

2022 Early Maturity Soybean Variety and Deer Preference Trials – Chatham, MI

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For a fifth year, Michigan State University Extension received funding from the Michigan Soybean Committee to evaluate early maturing soybean varieties in the Upper Peninsula. Our objective was to inform farmers in Northern Michigan 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 deer preference.

Thirty-six soybean varieties solicited from seed companies were planted at Johannesburg, MI on May 22 and at Chatham, MI on June 2, 2022. The trial at Johannesburg was lost to weeds, so only tissue sugar data was collected. Soybeans established poorly at Chatham, and were therefore replanted on June 21. Growing degree-day accumulation and precipitation from planting to harvest were near normal for Chatham, but not conducive to soybean production. Late planting and cool early season weather limited the crop significantly. Both trials at Chatham were harvested November 3 using a Wintersteiger plot combine. Seed was weighed and yield corrected for moisture content to a standard 13%. Data were analyzed using ANOVA and Tukey's HSD test ($\alpha = 0.05$) in the Agricolae package for R.

Forage soybean varieties from Eagle Seed were not planted at Johannesburg due to late arrival, and were not harvested at Chatham due to lack of pods (late maturity). The trial planted June 2 averaged 10.46 bu/ac, with the lowest yielding variety producing 4.70 bu/ac and the best performing variety yielding 19.27 bu/ac. The average soybean yield for Michigan's Upper Peninsula is 25.50 bu/ac (Source: USDA NASS). There were significant differences among varieties in yield, protein and oil. At Johannesburg, observed differences among varieties in tissue sugar concentration were marginally significant ($P=0.10$).

The trial planted June 21 averaged 8.95 bu/ac, with the lowest yielding variety producing 2.11 bu/ac and the best performing variety yielding 17.16 bu/ac. There were significant differences among varieties in yield, protein and oil. Observed differences among varieties in tissue sugar concentration were nearly significant ($P=0.14$). Across the two trials, soybean yield was significantly affected by plant date, but not stand. The earlier planted trial averaged 1.51 bu/ac more than the later planted trial. Although the first planting showed slow and uneven stand establishment, populations were ultimately sufficient enough for the plant date advantage to outweigh a slight improvement in stand achieved by replanting.

In 2019 and 2021, we demonstrated that tissue sugar concentration and deer damage vary significantly among soybean varieties, and that deer damage is correlated with soybean tissue sugar concentration at V5 ($R^2=0.29$, $P=0.04$) (Fig. 1). Now, with two years of data available, it is apparent that soybean brands differ significantly in average tissue sugar ($P=0.04$) (Fig. 2). Furthermore, soybean tissue sugar concentration has not been correlated with growing year, maturity group or yield. Forage soybeans from Eagle Seed showed the highest tissue sugar; DF and Pioneer brands the lowest. This information can be used to select high or low palatability soybean brands/varieties for deer (damage) management.

TRIAL DETAILS

PURPOSE:

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

TRIAL LOCATION:

MSU Upper Peninsula Research and Extension Center in Chatham, MI on Eben very cobbly sandy loam

EXPERIMENTAL DESIGN:

Randomized complete block design with three replications

TRIAL MANAGEMENT:

- 9 seed brands, 36 varieties, RM 0.4-4.0
- Planted June 2 and 21, 2022 at 170,000 seeds per acre
- Plots 4' X 16' with 7 in. row spacing
- Borders and alleys planted to minimize edge effect
- 200 lbs. per acre of 0-0-60 potash top-dressed
- Post-emerge herbicide, 5 fl oz/ac Raptor + 1.5 pt/ac Basagran + 1 pt/ac Select

TAKE AWAYS:

- Early soybean planting is critical for yield potential
- Soybean brands differ in average tissue sugar concentration



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Table 1. Soybean yield and quality at Chatham, MI by brand and relative maturity, planted June 2, 2022.

†Tissue sugar data is from the Johannesburg, MI location.

(* denotes varieties that performed similarly to the **BEST** variety for a given metric at alpha = 0.05.)

Brand	Variety	MG	Stand (1 ft ²)	Yield (bu/a)	Protein (%)	Oil (%)	Sugar (%)†
Asgrow	AG07XF2	0.7	3.10*	11.63*	35.19*	19.14	16.75*
Asgrow	AG09XF3	0.9	2.78*	4.70	34.47*	19.20	13.28*
Asgrow	AG10XF1	1.0	3.35*	10.13*	34.89*	18.72	13.31*
Asgrow	AG11XF2	1.1	3.43*	10.17*	33.93*	19.35*	15.41*
Asgrow	AG12XF3	1.2	4.33*	8.40*	33.55*	19.44*	16.14*
Dairyland	0757E	0.7	3.68*	8.73*	32.76*	20.05*	13.33*
Dairyland	1121E	1.1	3.92*	8.47*	30.68	21.51	16.75*
Dairyland	1505E	1.5	2.61*	11.87*	35.23*	18.80	13.28*
Dairyland	1919E	1.9	3.19*	17.40*	33.60*	19.98*	14.87*
Dairyland	DSR-0645E	0.4	3.10*	6.30	33.04*	19.62*	16.89
DF	DF 151 N	1.5	3.27*	16.13*	33.84*	19.47*	14.23*
DF	DF 3141 N E3	1.4	3.51*	10.93*	33.47*	20.51*	14.16*
DF	DF 3172 N E3	1.7	3.59*	10.40*	31.57	20.97*	14.49*
Eagle	Big Fellow RR	7.0	2.78*	NA	NA	NA	NA
Eagle	Large Lad	7.0	2.04*	NA	NA	NA	NA
Eagle	MultiMAX North	5.0	2.53*	NA	NA	NA	NA
Eagle	Wildlife Manager MW	7.5	1.55*	NA	NA	NA	NA
Eagle	Wildlife Manager N	7.5	2.45*	NA	NA	NA	NA
Federal	AE1210S	1.2	3.35*	7.40*	34.31*	19.85*	NA
Federal	AE1710	1.7	2.94*	9.50*	34.35*	19.86*	15.40*
Federal	F0920N RXF	0.9	3.19*	5.90	32.51*	20.07*	13.90*
Legend	05E256N	0.5	2.61*	7.33*	33.43*	19.56*	14.62*
Legend	07E165N	0.7	2.86*	7.50*	34.81*	19.63*	15.28*
Legend	10E125N	1.0	2.53*	7.13*	35.91*	18.53	14.95*
Legend	14E152N	1.4	3.43*	10.00*	34.78*	19.60*	15.51*
MSU	E13268	1.7	3.43*	12.67*	33.91*	19.25*	14.65*
MSU	E19191	1.3	4.41	16.73*	34.58*	19.08	15.97*
MSU	E19314T	1.6	3.19*	10.80*	36.27	18.56	14.63*
MSU	E20078	1.7	2.78*	12.83*	35.94*	18.82	15.31*
Pioneer	09A53X	0.9	3.59*	8.03*	33.02*	19.97*	13.48*
Pioneer	09T68E	0.9	3.02*	5.60	32.54*	20.23*	14.37*
Pioneer	13A89X	1.3	3.59*	15.07*	31.72*	20.58*	13.55*
Pioneer	17A87E	1.7	3.27*	16.43*	33.55*	19.70*	13.45*
Pioneer	18A87E	1.8	3.84*	19.27	34.71*	20.39*	13.44*
ZFS	1721	1.7	3.02*	10.63*	36.05*	19.23	15.46*
ZFS	13H988	1.3	3.76*	6.07	34.46*	19.51*	13.68*
AVERAGE		1.5	3.17	10.46	33.97	19.65	14.68



Table 2. Soybean yield and quality at Chatham, MI by brand and relative maturity, planted June 21, 2022.
 (* denotes varieties that performed similarly to the **BEST** variety for a given metric at alpha = 0.05.)

Brand	Variety	MG	Stand (1 ft ²)	Yield (bu/a)	Protein (%)	Oil (%)	Sugar (%)
Asgrow	AG07XF2	0.7	3.33*	12.24*	36.70	17.97*	16.91*
Asgrow	AG09XF3	0.9	4.33*	12.23*	35.57	18.00*	13.50*
Asgrow	AG10XF1	1.0	3.50*	10.47	36.27	17.60*	17.01*
Asgrow	AG11XF2	1.1	5.50	16.13	37.17*	17.03	13.77*
Asgrow	AG12XF3	1.2	5.50	12.75*	37.40*	17.37	15.94*
Dairyland	0757E	0.7	4.00*	13.45*	34.80	18.50*	14.06*
Dairyland	1121E	1.1	4.67*	6.19	34.87	18.67*	11.52*
Dairyland	1505E	1.5	4.67*	6.64	37.23*	16.63	12.74*
Dairyland	1919E	1.9	4.33*	8.13	34.87	17.57*	16.91*
Dairyland	DSR-0645E	0.4	3.83*	11.23*	37.07*	17.07	13.77*
DF	DF 151 N	1.5	4.83*	9.79	36.27	17.20	11.85*
DF	DF 3141 N E3	1.4	4.33*	2.60	37.30*	16.25	11.42*
DF	DF 3172 N E3	1.7	4.50*	7.41	36.90	17.37	12.05*
Eagle	Big Fellow RR	7.0	5.00*	NA	NA	NA	17.21*
Eagle	Large Lad	7.0	3.33*	NA	NA	NA	17.42
Eagle	MultiMAX North	5.0	2.50*	NA	NA	NA	14.59*
Eagle	Wildlife Manager MW	7.5	3.50*	NA	NA	NA	15.63*
Eagle	Wildlife Manager N	7.5	4.17*	NA	NA	NA	15.99*
Federal	AE1210S	1.2	3.50*	10.14	36.03	18.43*	16.28*
Federal	AE1710	1.7	3.17*	5.01	37.77*	16.90	15.47*
Federal	F0920N RXF	0.9	4.33*	11.19*	35.43	18.80	15.07*
Legend	05E256N	0.5	5.33*	10.15	37.47*	17.00	14.51*
Legend	07E165N	0.7	4.50*	10.87	38.70*	17.30	15.39*
Legend	10E125N	1.0	3.50*	9.34	37.83*	17.10	13.91*
Legend	14E152N	1.4	3.83*	2.97	36.63	17.23	15.50*
MSU	E13268	1.7	5.00*	9.61	35.57	18.30*	14.33*
MSU	E19191	1.3	4.33*	4.74	35.17	17.37	16.70*
MSU	E19314T	1.6	3.83*	4.15	38.13*	16.47	12.60*
MSU	E20078	1.7	4.17*	6.18	37.30*	17.23	14.65*
Pioneer	09A53X	0.9	4.33*	13.33*	36.07	18.40*	17.15*
Pioneer	09T68E	0.9	4.00*	11.58*	35.93	17.97*	12.26*
Pioneer	13A89X	1.3	2.83*	8.60	35.73	17.50*	13.69*
Pioneer	17A87E	1.7	3.67*	5.49	36.17	16.97	12.37*
Pioneer	18A87E	1.8	4.33*	5.27	36.97*	17.27	12.65*
ZFS	1721	1.7	5.17*	7.56	38.97	16.87	13.88*
ZFS	13H988	1.3	4.50*	9.96	35.77	18.03*	12.29*
AVERAGE		1.5	4.17	8.95	36.57	17.51	14.47



Figure 1. Deer Damage by Soybean Tissue Sugar Concentration at V5 in 2021

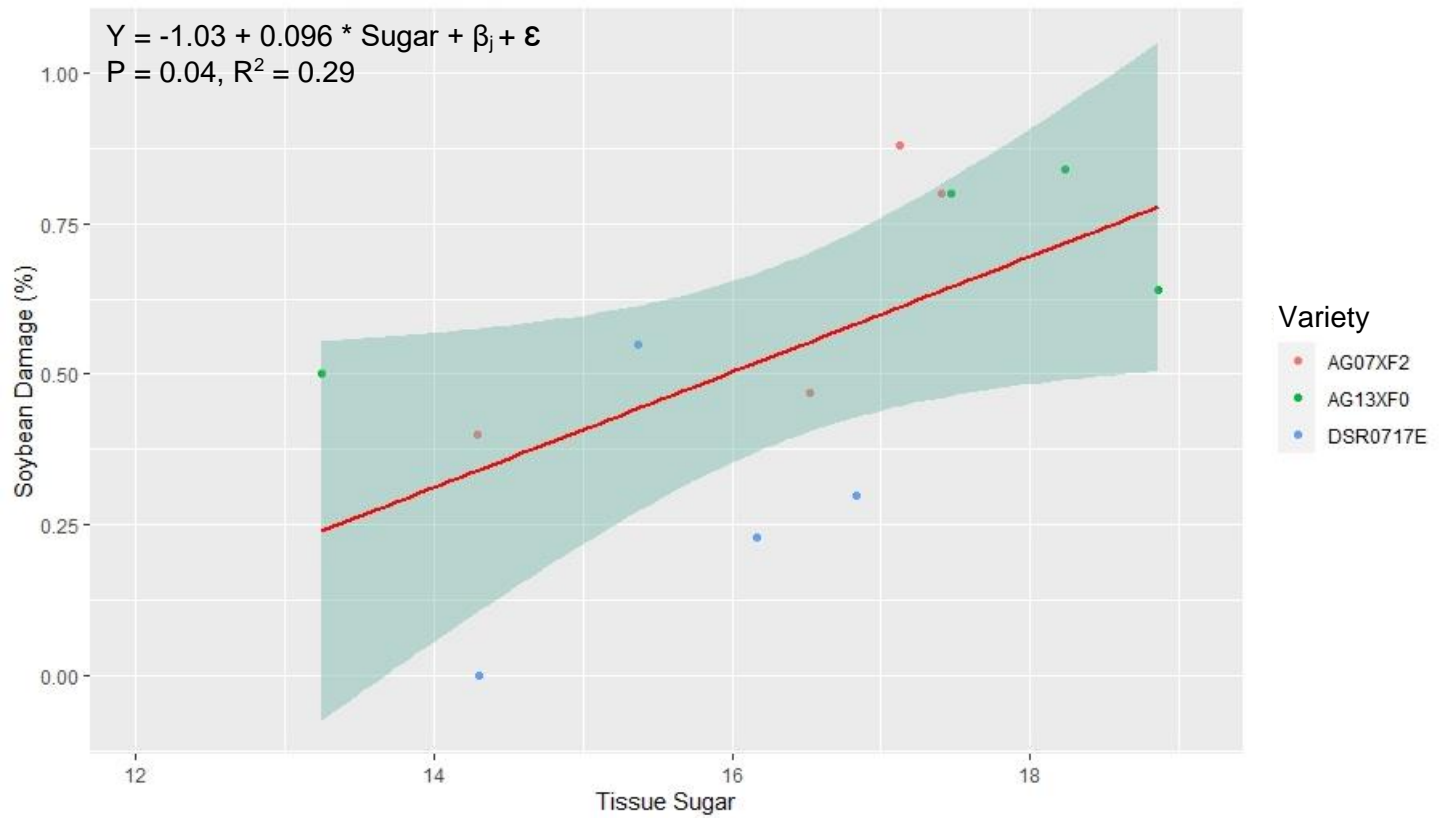


Figure 2. Tissue Sugar Concentration by Soybean Brand in 2019 and 2022

