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OILSEED PUMPKIN PRODUCTION: VARIETY AND FERTILITY TRIALS

Interim Research Report E2009-38

BACKGROUND

Oilseed (hull-less) pumpkins have been produced for generations in Eastern Europe, but are a novel crop for North American producers. Oilseed pumpkins produce seeds lacking the outer tough, white hull prevalent in more commonly grown pumpkin varieties, making these seeds desirable for oil pressing and for snack products. These hull-less seeds are largely composed of rich, dark green oil that boasts a range of health benefits attributed to the high content of Omega 6 and 9 fatty acids, zinc, and Vitamin E. Health conscious consumers or processors seeking this crop are likely to support organic production. In 2008, the OACC continued trials to examine the feasibility of producing this crop using organic management practices in the Maritimes.

RESEARCH OBJECTIVES

- Improve understanding of agronomy and production potential for oilseed pumpkin as a novel crop for producers.
- Evaluate best organic management practices for fertility and planting timing for oilseed pumpkin.
- Assess oilseed pumpkin oil yield and quality for comparison to industry standards

WHAT WAS DONE

In 2007, oilseed pumpkin trials were established to develop fertility, weed and pest management strategies for the Styrian oilseed pumpkin (cv. *Gleisdorfer olkurbis)* imported from Austria (see Bulletin 2008-38). However, the length of the growing season required for the Styrian crop resulted in some pumpkins that failed to reach maturity, even in late October. In an effort to overcome these maturity issues, 2008 trials examined other varieties of oilseed pumpkins with shorter maturation periods, and also examined the feasibility of planting earlier in the season. In addition, fertility as supplied through green manures and animal manure sources were examined.

A factorial trial was established at the Brookside Organic Research Site in Truro, NS to examine the performance of two locally available oilseed pumpkin varieties, Kakai and Snackjack. The factors of the experiment included planting timing (early = May 30, late = June 11), green manure preceding the pumpkin plant (timothy or red clover) and pelletized poultry manure (0 or 80 kg N ha^{-1}). Each factor combination was replicated three times. Demonstration trials were also established on two farms in Prince Edward Island.

Kakai and Snackjack oilseed pumpkins approaching maturity (left) and split open for harvest (J. MacKenzie)

The timothy and clover stands preceding the pumpkin plots had been in place for two years and were incorporated three weeks before the first pumpkin planting. One week before planting, pelletized poultry manure was applied by hand and incorporated in a 0.61 m (2') band along the crop row. Seeds were planted with a handheld corn jab-type planter at a depth of 3.8 cm (1.5"), with 1.2 m (4') between plant rows and 30 cm (1') between plants within a row. Cucumber beetles arrived in the plots at the beginning of July, hence plots were sprayed with Surround on five occasions until the beetle pressure subsided.

Pumpkin vine establishment was monitored throughout June and into July. Early planted seeds were observed to have very poor germination, with many rotting seeds found in the soil upon further examination thought to be largely attributed to cold soil temperatures. Late planted seeds exhibited higher germination (roughly 50%), but establishment was such that plants were transplanted within and between plots on July 10 to achieve the desired plant density of 2.7 plants m^{-2}. Pumpkins were harvested on October 30, with pumpkins split open in the field and the seeds removed. Seeds were then washed to remove residual flesh and dried at 50°C for four days.

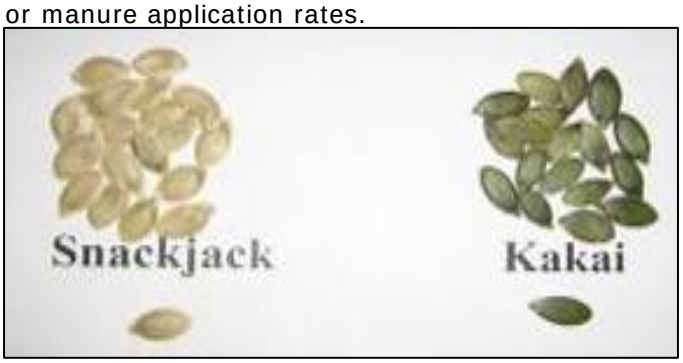
PRELIMINARY RESULTS

Table 1. Mean yield and yield components of oilseed pumpkin, illustrating the effects of variety and green manure plowdown. All means presented are significantly different ($p<0.05$).

	Pumpkins per Plant	Weight per Pumpkin (kg)	Seed per Pumpkin (g)	Seed Weight (g 1000 seeds^{-1})	Seed Yield (g m^{-2})	Oil Content (%)	Oil Yield (g m^{-2})
VARIETY							
Kakai	0.91	3.22	41.73	152.8	86.35	49.80	42.97
Snackjack	1.34	0.91	32.64	117.6	124.75	47.31	58.94
GREEN MANURE							
Timothy	ns	1.76	31.25	124.63	85.59	ns	41.69
Clover	ns	2.36	43.11	145.77	125.52	ns	60.22
Standard Error	*0.096*	*0.16*	*2.42*	*3.53*	*10.18*	*0.26*	*4.99*

Due to poor germination and crop establishment of the early planted plots, analysis of yield and oil content will focus on the late planted plots. Unfortunately, the trial and demonstration plots were plagued by poor germination, even when soil temperatures warmed to 15°C at the late planting date. Observations in the field suggest that planting depth and packing may impact crop establishment. Such factors should be examined, along with possible seed treatments that may promote germination.

Statistical analysis revealed that the main factors influencing the various pumpkin yield components were the pumpkin variety and the green manure plowdown that preceded the pumpkin crop. Results, as presented in Table 1, indicate that Kakai pumpkins were significantly larger than the Snackjack pumpkins and produced a significantly higher weight of seeds per plant with a higher average seed weight and oil content. However, the Snackjack plants more than compensated for these deficiencies, producing more pumpkins per plant that resulted in a higher overall seed and oil yield. For all characteristics examined, there were no significant interactions between variety, plowdown, or manure application rates.



Snackjack and Kakai seeds. Note the complete absence of hulls on the Kakai and reduction of hulls on the Snackjack seeds (J. MacKenzie)

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Poultry manure applications had little impact on pumpkin performance, with applications significantly increasing only pumpkin seed yield ($p < 0.05$). This may be attributed to the dilution of the nitrogen application, which was calibrated based only on the narrow band applied and not the entire plot area.

Further analysis of the fatty acid profile of the pumpkin seed oil reveals a high composition of Omega 6 and 9 fatty acids in both varieties, with linoleic acid (60-64%) and oleic (16-20%) dominant contributors in both varieties, as is common in oilseed pumpkins. These characteristics suggest that either variety could serve a snack or oil seed market. It should, however, be noted that the reduced hull present in the Snackjack variety may reduce its appeal in these markets.

THE BOTTOM LINE...

Oilseed pumpkin is an interesting new crop, not without its challenges, for Maritime organic farmers. Legume green manures may serve as an ideal fertility source for this high value crop.

CREDITS

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