Northern New York
Agricultural Development Program

FACT SHEET

Producing Organic Food-Grade Soybeans in NNY

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Why Organic Production of Soybeans?

Increased demand for organic food coupled with the widely reported health benefits associated with soy products have resulted in premium prices being paid for organically grown food-grade soybeans.

... varieties are adapted to northern growing conditions.

Introduction:

Why Produce Soybeans Organically in NNY?

Organic grain production is one strategy that Northern New York farmers could use to diversify their cropping systems and improve profitability. Increased demand for organic food coupled with the widely reported health benefits associated with soy products have resulted in premium prices being paid for organically grown food-grade soybeans.

Several early maturing (maturity groups 000 – 1) food-grade soybean varieties have been developed by Agriculture Canada breeders and companies like Prograin Inc. and W.G. Thompson. These varieties are adapted to northern growing conditions and should perform well in Northern New York. The critical questions are how well the new food-grade varieties perform under organic management, and what kind of production and cultivation systems will be required to control weeds and, at the same time, optimize yields?

Objectives:

The objectives of the study of organic production of soybeans at the Cornell Baker Research Farm at Willsboro, NY, are to:

1) evaluate the performance of regionally adapted food-grade soybean varieties in an organic production system, and

2) determine the influence of row spacing on yield and the effectiveness of organic weed control measures.

Growing food-grade soybeans at a wide 30" row spacing allows for more organic weed control options than with narrow 7" row spacing, but yields at the wider 30" row spacing may be expected to be lower than with the 7" row spacing.

For more information about growing soybeans, contact the Cornell Cooperative Extension office for your county:

- **Clinton-Essex**
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- **Franklin**
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- **St. Lawrence**
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Methods:

Split plot experimental design used

A food-grade soybean production trial was conducted on certified organic fields at the Cornell Baker Research Farm at Willsboro in 2003. The farm's soil type is classified as Kingsbury clay, and all the organic fields are tile drained.

Eight soybean varieties, ranging in maturity from group 00 to 1, were grown at either 7-inch or 30-inch row spacings. A split plot experimental design with six replications was employed. Row spacings were the whole plot treatments and varieties were the subplot treatments. Plots with 30-inch row spacings were 10' x 15.5' (4 rows per plot). Seven-inch row spacing plots were 5' x 16.5' (8 rows per plot). Plant population targets were 225,000 plants per acre and 200,000 plants per acre for 30" and 7" row spacings, respectively. Twelve-foot sections of the center two rows were harvested from the 30" row spacing plots. In 7" row spacing plots, 12" sections of the center six rows were harvested.

Early maturing soybean varieties are typically shorter than later maturing varieties and may not compete well with weeds. Growing food-grade soybeans at a wide 30" row spacing allows for more organic weed control options (between-row cultivations) than with a narrow 7" row spacing configuration, but yields at the wider 30" row spacing may be expected to be lower than with the 7" row spacing.

Production Practices:
Soybeans followed a mixed alfalfa/grass hay crop in the rotation. In preparation for the soybeans, the hay sod was plowed the previous summer and fallowed for the remainder of the growing season to kill the sod and reduce perennial weed pressure.

Early season spring weeds were controlled with a stale seedbed approach as the fields were first disced in early May, and then disced again and dragged with a spring-tooth harrow immediately prior to seeding in June.

A rotary hoe was used for blind cultivation of all plots when the plants were 4" tall. The 30" row spacing plots received an additional cultivation with sweeps between the rows when plants were 12" tall.

No soil amendments were added to the fields. Seeds were inoculated with Rhizobium sp. at planting.

Results

Plant Height:

Mean plant heights varied significantly with variety and there was a trend toward increased height with later maturing varieties (Table 1). The response in plant height to row spacing differed among the entries as there was a significant variety x row spacing interaction. Jutra and Majesta, two later maturing varieties were taller at the 30" row spacing than they were at the 7" row spacing. All other entries were shorter at the 30" row spacing compared to the 7" row spacing.

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Table 1. Maturity group and mean plant height for eight varieties in 2003

Entry	Variety	Maturity Group	Mean Plan Height (cm)
4	Majesta	1	103.2 a
6	Venus	0.4	102.6 a
5	Delta	0.7	97.6 ab
1	Supra	00	95.6 b
2	Jutra	0.8	93.6 bc
3	Pro117	0.4	89.1 cd
8	Korada	0.4	87.5 d
7	Lotus	00	84.5 d
			LSD(0.05) = 6

Yield:

Mean grain yields ranged from 48.5 bu/a to 52.3 bu/a (Table 2), but varietal differences in yield were not statistically significant. It is interesting to note, however, that Korada had the highest mean yield in the trial for the third consecutive year. Korada was the only variety from the 2001 and 2002 trials to be included in 2003. Given that it is generally one of the shortest varieties in the trial, and has a maturity group rating of 0.4, Korada's consistently high yields are impressive.

Mean grain yields ranged from 48.5 bu/a to 52.3 bu/a (Table 2.)

Row spacing did not appear to influence yield in 2003. These results are consistent with the 2002 results, but differ from the 2001 trial in which soybeans produced significantly higher yields at the 7" row spacing than at the 30" row spacing.

Table 2. Mean yields for eight food-grade soybean varieties in 2003.

Entry	Variety	Maturity Group	Mean Yield (bu/a)
8	Korada	0.4	52.3
4	Majesta	1	51.1
1	Supra	00	50.5
5	Delta	0.7	50.2
6	Venus	0.4	49.5
2	Jutra	0.8	49.3
3	Pro117	0.4	48.6
7	Lotus	00	48.6

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Weed Control:

Weed control was excellent in all plots in 2003 (Figure 1). Weed control is generally a major challenge when developing a workable organic production system, and it can be particularly tricky when transitioning from a perennial sod to an annual field crop. The late summer fallow period the year prior to planting effectively killed the sod and perennial weeds, as well as a couple of flushes of annual weeds. Early spring weeds were primarily controlled by the stale seedbed, and any weeds that germinated after planting were cultivated out with the rotary hoe. An additional cultivation with sweeps was made between the 30" rows, but may not have been necessary.

Figure 1.

Early season plots with 7" and 30" row spacing in the 2003 organic food-grade soybean trial. (Photo by Michael Davis)

Organic Food-Grade Soybeans Production Project Sponsor

The Northern New York Agricultural Development Program provided funding for the organic food-grade soybeans project.

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For more information on the Organic Food-Grade Soybeans Production project,
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The Northern New York Agricultural Development Program selects and prioritizes research the results of which can be practically applied to farms in the six-county region of northern NY: Jefferson, Lewis, St. Lawrence, Franklin, Clinton and Essex Counties.

To learn more about the Northern New York Agricultural Development Program, contact Co-Chairs Jon Greenwood, 315-386-3231, or Joe Giroux, 518-563-7523; or R. David Smith, Cornell University, 607-255-7286; or visit www.nnyagdev.org. ◆

Northern New York Agricultural Development Program

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