2017
Montgomery County Diploid
Watermelon Cultivar Evaluations

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General Cultural Practices

The Diploid watermelon field trial was grown on bare ground, Wakulla and Candor deep sandy soil. Pesticides used in the field trial were chemicals labeled for commercial production of the crop, (2017 North Carolina Agricultural Chemicals Manual, (http://ipm.ncsu.edu/Agchem/agchem.html).

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Disclaimer

This publication presents data from the cultivar evaluation trial conducted during 2017. Information in this report is believed to be reliable but should not be relied upon as the sole source of information. Limited accompanying detail is included but excludes some pertinent information, which may aid interpretation.

Watermelon Cultural Practices for 2017 Cultivar Trial, God's Garden, Norman, NC

Introduction

Watermelon production in Montgomery county is limited to mainly small growers found in the southeast corner of the county in a very sandy soil. The majority of the growers sell their watermelons at farmer's markets or roadside stands. The watermelons that are grown in the county are primarily of the seeded (diploid) type and include older varieties such as Crimson Sweet, Jubilee, Congo, and Sugar Baby. The problem with these varieties, that many growers will agree upon, is that they are not consistent in either yield, shape, or quality on an annual basis. Though this can be the case with any watermelon crop regardless of variety because of environmental conditions, the basis of this study was to introduce newer diploid varieties to the area and determine if these newer lines of

seeded watermelons were more consistent than the older standards being grown. In terms of the cooperator for this study, God's Garden, the standard that is being used is 'Sangria'. The farm manager expressed concern in the lack of consistency and wanted to look at newer cultivars of diploid watermelons. Therefore, the primary objective of the study was to compare the grower's standard, 'Sangria', with three other cultivars that are considered either newer to the commercial market (CS 4030 and SS 8585) or commercially accepted across the Southeast (Estrella).

Materials and Methods

The diploid cultivar evaluation study was comprised of 4 cultivars planted on 0.75 acres of land. Once all seed were obtained from the seed companies, they were planted using a 2-row Mater Mac vacuum planter. Preplant fertilizer was applied through a broadcast application across the entire area to be planted at a rate of 300 lbs/acre of 6-3-18 that resulted in 18, 9, and 54 lb/ac of N, P_2O_5, and K_2O being applied**.** A second application of fertilizer was applied approximately 4 weeks after seeding at a rate of 150 lbs of 34-0-0 and 100 lbs of 14-4-14 mixed. This application of fertilizer added another 65, 4, and 14 lbs/ac of N, P_2O_5, and K_2O to the study. A final application of 250 lbs of 6-3-18 fertilizer was broadcast applied approximately 8 weeks after seeding. This application added another 15, 7.5, and 45 lbs of of N, P_2O_5, and K_2O to the study. Cumulative totals of fertilizer applied to the study was 98, 20.5, and 113 lbs of N, P_2O_5, and K_2O which would be considered to be below optimal for commercial watermelon production, but plant growth did not show any affects. Plant beds were rowed up after initial fertilizer was incorporated. The study was set up as a Split-Plot Design due to equipment constraints by the grower. Each treatment consisted of 2 rows that were planted approximately 300' long. Plot size was 2 row, 5 plants per row (10 plants per plot) offset, 20 feet long with 40 feet alleys between plots. Row middle spacing was 4 feet and in-row spacing was 4 feet. Between treatment spacing was 12 feet which gave each plant 32 square feet of growing room. Due to using a vacuum planter rather than transplants to plant the rows, seed germination for some cultivars was inconsistent which allowed for some plots to be short on the number of plants needed for the study. Therefore, in those cases, plots with missing plants were replanted approximately 10 days after seeding to achieve 100% plant stand. Replanting was completed by taking plants from other areas in the row that had good germination and moving the plants to the plot areas that were missing plants. This was successful as all seedlings that were transplanted into the plot areas survived.

The following pesticides were used throughout the growing season to combat against insects, disease, and weeds. For weed control, the herbicide mixture of Curbit and Strategy were used at planting at a recommended rate of 5 pt./acre. Weed suppression after seed germination had occurred consisted of plowing, hoeing, and hand weeding. Insect management at planting consisted of applying imidacloprid and season long insect management consisted of alternating the insecticides esfenvalerate (Asana) and Permethrin (Super 10) every 10-14 days. Disease control was managed by alternating applications of Bravo, Mancozeb, and Quadris at respective recommended rates.

There was a total of three harvests within the plot areas. The first harvest was 19 July 2017. Subsequent harvests were 24 and 28 July. Each fruit was harvested when ripe, weighed and categorized by marketable or unmarketable weight. Fruits were considered marketable if they weighed at least 10 pounds. Evaluations of each watermelon entry included yield, fruit number, soluble solids using a hand held digital refractometer, fruit shape and size, and exterior/interior descriptions (length/width ratio and flesh color). A taste test was also conducted at the Montgomery county farmer's market to determine if consumers could tell the difference between the cultivars and

if a particular cultivar was more desirable than another. A total of 26 people participated in the taste test.

Results and Discussion

The overall growing season was hot and abnormally dry, however there were some timely rainfalls that occurred in the area that the study was being conducted in that was not seen in surrounding areas. Overhead irrigation was also applied to supplement the rainfall that was received.

The four cultivars that were evaluated in the trial were all 'Allsweet' type watermelons. Overall yields were approximately one-fourth to one-third lower than normal due to environmental and cultural practices. However, plant growth was not affected, only fruit set and size. Marketable yields for all cultivars were similar except for CS 4030, as this cultivar yielded 48% less than the highest marketable yielding cultivar Estrella. Estrella not only had the highest marketable yield per acre, but also produced the highest percentage of marketable fruit among all cultivars (Table 1). Average marketable fruit weight among cultivars was similar with all cultivars within one pound of each other (Table 1). The cultivar with the greatest average fruit weight was SSX 8585 (14.1 lb.) compared to Sangria that had the lowest fruit weight (13.1 lbs.). In regards to fruit number produced by cultivar, Sangria produced the most fruit on a per acre basis (1,906) with CS 4030 producing the fewest fruit per acre (1,293), however, both of these cultivars produced the most unmarketable fruit numbers that accounted for 32% of each cultivar yield (Table 2). Estrella again had the fewest unmarketable fruit per acre with SSX 8585 having the next fewest unmarketable fruit per acre. Fruit numbers, similar to fruit weight, was affected by environmental and cultural practices as they were lower than normal. Fruit set was also adversely affected among all cultivars. Generally, diploid watermelons should produce 1 to 2 fruit per plant in a normal growing season. The cultivars in this study produced 1 fruit or fewer per plant with Sangria being the only cultivar to numerically produce the most fruit per plant (Table 2).

Fruit quality data was collected to determine if any of the cultivars were significantly different than another. Quality measures such as Brix (Soluble Solids), rind thickness, fruit length and width, and flesh color were collected as these measures were considered to be the most important for consumers and growers. Similar to yield results, quality results among all the cultivars were very similar. Soluble solid measured from 10.7 (SSX 8585) to 11.5 (Sangria and Estrella). Color ratings were also taken with Estrella having consistently the highest flesh color rating (4.4) and Sangria having the lowest (4.1) on a scale from 1 (white) to 5 (blood red). Based upon only flesh color and soluble solids, the cultivars were picked at optimal maturity. Soluble solids could have been slightly higher; however, the grower had applied irrigation the day prior to harvest and the uptake of water may have slightly diluted overall soluble solid levels. A consumer taste test was also completed at the local Montgomery county farmers market to determine if consumers could tell a difference between cultivars and to determine if a particular variety tasted better overall. A total of 26 people participated in the taste test and the results from the taste test were that 39% of the participants preferred Sangria while Estrella and CS 4030 garnered 27% of the participants respectively, and SSX 8585 was the least favored and was preferred only by 8% of the participants. This was a blind taste test therefore; no contestant knew what variety they were trying. Once each participant had a chance to taste each variety they were asked to place a colored slip of paper in an envelope by the pan of watermelon they preferred. The different colors represented each cultivar of watermelon.

Conclusions

Overall, the study was successful even though fruit yields were not what many would consider optimal. Fruit quality was excellent among all cultivars. The basis of this study was to determine if newer cultivars were better for production in the Sandhills portion of Montgomery county than the standard Sangria. Based upon these results, Sangria is still a good yielder and has fruit quality comparable to the other newer cultivars. However, Estrella yields were comparable to Sangria and interior quality was numerically better. Estrella also produced a more consistent yield of marketable fruit which was a major concern for the grower as they were looking for a watermelon that was more consistent in shape and size. The newer cultivars of SSX 8585 and CS 4030 performed well, however CS 4030 yields were much lower than the other cultivars which may deter growers from trying this cultivar. Interior quality of CS 4030 however was comparable to Estrella with the only major difference being rind thickness. CS 4030 had the thinnest rind thickness, (Table 3), of all cultivars which is a nice feature for consumers since this would mean that there is more flesh available to eat. Another quality observation that was made of the newer cultivars (Estrella, SSX 8585, and CS 4030), was when the fruit were being cut in half to collect interior quality data, the rind of each cultivar would split easily, almost exploding. This could have been due to the ripeness of the fruit or environmental conditions but an observation that was worth noticing as Sangria watermelons did not show this "exploding" rind when being cut in half. The results of this trial show that Sangria is still a great option for growers, but the cultivar Estrella may be a more improved option for growers wanting a more consistent fruit.

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Table 1. Diploid cultivar yield (cwt.) per acre, percentage marketable, and average fruit weight for cumulative harvests (3).

	Yield (Cwt.)			Percent Yield by Category		
Cultivar	**Marketable**	**Unmarketable[1]**	**Total**	**Marketable**	**Unmarketable**	**Avg. Mkt. Wt.**
Sangria	268.8	73.8	342.6	78	22	13.1
Estrella	298.4	23.9	322.3	93	7	13.8
SSX 8585	287.3	39.5	326.8	88	12	14.1
CS 4030	200.8	53.6	254.4	79	21	13.8
Average	**263.8**	**47.7**	**311.5**	**84.5**	**15.5**	**13.7**

[1] Unmarketable fruit are fruit that are $\leq$ 10 lbs.

Table 2. Diploid fruit number per acre, percentage marketable by number, and average fruit number per plant results for cumulative harvests (3).

	Numbers/Acre			Percent Yield by Category		
Cultivar	**Marketable**	**Unmarketable**	**Total**	**Marketable**	**Unmarketable**	**Avg. No./Plt.**
Sangria	1906	885	2791	68	32	1.0
Estrella	1770	272	2042	87	13	0.8
SSX 8585	2110	408	2518	84	16	0.9
CS 4030	1293	613	1906	68	32	0.7
Average	**1770**	**545**	**2314**	**77**	**23**	**0.9**

Table 3. Diploid cultivar fruit quality measurements including length, width, and LD ratio.

	Length [1]	Width	LD	% Brix	Color[2]	Rind[3]
Cultivar						
Sangria	35.1	18.9	1.9	11.5	4.1	12.8
Estrella	32.5	21.2	1.5	11.5	4.4	14.0
SSX 8585	33.6	18.6	1.8	10.7	4.2	12.5
CS 4030	31.8	20.3	1.6	11.3	4.1	11.2
Average	**33.2**	**19.7**	**1.7**	**11.3**	**4.2**	**12.6**

[1] Length and Width measurements were measured in inches.

[2] Color rating: 1=white; 3=pinkish red (Crimson Sweet); 5=Blood red

[3] Rind: Rind Thickness was measured in cm. on the top and bottom of 3 fruit from each plot.

Figure 1. ‘Sangria’ diploid watermelon

Figure 2. ‘Estrella’ diploid watermelon.

Figure 3. ‘SSX 8585’ diploid watermelon.

Figure 4. ‘CS 4030’ diploid watermelon.