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In 2009, the University of Vermont Extension continued their evaluation of organic food grade soybean varieties at two locations. The purpose of the program was to provide yield comparisons, growth characteristic observations, and bean quality evaluations of food grade soybeans in Vermont's climate. Performance trials were established as replicated research trials in northern Vermont.

Food Grade Soybeans:

Over the past few years, UVM Extension has documented that high quality food grade soybeans can be produced in Vermont. There are many requirements that growers need to be aware of for food grade soybeans to be acceptable to processors. The most important is the cleanliness of the beans. Processors are interested in beans that will produce a uniform, pure colored soy product. This means that the beans must be harvested properly, with the combine set far enough off of the ground so that no dirt or rocks are picked up that might stain the beans. It is also important to note that weed sap can cause beans to be off-colored, so fields should be relatively weed free. However, attention must be paid during cultivation so that dirt is not kicked up over the beans, yet again causing staining. If weeds are problematic, some farmers choose to harvest after a killing frost, as the frost will kill the weeds and allow them to dry down prior to harvest. This will prevent them from staining the beans. It goes without saying that food grade soybeans must meet other regulations as well, and be free of *E. coli*, rodent feces, pathogens, and GMO free (if raised for organic production). When choosing soybean varieties it is important to select cultivars that have a clear or yellow hilum, to prevent discoloration of the final soy product. Beans should also generally be above 30% protein. Cultivars that produce uniformly sized and colored beans should be favored. Mostly importantly, a variety that fits the climate of the production area is of absolute importance. If beans do not mature, then a crop is not marketable at all! Soybean varieties are broken down into Maturity Groups ranging from 000 up to 13. In Vermont soybean maturity groups from 000 up to early group 2 are grown. The Champlain Valley offers a longer growing season and generally farmers grow group 1 to early group 2. In shorter season climate farmers will plant 000 to early group 1. To the best of our knowledge food grade soybeans are not available for very early maturity groups 000 – 0.

Replicated Research Trials:

Replicated soybean variety trials were conducted in Alburgh and Hardwick, Vermont. The experimental design at both locations was a randomized complete block with four replications, with soybean varieties as the treatments. Varieties planted in Alburgh

Table 1. Varieties and maturity groupings trialed in Hardwick and Alburgh, VT.

Table 3. Temperature, precipitation, and calculated GDD for Hardwick, VT.

	May	June	July	August	September	October
Average Temperature	50.3	58.6	62.1	62.9	52.6	39.3
Departure from Normal	0.9	-1.8	-2.8	+0.1	-1.2	-2.8
Precipitation	5.74	4.69	5.82	4.66	2.62	4.17
Departure from Normal	+1.97	+0.38	+1.39	-0.13	-1.35	+0.57
Growing Degree Days	177.0	305.0	405	461	264.5	24.5
Departure from Normal	-69.5	-64.0	-56.9	+45.6		

Table 4. Soybean Variety Trials, general plot management in Alburgh and Hardwick, VT.

	Borderview Farm, Alburgh, VT	**High Mowing Seeds, Hardwick, VT**
Soil type	Silt loam	Sandy loam
Seeding rate	180,000 seeds/acre	175,000 seeds/acre
Previous crop	Wheat	Cover crop
Tillage operations	Spring plow, disk	Spring plow, disk
Planting date	6-15-2009	6-5-2009
Row width	30 inches	30 inches
Fertilizer	2 ton/acre poultry com	2 ton/acre poultry com
Cultivation	Tineweed, inter-row cultivation, 3x	Handweeded
Harvest date	11-2-2009	10-23-2009

Figure 1. Hardwick variety trials drying down, 10-13-2009, just prior to harvest.

Alburgh Trial Results:

The trial in Alburgh, VT was first planted on May 21, 2009 in what turned out to be a particularly weedy area. Germination was poor, and tineweeding was attempted as a means of cultivation, but resulted in uprooting many seedlings. Trials were replanted on June 15, 2009, just prior to one month of rain (Table 2). Due to moist conditions, cultivation was not possible, and the weeds got out of hand, completely eclipsing certain treatments, which were subsequently mowed down.

As a result, out of 40 plots planted, 19 were harvested. The varieties Naya, 1F44 and Nova were

While protein is the most important consideration for soy products like soymilk and tofu, fat is also important. It has been found that seed oil content is negatively correlated with soymilk and tofu yields, as well as tofu quality parameters (Poysa and Woodrow 2002).

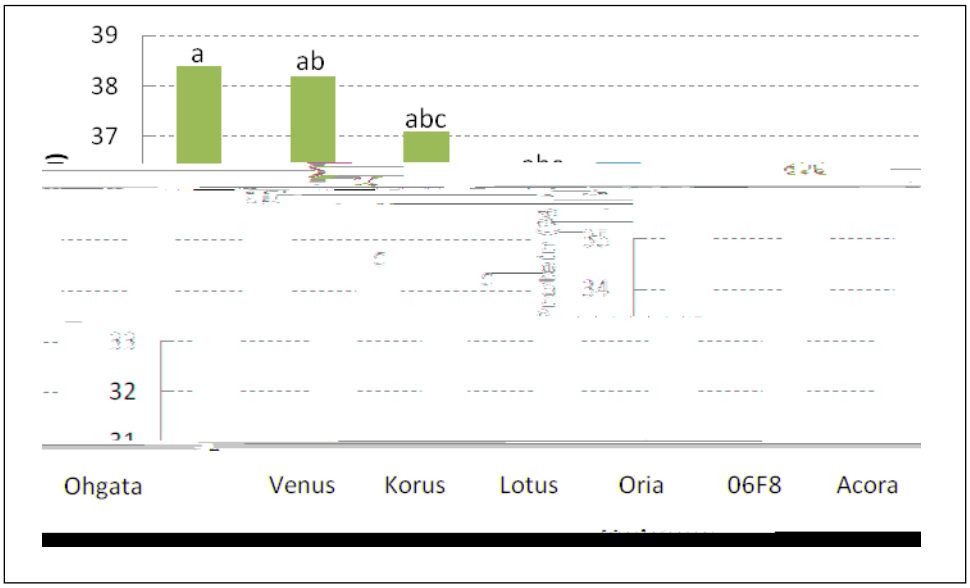

Figure 3. Varietal influences on protein concentrations in food grade soybeans.

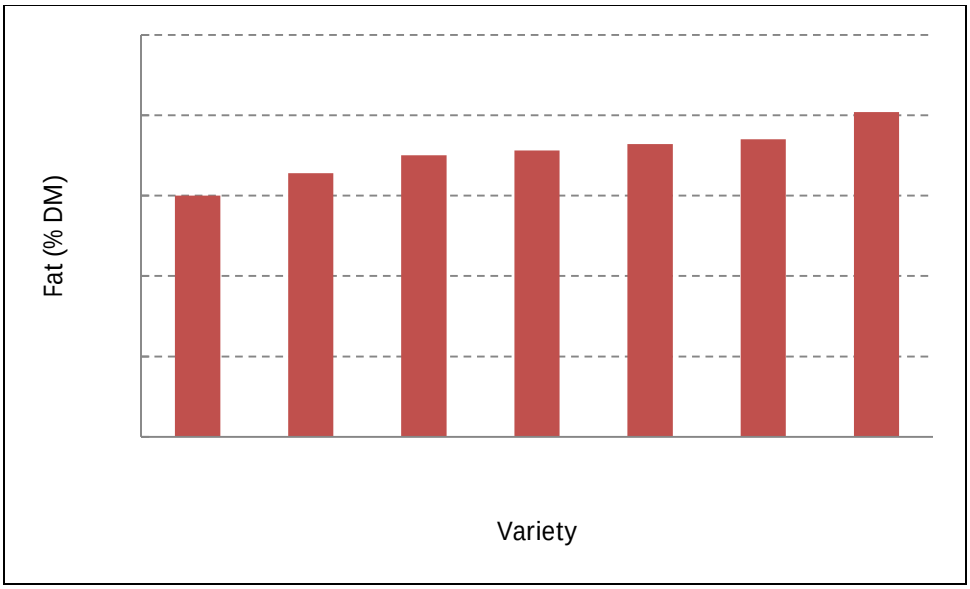

Figure 4. Varietal influences on fat concentration in food grade soybeans.

Hardwick Trial Results:

The plots in Hardwick had less weed pressure than the trials in Alburgh, due to the diligent efforts of the staff at High Mowing Seeds.

Table 6. Results from Hardwick Food Grade Soybean Variety Trial.

Variety	Population

Figure 5.

plots planted with 1F44 still retained their leaves

Nova, Ohgata, Venus, Dares, and Acora beans were also round and regular in shape. In Hardwick, 1F44 produced irregularly shaped beans that had a greenish tinge, most likely due to the fact that they did not have time to reach maturity before harvest. Phoenix produced uniformly round beans, but had a tendency towards a darker hilum. Naya beans were darker and irregularly shaped. CFS062 produced slightly golden beans. All varieties had acceptable protein levels for the food grade soybean market. Fat content has been shown to have a negative correlation with soy product yield (i.e. tofu, soy milk, etc.), and so varieties with lower fat content are preferable. Lotus had the lowest fat content, and 06F8 had the highest.

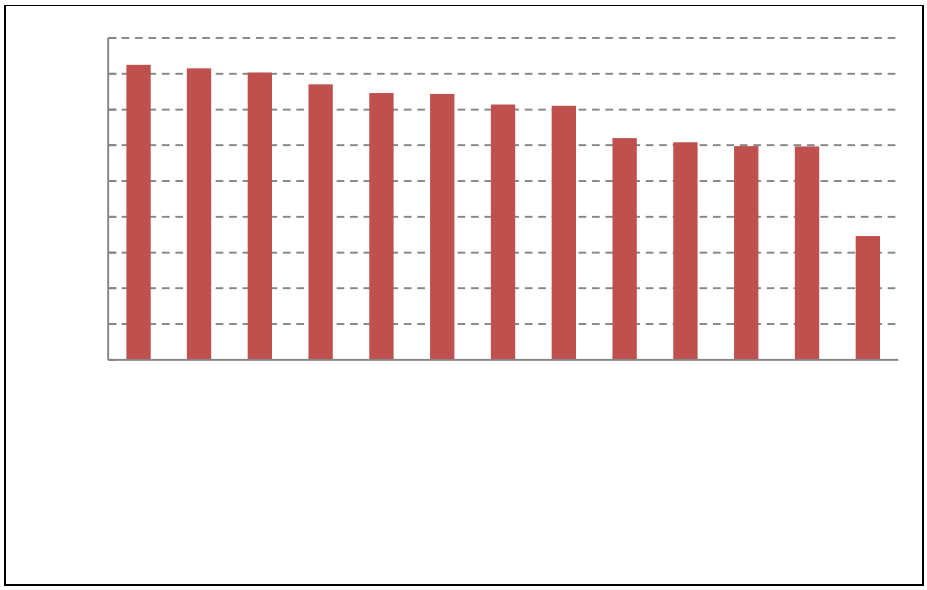

Figure 12. Protein content of food grade soybean varieties.

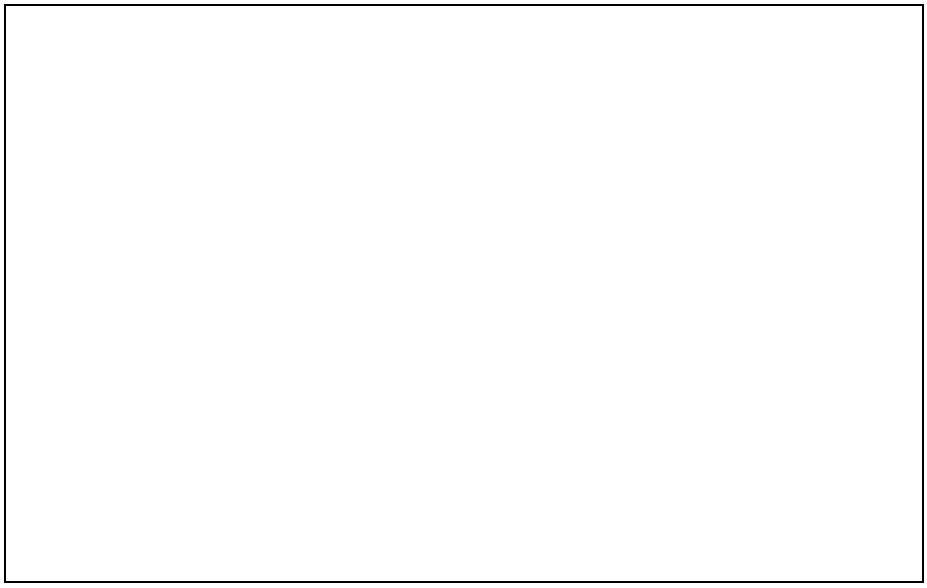

Figure 13. Fat content of food grade soybean varieties.

UVM Extension would like to thank the Rainville family and the folks at High Mowing seeds for their generous help with the trials.

The information is presented with the understanding that no product discrimination is intended and no endorsement of any product mentioned, or criticism of unnamed products, is implied.

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