

## Variety and Planting Date Affect NuSun Sunflower Yield and Oil Composition

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NuSun sunflower offers traditional corn/soybean growers a value added opportunity to increase crop diversification, spread economic risk, and lessen the impact on environmental resources. NuSun sunflower oil is attractive to both consumers and industrial food manufacturers as a healthful vegetable oil that is high in oleic acid, low in saturated fat, and is naturally free of *trans* fatty acids. Yield and quality of NuSun oil is largely influenced by management practices and environmental factors. Management strategies are distinguished by climate, and explicit research is necessary for producers to optimize and stabilize their crop's potential. The overall goal of this research is to identify and develop a sustainable management system that optimizes grain yield and oleic acid content of NuSun sunflowers in Missouri.

### Materials and Methods:

Research was initiated at the Bradford Research and Extension Center in 2003 to quantify the effect of cultivar and planting date on sunflower yield, test weight, and fatty acid composition. The experimental design was a randomized complete block factorial design with four replications. Treatment factors included cultivar and planting date. Cultivars were selected by maturity date, grain yield potential, and oleic acid level. Planting dates and cultivars are given in Table 1. Prior to each planting date, 130 pounds of nitrogen was surface applied to each plot. Phosphorus and potassium were applied according to soil test recommendations provided by the University of Missouri Soil and

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Plant Testing Laboratory. Sunflower yield was quantified at physiological maturity and was adjusted to 10% moisture.

### **Results and Discussion:**

Cultivar by planting date interactions were significant for grain yield ( $P \leq 0.003$ ), therefore data were reported separately by planting date (Table 1). Grain yield differed among cultivars on the May 16<sup>th</sup> and July 3<sup>rd</sup> planting date, whereas grain yield was similar among cultivars on the June 9<sup>th</sup> planting date. Sunflower grain yield may have been limited on the June 9<sup>th</sup> and July 3<sup>rd</sup> planting dates by drought conditions in 2003. Our preliminary data suggests that growers should select sunflower cultivars based on the estimated planting date, i.e. full season vs. double crop production systems, in order to maximize crop yield.

Cultivar by planting date interactions were not significant for test weight or fatty acid composition ( $P \geq 0.05$ ) therefore data was pooled over main effects (Table 2). Planting date did affect sunflower test weight as well as percent palmitic and stearic acid composition. Planting date did not affect percent oleic or linoleic acid composition. Crop test weight and percent palmitic, stearic, oleic, and linoleic acid composition differed by cultivar. These preliminary results indicate that oleic and linoleic acid composition may remain stable over diverse environments. This suggests that Missouri growers may enjoy a wide planting date window in which sunflowers may be seeded and still meet base standards for NuSun sunflower oil production. This experiment will be repeated in 2004.

Table 1. Effect of cultivar and planting date on NuSun sunflower grain yield at the Bradford Research and Extension Center, near Columbia, MO in 2003.

Cultivar	Planting date†		
	May 16 <sup>th</sup> ‡	June 9 <sup>th</sup>	July 3 <sup>rd</sup> §
	pounds/acre		
Triumph 636	2332.8 bcd	1440.7 a	362.0 ab
Triumph 665	2065.2 d	1365.1 a	601.2 a
Triumph 667	2384.7 bcd	1346.5 a	423.7 ab
Mycogen 8377	2835.4 a	1824.3 a	192.2 b
Croplan 385	2530.0 ab	1359.4 a	429.2 ab
Pioneer 64M60	2179.0 cd	1739.0 a	370.2 ab
Pioneer 63M91	2411.0 bc	1762.0 a	412.3 ab

† Cultivar by planting date interactions were significant for grain yield ( $P \leq 0.003$ ), therefore cultivar yield data were reported separately by planting date.

‡ Treatment means within the same column and followed by the same letter were not considered different at  $P \geq 0.05$ .

§ Drought conditions in 2003 may have limited sunflower yield potential.

Table 2. Effect of cultivar and planting date on NuSun sunflower test weight and fatty acid composition at the Bradford Research and Extension Center, near Columbia, MO in 2003.

Main effect	Test weight‡	Fatty acid composition†			
		Palmitic	Stearic	Oleic	Linoleic
<b>Planting Date</b>		% total oil			
May 16 <sup>th</sup>	31.2 a	4.8 a	2.8 b	68.6 a	23.9 a
June 9 <sup>th</sup>	27.6 b	4.5 a	2.9 b	68.2 a	24.4 a
July 3 <sup>rd</sup>	30.2 a	4.2 b	3.5 a	61.8 a	30.6 a
<b>Cultivar</b>					
Triumph 636	27.9 c	4.1 cd	3.3 b	76.9 a	15.8 d
Triumph 665	30.2 abc	4.5 bc	2.7 c	68.1 abc	24.7 bcd
Triumph 667	31.0 ab	5.4 a	2.7 c	51.5 d	40.4 a
Mycogen 8377	28.3 bc	4.4 bcd	2.9 c	72.0 ab	20.7 cd
Croplan 385	31.5 a	4.0 d	4.4 a	71.5 abc	20.2 cd
Pioneer 64M60	28.0 bc	4.8 b	2.7 c	59.7 cd	32.9 ab
Pioneer 63M91	30.6 abc	4.4 bcd	2.7 c	63.8 bc	29.2 abc

† Cultivar by planting date interactions were not significant for test weight or fatty acid composition ( $P \geq 0.05$ ) therefore data was pooled over main effects.

‡ Treatment means within the same column and main effect followed by the same letter were not considered different at  $P \geq 0.05$ .