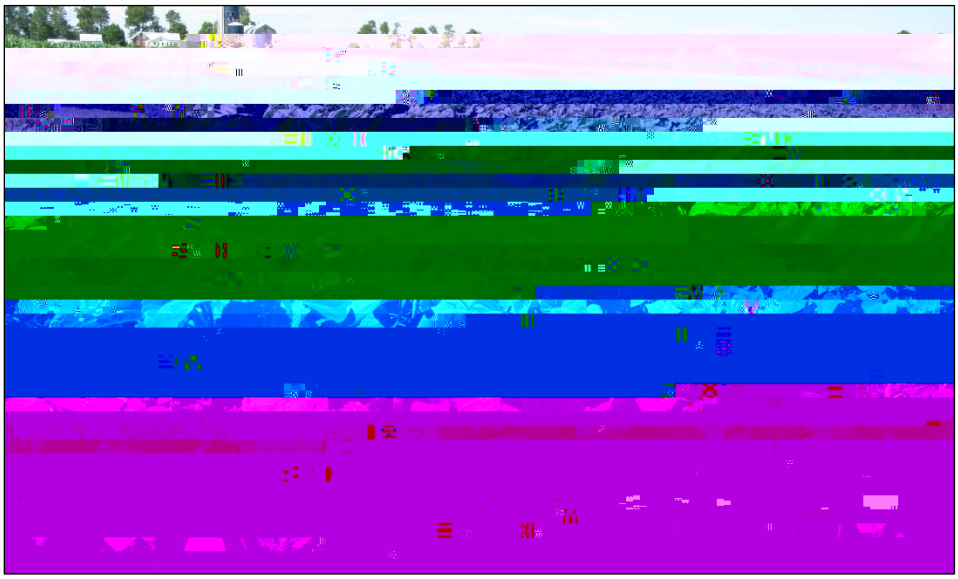
2012 Sunflower Variety Trial



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Oilseed sunflower is a relatively new crop for Vermont and the Northeast in general. Because of regional differences in soil conditions, length of growing season, and weather patterns, it is important to select specific conditions. Sunflower varieties that will perform well here will generally be early to medium in maturity and have good disease resistance. In addition, varietal differences in plant stand characteristics (such as height and head diameter) may confer ability to resist pest pressures and increase yields and overall quality. The goal of this study is to evaluate pest pressure as well as seed and oil yields of varieties that will most likely mature during a northeast growing season.

MATERIALS AND METHODS

sunflower variety trial at Borderview Research Farm in Alburgh, VT. The experimental design was a randomized complete block with split plots replicated four times. Seventeen sunflower varieties were trialed and evaluated for stand characteristics, seed yield, insect damage and oil content. Relative maturities (RM), traits and seed treatments are listed in Table 1.

Table 1. Seventeen sunflower varieties evaluated in 2012, Alburgh, VT.

Variety	Company	RM	Traits	Seed treatment
306	Croplan	88	DMR, NS	CruiserMaxx
369	Croplan	97	DMR, NS	CruiserMaxx
378	Croplan	97	DMR, NS	CruiserMaxx
460	Croplan	93	NS, ExpressSun	CruiserMaxx
555	Croplan	94	CL, DMR, NS	CruiserMaxx
2930	Syngenta	92	NS, DMR	CruiserMaxx
3433	Syngenta	94	NS, DMR	CruiserMaxx
3480	Syngenta	94	NS, CL, DMR	CruiserMaxx
3495	Syngenta	95	NS, CL, DMR	CruiserMaxx

Statistical analysis makes it possible to determine whether a difference among treatments is real or whether it might have occurred due to other variations in the field. All data was analyzed using a mixed model analysis where replicates were considered random effects. At the bottom of each table a Least Significant Difference (LSD) value is presented for each variable (e.g. yield). LSDs at the 10% level (0.10)

population on 16-Oct, just prior to harvesting (36,953 plants per acre). In all varieties, with the exception

Table 4. Plant stand characteristics of seventeen sunflower varieties, 2012.

	June population	Harvest population	Lodging	Sclerotinia head rot	Bird damage	Plant height	Head diameter	Harvest moisture
	plants ac^{-1}	plants ac^{-1}	%	%	%	inches	inches	%
306	32888	27443	10.0*	**0.00**	6.7	62.1*	4.74	10.3
369	21417	21417	5.0*	**0.00**	5.9	62.2*	6.32*	12.1
378	33323	28241	20.0	2.50	6.7	66.0*	5.87	10.4
460	33977	30347	10.0*	**0.00**	22.9	62.5*	5.57	10.1
555	33033	27443	10.0*	2.50	10.2	64.5*	4.78	8.8
2930	22361							

Treatments indicated in **bold** had the top observed performance.
* Treatments indicated with an asterisk did not perform significantly lower than the top-performing treatment in a particular column.
NS No significant difference was determined between treatments.

Lodging was impacted by variety, with the lowest level (0.00% lodging) in the variety Durango (Seeds 2000), though this was not statistically lower than lodging in 13 other varieties. The greatest incidence of lodging was in the variety Falcon (Seeds 2000) (42.5%). In this trial, no sclerotinia infection was found in the form of stalk or base rot. Sclerotinia head rot was present in eight of the 17 varieties, though there was no significant impact of variety on head rot susceptibility. There was, likewise, no significant difference in bird damage by variety, though the average level of damage to sunflower heads was 10.3%.

Plant height averaged 60.6 inches for the trial and was significantly different by variety (Figure 2). The tallest variety was Torino (66.1 inches), though Torino was not significantly taller than 3495 (Syngenta), 378 (Croplan), 555 (Croplan), 460 (Croplan), 369, or 306 (Croplan). Head width varied significantly by variety, and was greatest in Durango (6.79 inches), though not statistically greater than the variety 369 (6.32 inches). The smallest head width was in the variety 306, though the diameter was not statistically lesser than 11 other varieties. Harvest moisture was greatest in Durango, though not statistically greater than the harvest moisture of Torino. The trial average for harvest moisture was 10.8%.

Yield and quality were impacted significantly by varietal differences (Table 5). Test weights varied by variety, with the greatest test weight in the variety 3495, though this was not statistically higher than 11 other varieties. The lowest test weight, in the variety Sierra, was 28.5 lbs per bushel, which is still well within an acceptable range for sunflower. The standard bushel weight for sunflower seed is approximately 28 lbs. Seed yield, adjusted to 13% moisture for each test plot, averaged 2174 lbs per acre. There was a significant difference in seed yield by variety, with the greatest yield in Torino (2861 lbs per acre). The varieties 555, 3495, 460, 369, 306, 378, and Teton (Seeds 2000) did not differ significantly from the top performer in seed yield.

Table 5. Yield and quality measurements of trialed sunflower varieties, 2012.

	Test weight	Seed yield at 13% moisture	BSM damage	Pressing moisture	Oil content	Oil yield at 10% moisture	
	lbs bu^{-1}	lbs ac^{-1}	%	%	%	lbs ac^{-1}	gal ac^{-1}
306	31.5*	2365*	2.75	6.25	41.6*	1018*	133*
369	29.5	2375*	4.25				

DISCUSSION

Plant population varied significantly by variety, with one notable outlier; Torino had a higher population than all other varieties in early summer (29-Jun) and just prior to harvest (16-Oct). The trial average population was 28,891 plants per acre on 29-Jun and 23,544 plants per acre on 16-Oct, a difference of 5,347 plants per acre, or 18.5% loss during the season. In contrast, Torino, with a significantly greater population than all other varieties, experienced only an 11.0% decrease in population from Jun to Oct. Because the sunflowers were planted in May at a rate of 36,480 viable seeds per acre, the emergence rate was, on average, 79.2%, much higher than the emergence rate in 2011 (57%). A decline in plant populations from June to October could be caused by cultivation. Durango had an exceptionally low population, which may be the result of a larger seed size at planting. Many of the patterns in sunflower plant stand characteristics that have been noted in years past held true in 2012. For example, head width, which usually decreases as height increases, was greatest in the shortest variety, Durango. In addition, the harvest moisture was greatest in the variety Durango (15.1%), perhaps due to wide heads.

Overall, seed yields were relatively high in 2012, averaging over a ton. The top performer in seed yield