=0.04$). Lodging, partially related to white mold, was only noted in a few mid-late maturity entries. Varieties differed significantly in grain yield ($p<0.001$). The trial averaged 50.34 bu/a with the lowest yielding variety producing 41.03 bu/a and the best performer yielding 60.48 bu/a. Varieties also differed significantly in grain protein ($p<0.001$) and oil concentration ($p<0.001$), with one MSU line approaching 35.5% protein.

Since 2019, we have collected evidence demonstrating that soybean tissue sugar (Water Soluble Carbohydrate, WSC) concentration and deer damage vary significantly among soybean varieties, and that deer preference is positively correlated with WSC. In 2024, we again collected tissue samples from our entries to measure WSC concentration. Varieties differed significantly in WSC ($p=0.017$) when protected from deer browsing by temporary electric fencing. Since 2019, common soybean brands in our trials have differed significantly in sugar concentration (Fig. 2, $p=0.036$).

The trial was featured at a Soybean Field Day on September 12th, 2024. Many thanks to Michigan Soybean Committee, our seed suppliers and Hardies Dairy Farm for hosting the 2024 variety trial!

TRIAL DETAILS

PURPOSE:

Compare performance of available commercial soybean varieties, RM 0.5-2.0, under Northern Michigan conditions.

TRIAL LOCATION:

Hardies Dairy Farm in Hillman, MI on Negwegon silt loam.

EXPERIMENTAL DESIGN:

Randomized complete block design with four replications.

TRIAL MANAGEMENT:

- Conventional tillage
- Previous crop corn
- Manure fertility only
- 8 seed brands, 27 varieties, RM 0.3-1.9
- Planted May 30, 2024 at 175,000 seeds per acre
- Plots 4' X 16' with 7 in. row spacing
- Borders and alleys planted to minimize edge effect
- 1 pt/a Outlook pre-emerge herbicide, no post herbicide
- Fenced with 3-D electric rope for deer

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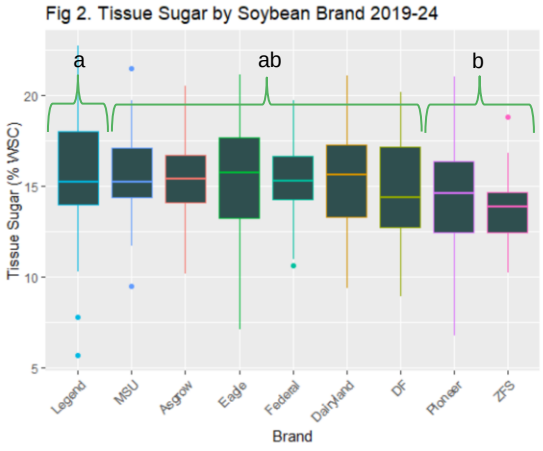
Table 1. Soybean yield and quality at Hillman, MI by brand and relative maturity.
(* denotes varieties statistically similar to the **HIGHEST** value for a given parameter at alpha = 0.05.)

Brand	Variety	MG	Stand (plants/a)	Lodging (0G-5B)	Yield (bu/a)	Protein (%)	Oil (%)	*Sugar (%)*
3G Seeds	AA0821E3	0.8	152,460	0.00	48.14*	34.73*	20.03	19.97*
Alloy	A10E35	1.0	201,465*	0.00	49.57*	33.55*	20.87	19.76*
Alloy	A13E35	1.3	179,685*	0.00	49.52*	32.81	20.16	19.35*
Asgrow	A10XF4	1.0	234,135*	0.00	49.35*	32.83	20.41	16.88*
Asgrow	A12XF5	1.2	217,800*	0.25	48.71*	33.30*	20.30	19.41*
Dairyland	DSR-0585E	0.5	223,245*	0.00	41.58	33.02	21.40*	18.61*
Dairyland	DSR-0799E	0.7	212,355*	0.00	46.31*	32.72	21.39*	18.74*
Dairyland	DSR-1345E	1.3	212,355*	0.00	50.04*	33.53*	21.18*	17.08*
Dairyland	DSR-1788E	1.7	245,025*	0.00	56.73*	34.07*	20.67	17.71*
DF Seeds	DF 3135 N E3	1.3	223,245*	0.00	55.53*	33.69*	21.93*	17.45*
DF Seeds	DF 3144 N E3	1.4	212,355*	0.25	50.58*	34.33*	20.33	17.71*
DF Seeds	DF 3165 N E3	1.6	245,025*	0.13	**60.48**	32.50	20.77	16.21
DF Seeds	DF 3194 N E3	1.9	201,465*	0.13	53.62*	32.06	21.37*	18.30*
Legend	03E553N	0.3	234,135*	0.00	42.61	33.25	20.63	**21.88**
Legend	05E453N	0.5	255,915*	0.00	46.64*	32.25	21.48*	18.36*
Legend	07E165N	0.7	239,580*	0.00	51.11*	34.12*	20.29	18.74*
Legend	09E345N	0.9	179,685*	0.00	43.30	32.36	21.39*	16.67*
Legend	11E453N	1.1	168,795	0.00	41.03	32.04	21.70*	19.06*
MSU	E15338	1.5	234,135*	**1.38**	54.07*	32.67	20.69	17.78*
MSU	E19314T	1.6	**304,920**	0.88*	52.50*	**35.50**	19.73	17.08*
MSU	E21409-2GT	1.7	255,915*	0.25	53.31*	31.32	21.14*	17.12*
MSU	E21100	1.8	212,355*	0.00	56.61*	32.64	20.34	15.69
Pioneer	P09Z79E	0.9	250,470*	0.00	46.78*	32.62	**22.03**	18.72*
Pioneer	P11Z72E	1.1	255,915*	0.00	50.33*	32.47	21.49*	18.40*
Pioneer	P13Z28E	1.3	223,245*	0.00	52.79*	33.88*	21.28*	17.88*
Pioneer	P16Z42E	1.6	223,245*	0.13	52.88*	32.70	21.24*	15.78
Pioneer	P18Z01E	1.8	239,580*	0.00	55.20*	32.63	21.16*	17.02*
	Mean	**1.2**	**223,648**	**0.13**	**50.34**	**33.09**	**20.94**	**18.05**
	P-Value		**0.043***	**<0.001*****	**<0.001*****	**<0.001*****	**<0.001*****	**0.017****

Fig 1. The plots on Aug 23, 2024



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