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Cantaloupe Variety Trial for Kentucky, 2016

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Cantaloupe is the fifth largest fresh market vegetable crop produced in Kentucky (USDA, 2013). It is a popular summer crop grown in many areas of the state and is commonly found at farmers markets and produce auctions. Although there continues to be standard varieties produced in the state, evaluation of new varieties is important to find those with improved fruit quality, yield, and shelf life. The objective of the trial was to evaluate yield, fruit quality, and maturity for fourteen different cantaloupe varieties.

Materials and Methods

On 14 April seeding of the cantaloupe varieties began using 50-cell black seedling flats (Landmark Plastic, Akron, OH). The seeding media used was Jiffy-Mix #17 (Jiffy Products of America, Lorain, Ohio), which is a common peat based substrate designed for vegetable transplant production. Due to the poor germination of a few of the varieties, a second seeding occurred on 20 April, using the same methods, with much better results. On a commercial production farm in Scott County on 19 May, each of the fourteen varieties was transplanted in the assigned plot into Maury silt loam soil. Transplanting was executed using a Rain-Flo waterwheel setter, with a water-soluble transplant fertilizer mixed into the water. The plots were 6 ft apart, 50 ft in length, with 20 plants in each plot spaced 30 in apart. At the end of each plot was a 10 ft break in order to have the plots separated and to have room to easily gain access to each plot. A plasticulture production system was employed using black plastic mulch-covered (4 ft. x 1 mil, Filmtech Plastics of the Sigma Plastics Group, Lyndhurst, NJ) raised beds with drip tape (12 in. emitter spacing, 30 gph/100 ft., Aqua Traxx, The Toro Company, Bloomington, MN). Using a Rain-Flo plastic layer/ bed shaper, plastic mulch and drip tape was installed on 15 April. Urea (46-0-0) was applied at a rate of 110 lbs to the acre and muriate of potash (0-0-60) was applied at a rate of 83.5 lbs to the acre as pre-plant fertilizer. Starting on 27 May fertigation occurred every week using calcium nitrate until 1 July, at which time potassium nitrate was applied until 22 July and then, for the last two fertigation events until 5 August, calcium nitrate was used again. At each fertigation event 9 lbs of nitrogen per acre were applied, based on the recommended rate of actual nitrogen for the season. Fertilization, diseases, and arthropod pests were managed using recommendations in the ID-36 *Vegetable Production Guide for Commercial Growers* (Saha et. al., 2015). Preventative fungicide applications were determined using MELCAST (Egel and Latin, 2012). Insecticide applications were based on weekly scouting reports throughout the production season.

Beginning on 13 July and terminating on 8 August, fruit was harvested three times per week for a total of 12 harvests. Every fruit harvested was then weighed and nine fruit from each variety, three for each replication, were then sampled for fruit quality on the same day, including brix (soluble solids), firmness, and other internal parameters. Measuring fruit firmness was done with an analog penetrometer (FT, Wagner Instruments, Greenwich, Connecticut). A manual refractometer (RF-12, Extech Instruments, Nashua, New Hampshire) was used for measuring soluble solids. Yield data were analyzed by general linear model and means were separated by Fisher's least significant difference test using SAS statistical programs (SAS Institute, Cary, NC).

Results and Discussion

Yields in 2016 were increased, ranging from 2,468 to 7696 fruit to the acre compared to 1600 to 6,490 fruit in 2105 (Table 1) (Saha, 2015). The increase in yield from 2015 to 2016 was likely due to the comparative reduction of rainfall over the 2016 growing season. Average precipitation in July in Scott County is 4.65 inches; in 2016 4.98 inches fell (Weather Underground, 2016). 2015 was an extremely wet season in July with nearly double the average rain fall for the month. Comparatively, rainfall in July 2016 was close to the annual average for the month. These relatively drier conditions allowed for timely preventative fungicide applications and more fertigation events than in the 2015 growing season, ultimately leading to more fruit set.

In terms of fruit count 8H2111 was the standout when compared to industry standards Aphrodite and Athena, with 7696 fruit/A (Table 1). Average fruit weights ranged from 5.4 to 8.4 pounds (Table 1). Orange Sherbet and Aphrodite had greater average fruit weights when compared to the other varieties, with the exception of 8H229 (Table 1). All other varieties excluding UGR1037-11, 8260b, and UGR1727-13 were comparable to Athena in terms of average fruit weight (Table 1). 8H2111 had the highest yield by weight as compared to all other varieties (Table 1). Varieties that were comparable to Aphrodite with respect to fruit weight per acre were UGR1037-11, 8H245, ME3743, ME3716, 8H277, UGR2101-14, and Orange Sherbet.

SV5196MF had significantly greater soluble solids (14° Brix) as compared to all other varieties other than UGR1037-11 (Table 2). However, it had the lowest numerical fruit number per acre as compared to all other varieties. UGR1037-11 and 8H277 had statistically higher brix as compared to both standards and comparable yield. Further 8H277 had an average fruit weight of 7.1 lbs which is the typical desirable size. SV5196MF, UGR1037-11, 8260b, UGR2101-14, and 8H229 had statistically greater firmness than Aphrodite and all other evaluated varieties. 8H277 and 8H211 had firmness statistically the same as Athena, while UG- 1037-11 was slightly more firm (Table 2).

Yields from industry standard Aphrodite and Athena prove why they have become the standards. 8H211 was comparable in soluble solids and average fruit weight with the standards and better in terms of number of fruit and fruit weight. Orange Sherbet and 8H229 were comparable to Aphrodite with respect to yield and quality. Orange Sherbet is a Tuscan type that can be substituted for the standards for individuals that are direct marketing. Variety selection is largely dictated by market. Based on this season's results, wholesalers should likely continue with Aphrodite and Athena, but could explore using 8H211 and 8H277 instead once released, because they are comparable; Direct marketers, such as those utilizing farmers markets and roadside stands, could consider other possibilities. For example, many of the Tuscan types such as Orange Sherbet are of excellent quality and are comparable in terms of yield. Although a bit smaller UGR1037-11 (5.4 lbs) also had good yield and fruit quality, which may be worth consideration for direct marketers as well.

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Table 1. Marketable Yield of cantaloupe varieties, 2016.

Variety	Seed Company	Number of Fruit per plot[z]		Average Fruit Weight (lbs)		Total Fruit Weight (lbs) per plot		Number of Fruit per acre		Total Fruit Weight (lbs) per acre	
8H2111	OG	53.0	A[y]	6.9	CDE	357.3	A	7695.6	A	51887	A
ME3716	SY	38.3	B	6.8	CDE	260.3	B	5566.0	B	37792	B
UGR1037-11	UG	37.7	B	5.4	G	202.2	BCD	5469.2	B	29364	BCD
8H245	OG	35.7	BC	6.3	EF	224.2	BCD	5178.8	BC	32553	BCD
ME3743	SY	35.0	BCD	7.4	BC	257.9	B	5082.0	BCD	37452	B
8H277	OG	34.3	BCD	7.1	CD	243.6	BC	4985.2	BCD	35368	BC
UGR2101-14	UG	32.7	BCD	6.3	EF	204.8	BCD	4743.2	BCD	29730	BCD
Aphrodite	SY	30.0	BCDE	8.4	A	252.0	BC	4356.0	BCDE	36594	BC
Orange Sherbet	SI	26.0	BCDEF	8.4	A	214.4	BCD	3775.2	BCDE	31129	BCD
Athena	SY	24.3	CDEF	6.7	CDE	159.9	DE	3533.2	CDEF	23215	DE
8H229	OG	22.7	DEF	8.1	AB	183.0	CD	3291.2	DEF	26567	CD
8260b	OG	19.3	EF	5.4	G	102.6	E	2807.2	EF	14893	E
UGR1727-13[x]	UG	18.7	EF	5.8	FG	107.6	E	2710.4	EF	15618	E
SV5196MF	S	17.0	F	6.4	DEF	108.6	E	2468.4	F	15765	E

[z]Plot size: 300 ft^2

[y]Means in columns separated by Fisher's least significant test ($P \leq 0.05$), means with same letter are not significantly different.

[x]Galia-Type

Table 2. Fruit quality of cantaloupe varieties, 2016.

Variety	Seed Company	Brix (% Soluble Solids)		Seed Cavity Length (in)		Seed Cavity Width (in)		Firmness (lbs-force)		Overall Length (in)		Overall Width (in)	
SV5196MF	S	14.0	A[z]	4.5	CDE	2.9	ABC	4.7	AB	6.9	E	6.4	C
UGR1037-11	UG	13.4	AB	4.1	DEF	2.8	ABCD	4.1	BCDE	6.9	E	5.8	D
8H277	OG	12.9	BC	5.4	AB	3.1	AB	3.3	EFGH	8.8	A	6.9	AB
8260b	OG	12.2	CD	4.3	CDEF	2.2	E	5.0	A	7.3	DE	6.7	ABC
UGR2101-14	UG	12.1	CD	2.9	I	2.4	CDE	3.7	CDEF	5.5	F	5.5	D
8H229	OG	11.7	DE	4.9	BC	2.4	CDE	4.4	ABC	8.2	ABC	7.0	A
Orange Sherbet	SI	11.6	DE	5.7	A	3.3	A	3.4	EFG	8.3	AB	6.6	ABC
8H245	OG	11.5	DE	4.7	CD	2.3	DE	3.2	FGH	7.5	CDE	6.8	ABC
Athena	SY	11.5	DE	3.1	HI	2.6	BCDE	2.8	GH	5.4	F	5.6	D
ME3743	SY	10.9	EF	3.3	GHI	2.6	BCDE	4.2	ABCD	5.9	F	5.8	D
8H2111	OG	10.8	EFG	4.7	BCD	2.6	BCDE	3.5	DEFG	8.0	BCD	6.9	AB
Aphrodite	SY	10.8	EFG	3.7	FGH	3.3	A	2.5	H	6.0	F	6.4	BC
ME3716	SY	10.3	FG	3.9	EFG	3.0	AB	3.6	DEFG	6.9	E	6.3	C
UGR1727-13[Y]	UG	9.8	G	4.1	DEF	2.2	E	3.1	FGH	7.0	E	6.5	ABC

[z]Means in columns separated by Fisher's least significant test ($P \leq 0.05$), means with same letter are not significantly different.
[Y]Galia type