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Seedless Watermelon Variety Trial for Kentucky, 2015

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Introduction

Watermelon continues to be a major vegetable crop produced for fresh market in Kentucky. Watermelon is only second in acreage to sweet corn in the state, and while sweet corn acreage has been diminishing, watermelon acreage has been increasing. From 2007 to 2012, there was a greater than 40 percent increase in acres planted to watermelon in Kentucky (USDA, 2013). There has been a sustained trend toward expansion of vegetable crops, particularly for major crops in the state (Snell et al., 2013). Watermelon production is not concentrated in one region of the state but rather distributed throughout. However, most of it is in Daviess, Lincoln, Casey, Hart, Allen, and Christian counties.

Farmers need to select varieties that suit their buyers, have good yields, and good quality. Kentucky markets are diverse, thus watermelon varietal characteristics appropriate for wholesale producers are not necessarily the same as those for farmers selling via retail channels. The objective of the experiment was to evaluate 20 seedless watermelon varieties produced under local conditions in Kentucky.

Materials and Methods

The experiment was established April 19 when 20 varieties were sown in 50-cell black seedling flats (Landmark Plastic, Akron, Ohio). Jiffy-Mix #17 (Jiffy Products of America, Lorain, Ohio) was the seedling media used. All varieties, as well as the non-harvested pollenizer variety Accomplish, were transplanted on May 22 with a Rain-Flo waterwheel setter into a Maury silt loam.

The experimental design was a randomized complete block, replicated three times. Rows were spaced on 8-foot centers with 4-foot in-row spacing. Experimental plots were 40 ft. in length with 10 seedless plants per plot. Pollenizers were interplanted within the row at a ratio of one pollenizer for every two trial plants. Pre-plant fertilizers were 110 lbs. of urea (46-0-0) and 100 lbs. of muriate of potash (0-0-60) per acre. Plastic-mulch-covered (4 ft x 1 mil, Filmtech Plastics of the Sigma Plastics Group, Lyndhurst, New Jersey) raised beds were formed using a Rain-Flo plastic layer. Simultaneously, irrigation drip tape was installed (12-inch emitter spacing, 30 gph/100 ft, Aqua Traxx, The Toro Company, Bloomington, Minnesota) under the plastic.

Fertigating began June 3 and ended July 31, applying 5 lbs N per acre using calcium nitrate each time. In 2015, fertigations were fewer than in typical seasons due to excessive rainfall, which led to frequent soil saturation and reduced irrigation frequency. Between June 12 and July 2, vines were turned back onto the plastic weekly to keep varieties separated and to allow for cultivation of row middles for weed management.

The *Vegetable Production Guide for Commercial Growers* (University of Kentucky Extension publication ID-36, Bessin et al, 2014) was followed to select fungicides and insecticides and to properly rotate between pesticide modes of action. The timing of preventative fungicide sprays

was determined using MELCAST (Egel, 2014). It has been shown that in some seasons, that can result in reduced fungicide usage (Egel and Latin, 2012). Insecticide applications were based on insect counts gathered by weekly scouting for arthropod pests.

Plots were harvested weekly from July 31-August 27 (five harvests). Each fruit was individually weighed, while fruit less than 9 pounds were not included. Three fruit from every replication of all varieties were evaluated for internal quality including percent soluble solids, size, and firmness. Soluble solids were measured using a refractometer (RF-12, Extech Instruments, Nashua, New Hampshire). An analog penetrometer (FT, Wagner Instruments, Greenwich, Connecticut) was used for measuring fruit firmness. 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, North Carolina).

Results and Discussion

In 2015, yields were greatly reduced with a range of 20,700-40,500 lbs/acre as compared to 43,300-85,200 lbs/acre in 2014 (Table 1) (Saha and Hanks, 2014). Reduced yield was likely due to excessive rain in July, which promoted anthracnose and gummy stem blight diseases. The average precipitation for July in Fayette County is 4.65 inches, while in 2015 9.66 inches fell (Weather Underground, 2015). In addition to promoting disease development, the rainy weather often prevented timely fungicide applications, and as the ground was saturated, it was impractical to fertigate.

The top 13 yielding varieties had statistically similar yields. Numerically, SV0258WA had the highest yield (297 lbs/plot) (Table 1). Fruit count of SV0258WA was not significantly different from fourteen varieties (Table 1). A similar trend was observed with regard to total bins of SV0258WA per acre (58.2 bins/A) (Table 2). Other comparable varieties included Lucille, SV7018WA, as well as commonly used varieties in Kentucky such as Fascination and Tri-X 313. More than half of the SV0258WA melons were the 45-count size (Table 2). WDL0409, KB12106, Traveler, and USAW90020 produced the most watermelons in the 60-count size (Table 2). Talca, Maxima, Lucille, Fascination, and SV0258WA were the top five varieties numerically for producing the most watermelons in the 45-count class (Table 2).

The average brix of SV7018WA (10.9%) was greater compared to the other 19 varieties (Table 3). Average brix for SV0258WA was 9.9% and was comparable to the other varieties evaluated (Table 3). Fruit firmness varied from 2.98 lbs-force to 3.93 lbs-force (Table 3). Overall, there was not a great amount of variation in fruit quality among varieties this season. As in many wet seasons, excessive rainfall in the 2015 season diluted the sugar content of the fruit.

In summary, choosing an appropriate variety to fit your marketing style is important. For instance, if wholesale is your primary method, what aspects of your production are most important? Total yield and Brix are typically considered; however, choosing a variety that produces most of its fruit in the 45-count size could also be a consideration. This is one of the more typically preferred sizes.

Given multiple considerations, based on these results, appropriate varieties would include: Lucille, SV7018WA, Fascination, and SV0258WA. Fascination is widely planted in the southeast United States and SV0258WA is newer but increasing in usage. Lucille and SV7018WA are more recent releases, and it would be beneficial to evaluate these varieties in a season with more favorable conditions. Excessive precipitation and the ensuing waterlogged soil and foliar disease certainly impacted the production season.

Acknowledgments

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Table 1. Yield of seedless watermelon varieties, 2015.

Variety	Seed Company	Total Fruit Weight per Plot (lb) ^z	Total Fruit Number per Plot	Fruit Weight per Acre (lb)	Fruit Number per Acre
SV0258WA	SM	297 a	19 abc	40,500 a	2,630 abc
Lucille	OG	284 ab	20 a	38,600 ab	2,760 a
Fascination	SY	277 ab	19 abc	37,700 ab	2,550 abc
SV7018WA	SM	276 abc	20 ab	37,500 abc	2,680 ab
USAW 90020	UA	273 abc	21 a	37,200 abc	2,820 a
SV8298WA	SM	270 abcd	18 abc	36,700 abcd	2,490 abc
Razorback	HI	268 abcd	17 abcd	36,400 abcd	2,310 abcd
Sweet Dawn	SY	263 abcd	18 abc	35,800 abcd	2,410 abc
Captivation	SY	254 abcd	16 abcd	34,600 abcd	2,180 abcd
Savannah	SY	249 abcd	18 abc	33,800 abcd	2,410 abc
SV0241WA	SM	241 abcd	17 abcd	32,800 abcd	2,310 abcd
TRI-X 313	SY	240 abcd	17 abcd	32,700 abcd	2,270 abcd
Traveler F1	HM	236 abcd	18 abc	32,000 abcd	2,490 abc
Talca	OG	229 abcde	15 bcde	31,100 abcde	2,000 bcde
Unbridled	SK	219 bcdef	16 bcde	29,800 bcdef	2,150 bcde
Exclamation	SY	215 bcdef	14 bcde	29,200 bcdef	1,950 bcde
KB12106	KB	204 cdef	16 bcde	27,800 cdef	2,140 bcde
Kingman	SK	195 def	14 cde	26,500 def	1,900 cde
Maxima	OG	155 ef	10 e	21,000 ef	1,360 e
WDL0409	SY	152 f	12 de	20,700 f	1,590 de

^zPlot size: 320 ft².^yMeans within columns separated by Fisher's least significant test ($P \leq 0.05$), means with same letter are not significantly different.

Table 2. Seedless watermelon varieties by average fruit weight, 2015.

Variety	Total Bins per Acre	Percent of Fruit in Each Size Class			
		60-count	45-count	36-count	30-count
		9-13.5 lbs	13.6-17.5 lbs	17.6-21.4 lbs	>21.4 lbs
SV0258WA	58.2 a ^z	24.5	50.2	25.2	0
Lucille	57.0 ab	37.1	54.8	8.0	0
SV7018WA	54.7 ab	47.9	38.3	12.3	1.5
Fascination	54.2 abc	30.1	54.6	12.8	2.6
USAW 90020	53.9 abc	61.6	31.9	6.5	0
SV8298WA	52.7 abc	37.0	46.9	16.2	0
Razorback	52.7 abc	23.3	47.3	23.3	6.1
Sweet Dawn	51.2 abcd	39.2	40.5	18.5	1.9
Savannah	50.2 abcd	41.2	37.6	19.8	1.4
Captivation	48.9 abcd	24.4	47.8	25.6	2.2
TRI-X 313	47.6 abcd	43.7	39.4	13.0	3.9
SV0241WA	47.4 abcd	43.5	44.4	9.8	2.2
Traveler F1	46.6 abcd	66.5	32.1	1.4	0
Talca	44.9 abcd	21.4	58.4	13.2	7.0
Unbridled	43.6 abcde	41.1	46.3	11.1	1.5
Exclamation	42.6 bcde	33.4	46.2	16.0	4.5
KB12106	39.8 cde	66.5	33.5	0	0
Kingman	37.6 de	58.3	30.0	10.3	1.4
Maxima	30.0 e	23.9	58.3	14.4	3.3
WDL0409	29.5 e	68.9	28.9	2.2	0

^z Means within columns separated by Fisher's least significant difference test ($P \leq 0.05$), means with same letter are not significantly different.

Table 3. Fruit quality of seedless watermelon varieties, 2015. Three fruit from every replication for each variety.

Variety	°Brix ^z	Firmness (lbs-force)	Fruit Length (in)	Fruit Width (in)	Degree of Seedlessness ^x	Hollow Heart ^y	Color
SV7018WA	10.9 a ^w	3.4 defg	11.2 a	8.1 cdefg	0.0	0.2 bc	red
USAW 90020	10.3 b	3.2 fg	10.2 bcd	8.1 cdefg	0.3	0.0 c	pink
TRI-X 313	10.2 bc	3.4 bcdef	10.7 abc	8.0 defg	0.1	0.8 ab	pink
SV8298WA	10.2 bc	3.7 abcde	10.7 ab	7.8 efg	0.1	0.4 bc	pink
Unbridled	10.1 bcd	3.0 g	9.6 d	8.6 bc	0.4	0.4 bc	pink
Lucille	10.0 bcde	3.2 fg	10.7 abc	8.0 defg	0.1	0.7 bc	pink
Captivation	10.0 bcde	3.8 abc	11.2 a	8.3 cde	0.0	0.8 ab	light pink
Exclamation	10.0 bcde	3.4 bcdefg	9.8 d	9.2 a	0.2	0.4 bc	pink
Kingman	9.9 bcde	3.6 abcdef	10.0 cd	7.6 g	0.1	0.4 bc	pink
WDL0409	9.9 bcde	3.7 abcde	10.1 bcd	7.7 fg	0.1	0.7 bc	pink
SV0258WA	9.9 bcde	3.6 abcdef	11.2 a	8.3 cde	0.0	0.9 ab	pink
Savannah	9.9 bcde	3.3 efg	10.6 abc	8.3 cde	0.1	0.2 bc	pink
KB12106	9.9 bcde	3.8 abcd	11.1 a	7.6 g	0.0	1.4 a	pink
Traveler	9.8 bcde	3.8 abc	10.0 bcd	8.4 cd	0.0	0.4 bc	pink
Maxima	9.8 bcde	3.7 abcde	10.0 d	9.0 ab	0.2	0.3 bc	pink
Talca	9.7 cde	3.2 fg	10.7 abc	9.0 ab	0.1	0.3 bc	pink
Sweet Dawn	9.7 cde	3.9 a	11.4 a	8.3 cde	0.0	0.0 c	pink
SV0241WA	9.6 cde	3.4 cdefg	10.7 abc	7.9 defg	0.0	0.7 bc	red
Razorback	9.4 de	3.8 ab	9.7 d	8.4 cd	0.1	0.2 bc	pink
Fascination	9.4 e	3.4 defg	10.9 a	8.2 cdef	0.1	0.9 ab	pink

^z°Brix: the percent of soluble solids.

^xDegree of Seedlessness: 1 = 0 seeds, 2 = 1 - 5 seeds, 3 = >5 seeds.

^yHollow Heart: 0 = none, 1 = minor cracking, 2 = severe cracks or cavities.

^wMeans within columns separated by Fisher's least significant difference test ($P \leq 0.05$), means with same letter are not significantly different.

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