



Northern NY Agricultural Development Program 2011 Small Grants Project Report

Soybean Variety Trials in Northern NY 2011

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Background:

Soybean acreage in New York has increased from about 40,000 acres in 1990 to almost 300,000 acres in 2011. Most of the acreage increase has occurred in the Finger Lakes and Western NY regions. Nevertheless, soybeans were produced on over 6,000 acres in Jefferson County and almost 3,000 acres in the remaining NNY counties for a total of 9,000 acres in 2010. The probability of increased soybean acreage in NNY is great for the following reasons:

First, it is no longer too cool to produce soybeans in NNY because of development of high yielding Group I soybean varieties and the warmer summers. In the Quebec Province of Canada, 659,000 acres were planted to soybeans in 2010 and over 100,000 acres were planted in the Ontario Province between the NY/Canadian border and Ottawa. As global warming continues over the next several decades, NNY may prove to be the ideal rather than a marginal region for soybean production.

Second, the high price for soybean meal has more dairy farmers in NY considering either planting the crop themselves while putting in an on-farm soybean roaster or transporting their own soybean crop to a local roaster. Soybeans are a "low-input" crop requiring planting, spraying once with Roundup (unless aphids or diseases appear and then an additional spray is required), and harvesting the crop in October. The lower inputs required for soybeans vs. corn makes it an attractive crop from a labor-management perspective, especially on smaller dairy operations. Also, the current high price of the crop makes it an ideal candidate as a cash crop, if liquidity is an issue for some dairy farmers. Soybean processing or handling facilities are

now on the St. Lawrence River so transportation of the crop to these facilities would be relatively easy.

Third, soybeans do not suffer the same yield penalty that corn does with delayed planting. Soybeans can be planted through the first week of June with minimal yield penalty (1/3 bushel/day loss in central NY from May 15-June 15 compared with 1 bushel/day for corn until June 1 and then 1.5 bushel/day until June 15). Many soils in NNY do not dry out until early June and soybeans could be planted at this time with a limited yield penalty.

The summers are warming in NNY. The Watertown Airport averaged 1934 growing degree days from June 1-September 30 during the 1981-2010 period compared with only 1911 growing degree days during the 1961-1990 period. The cost of soybean meal is now approaching \$400/ton and will probably remain high because of the increased demand in China. Soybeans may be better adapted to NNY than corn as indicated by the vast acreage of soybeans in Canadian Provinces directly north of NNY and the limited yield penalty for planting soybeans in June on slow-draining soils. Soybean acreage has increased in the Finger Lakes and Western NY regions because growers have substituted soybeans for dry beans, snap beans, oats, and other miscellaneous crops, which has proved to be a major boon to these producers over the last 5 years. Is it time for NNY farmers to reap the same benefits?

MATERIALS AND METHODS

The annual testing of soybean varieties was conducted at three locations in New York in 2011. Roundup Ready varieties in Maturity Groups 0, I and II were planted at the Aurora Research Farm in Cayuga Co., Neenan Brothers Farm in Lima in Livingston Co., and the Ron Robbins' farm in Sackets Harbor in Jefferson Co. The Sackets Harbor site in Northern NY averages about 2200 GDD from May through September.

The April-May period was the wettest ever recorded at the Watertown airport (about 5 miles east of the experiment on Rt.3 between Watertown and Sackets Harbor) so virtually no soybeans were planted in NNY in May (and only 14% statewide in NY). We planted Group 0/I and Group II varieties in separate tests at Sackets Harbor on 3 June. Each individual plot consisted of ten 20-ft. rows spaced 7 inches apart. Each entry was planted with a small plot drill (6 foot wide Almaco) at seeding rates of 200,000 seeds/acre with four replications. A randomized complete block experimental design was used for all tests. We used 22 fluid oz/acre of Roundup Touchdown about 5 weeks after planting for weed control. Aphid numbers and white mold was low throughout the year.

Yields were determined by harvesting an 18-foot section of the seven center rows (4.08 feet) of each plot at all sites with a small plot combine (Hege 140C). Plant height and lodging scores (1.0-5.0 rating with 1.0=no lodging and 5.0=complete lodging) were taken at harvest. The Group 0/I and II tests were harvested at Sackets Harbor on 12 October. The Hege plot combine does not have weighing capabilities so the entire plot sample was taken to the lab to determine plot weight and then sub-sampled to determine moisture. All yields were adjusted to 13% moisture. We used the ANOVA test to determine significance for yield, seed moisture, lodging score, and height. All means were separated by Fisher's protected LSD (0.05) when significance occurred.

RESULTS AND DISCUSSION

Growing Conditions

After the wettest April-May period on record, weather conditions turned somewhat dry and warm in June and July (4.62 inches with only 1.77 inches in July) in Jefferson County (Table 1). It continued warm in NNY for the remainder of the growing season with the 5th warmest June through September on record (at Watertown). Also, it was the 3rd wettest August through September period (at Watertown) so the June 3rd planted soybean trials did not experience stress during the pod-filling period. The Group 0/I varieties yielded 56 bushels/acre and Group II varieties yielded 53 bushels/acre (Tables 2 and 3). A light frost occurred at the Sackets Harbor site on 6 October when some late Group II varieties were in the R6.5 stage (leaves turning yellow), which probably reduced their yield and delayed dry-down.

Lodging and Harvest Moisture

Most Group I varieties at Sackets Harbor were within a couple points of 13% moisture at harvest (Table 2). Group I varieties averaged 13.0% moisture but Group II varieties averaged 17.2% (Table 3), probably because the light frost delayed dry-down of some of the Group II varieties that still had yellow leaves (R6.5 stage).

Yield-Group I test

The highest-yielding variety in the Group I test was a very early Group I variety, AG1031 from Asgrow (11% above the average yield of the test, Table 2). Other varieties that yielded much above-average (5% above the average) in the Group I test include HS 19A02 from Growmark FS Seeds, 1805R2 from Channel Bio, RPM DB1711RR from Doebler's, HS 19A11 from Growmark FS Seeds, and H16-10R2 from Hubner Seed. In addition, AG 1832 and AG1631 from Asgrow had above-average yield in the Group I test.

Yield-Group II test

The early Group II variety, AG2031 from Asgrow, had the highest yield (21% above-average) in the Group II test (Table 3). Other Group II varieties that yielded much above-average include AG2232 from Asgrow, 2292R2 from T.A. Seeds, H20-12R2 from Hubner Seed, SG2018 and SG2111 from Seedway, 38RY23 from Dyna-Gro , and AG2430 from Asgrow. In addition, HS 21A12 from Growmark FS Seeds, SG2410 from Seedway, HS 27A14 from Growmark FS Seeds, 2200R2 from Channel Bio, and AG2330 from Asgrow had above-average yield.

Conclusions:

The 2011 growing season in Northern New York was challenging because of the wettest April-May on record delayed soybean planting until June. The exceptionally warm June through September period (5th warmest on record at Watertown) coupled with the late frost (October 6) allowed for very good soybean yields this year in NNY. If the current price remains above \$11/ bushel, we expect soybean acreage in New York, including NNY, to increase next year. Because of the limited number of inputs for soybean production (minimum till, plant, spray Roundup, and harvest without drying in most growing seasons), soybean variety selection is one of the most important management decisions that affect yield.

Next Step:

Hopefully, we can continue soybean variety trials in NNY to provide the ever-increasing number of growers additional information to use when making this crucial management decision.

Outreach:

The results of this study were shared with our field crop educators at our In-Service in Ithaca on November 16. Also, the information was presented at the Field Crop Dealer Webinar on November 21 in which 133 participants (targeted audience was industry folks) attended. Likewise, the results of this study were incorporated into our news article, entitled "Recommended Roundup Ready Soybean Varieties for New York" in our newsletter, **What's Cropping Up?** that was published in December of 2011 (Vol.21, No.4, p.1-2, on our web site at: www.fieldcrops.org). Furthermore, the results will be incorporated into the recommended soybean variety tables in our **2013 Cornell Guide for Integrated Field Crop Management**.

Acknowledgments:

We acknowledge the support of Cornell Agricultural Experiment Station for providing support for the soybean variety testing program. This allows partial support for a highly-skilled individual to transport equipment, plant, spray, and harvest the trials as well as to hire temporary help to assist in all field operations and process all field samples in the lab (plot weights, moistures, and data entry).

Table 1. Monthly and total precipitation and growing degree days (GDD, 86-50 F system) at the Watertown Airport during the 2011 soybean growing season.

	Precipitation	GDD (86-50 F)
Month	Watertown Airport	Watertown Airport
June	2.85	467
July	1.77	676
August	6.38	594
Sept.	4.98	396
Total	15.98	2133

Table 2. Yield, seed moisture, lodging score, and height of Group I Roundup Ready soybean varieties harvested at Sackets Harbor, NY on 13 October, 2011.

COMPANY/BRAND	VARIETY	YIELD	MOISTURE	LODGING	HEIGHT
		<u>bu/ac</u>	<u>%</u>	<u>1-5 rating</u>	<u>cm</u>
Asgrow	AG1031	62.3	12.7	1.0	69
Growmark FS	HS 19A02	60.3	12.8	1.0	72
Channel Bio	1805R2	60.2	13.2	1.0	65
Doebler's	RPM DB1711RR	60.0	12.4	1.0	68
Growmark FS	HS 19A11	59.3	13.1	1.0	62
Hubner Seed	H16-10R2	59.1	13.0	1.0	65
Asgrow	AG1832	56.7	13.2	1.1	72
Asgrow	AG1631	56.2	12.8	1.1	66
Growmark FS	HS 17A12	55.9	13.3	1.0	69
Asgrow	AG1431	55.2	12.5	1.0	69
Seedway	SG1711	54.9	13.0	1.0	67
Seedway	SG1911	54.5	12.9	1.0	65
Asgrow	AG1831	54.5	14.6	1.0	78
Dyna-Gro	34RY17	54.4	13.4	1.0	65
TA Seeds	1719R2	53.8	13.0	1.0	62
Channel Bio	0905R2	53.6	11.9	1.0	70
Asgrow	AG1931	53.4	13.6	1.0	77
Growmark FS	HS 13A11	52.8	12.6	1.0	60
Seedway	SG1311	52.2	12.3	1.0	62
TA Seeds	1209R	46.6	13.4	1.0	53
AVG.		56	13.0	1.0	67
LSD 0.05		5	0.61	NS	6

Table 3. Yield, seed moisture, lodging score, and height of Group II Roundup Ready soybean varieties harvested at Sackets Harbor, NY on 13 October, 2011.

COMPANY/BRAND	VARIETY	YIELD	MOISTURE	LODGING	HEIGHT
		<u>bu/ac</u>	<u>%</u>	<u>1-5 rating</u>	<u>cm</u>
Asgrow	AG2031	64.0	14.1	1.1	80
Asgrow	AG2232	62.2	17.2	1.1	86
TA Seeds	2229R2	58.5	15.2	1.0	68
Hubner Seed	H20-12R2	58.4	13.7	1.0	70
Seedway	SG2018	58.3	13.7	1.0	81
Seedway	SG2111	57.5	14.0	1.0	73
Dyna-Gro	38RY23	56.5	16.0	1.1	75
Asgrow	AG2430	56.2	15.2	1.0	78
Growmark FS	HS 21A12	54.3	15.7	1.0	71
Seedway	SG2410	54.1	19.0	1.2	87
Growmark FS	HS 27A14	53.9	18.7	1.3	86
Channel Bio	2200R2	53.7	15.5	1.1	70
Asgrow	AG2330	53.4	18.6	1.1	76
TA Seeds	2599R2	51.0	19.4	1.4	90
Dyna-Gro	V25N9RR	49.5	19.5	1.1	78
Asgrow	AG2431	43.2	19.7	1.1	72
Doebler's	RPM DB2511RR	42.6	18.9	1.1	70
TA Seeds	2890R	41.1	19.9	1.2	86
Asgrow	AG2532	41.0	19.5	1.1	79
AVG.		53	17.2	1.09	78
LSD 0.05		5	0.80	0.21	7