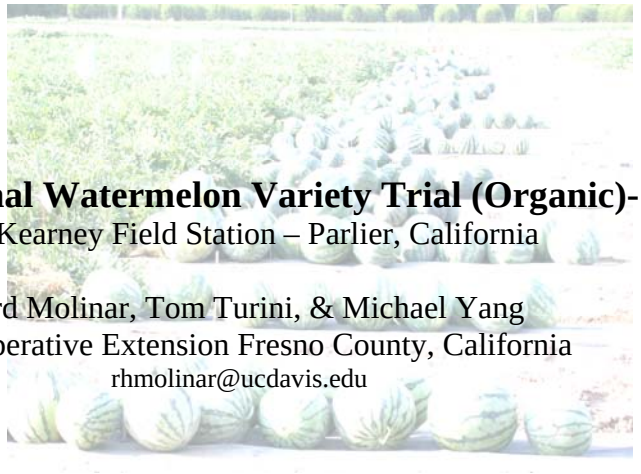

Personal Watermelon Variety Trial (Organic)- 2008

UC Kearney Field Station – Parlier, California

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INTRODUCTION

Seedless melons have been around for at least 50 years. Seedless watermelon continues to be preferred over watermelon with seeds, in a report from the National Watermelon Board- - higher than in the 2004 and 2002 domestic studies (2006 – 60% vs. 2004 – 56% vs. 2002 – 47%). According to this report, the most important reasons for purchasing watermelon is its "good taste", followed by "my family/kids like it", "it's healthy/nutritious" and "it's cool/refreshing/juicy". Objections to large melons are: "being too big/inconvenient". However, some differences exist by region and demographics – with households in the West complaining about its "large size", while those in the Plains and Southeast, as well as less affluent respondents mentioning that it's "too expensive". Additionally, older respondents are more apt to reject watermelon due to its "large size". Mini personal watermelons make up only about 8.5% of the total production. They are a cross between a diploid (the normal 2 sets of chromosomes, 22) and a tetraploid melon (4 sets of chromosomes, 44). The result is a seedless triploid melon with 3 sets of chromosomes which is sterile but which may still have the white aborted seeds (pips) present. The tetraploid melon is usually made by treating the diploid seed with a chemical.

According to the National Watermelon Board, China is the leading producer of watermelons with over 50% of the production, followed by Turkey, The Russian Federation, Iran, Brazil, Egypt, the USA, and Spain (2006). In the United States, Florida produces the most melons, followed by Texas, Georgia, California, and Arizona.

Four types of watermelons are available in supermarkets. Older *'diploid' seeded* (Picnic) watermelons have been a major part of the market for many years (since 1629) and weigh 18-45 pounds. Examples of the picnic type are Jubilee and Crimson Sweet. The large *seedless triploid* watermelons usually weigh 18-20 pounds and have been a popular item since 1988. The *icebox size* melons are generally 5-15 pounds each and have been available for at least eight years. The newest melons in the marketplace are *seedless "mini or personal"* watermelons. They offer an attractive alternative for the consumer that has limited refrigerator space or for small families. These newer triploid personal size melons, weighing 3-7 pounds each, first became widely available in markets in 2003. Besides the smaller size, advertisers also promote a thinner rind, which means more edible flesh. A trade off, however, may be a higher degree of internal bruising if not handled carefully. Varieties such as PureHeart, Petite Perfection, and Bambino are some of the first commercial varieties.

MATERIALS AND METHODS:

A trial was established at the UC Kearney Research and Extension Center in Parlier, California in 2008 to evaluate 32 varieties of mini watermelons. A winter crop of vetch, peas, and faba beans was fall planted and disked in for organic matter and nitrogen additions. Seeds were started in the greenhouse on March 17 (Headstart Nursery in Gilroy). Transplants were set in the ground on May 6-7, 2008 into black plastic mulched beds spaced 80" from center to center with 3-inch buried drip irrigation (T-Tape). Plant spacing was 24" between the plants down the row. Plots were 40 feet long, and there were four replications in a randomized complete block design. Soil type is a Hanford fine sandy loam. The pollinator SP4 (Syngenta) was transplanted at the same time using the in-row ratio of 3:1 (3 triploid plants:1 pollenizer). They were set on the other side of the bed, not taking the place of a triploid variety. There were Honeybees (4 hives) were set out just prior to bloom for pollination. Total experiment with borders was 1.2 acres.

A 30-foot section (.0045913 acre) from each plot of the trial was harvested 5 times (weekly) – July 10, July 15, July 22, July 29 and August 7. Each harvested (30 feet) plot consisted of 16 triploid plants and 5 pollenizers. Harvests were evaluated for total number, total weight, and marketable fruits. First harvest was 65 **D**ays **A**fter **T**ransplanting (DAT). In addition, other quality parameters measured were melon diameter, rind thickness, flesh color, pressure testing of flesh, and Brix (soluble solids, or sugar). The quality parameters were measured from five randomly selected melons from each plot, each replication, and from selected harvests. Each melon was cored from the outside and the core sample taken back to the lab for Brix measurements. Each of the five melons were halved for diameter and thickness measurements (in centimeters). Flesh color was rated on a 3-point scale where 2 = pink/red, 3 = red, 3 = red-orange.

Phytamin 801 (6-1-1) organic fertilizer was applied weekly at the rate of 2.5 gallons (1.4 lbs nitrogen) per acre for a total of 8 applications (20 gallons. The fertilizer is derived from seabird guano, fish solubles, and potassium sulfate. Insect control included 1 release 6 units of lacewing larvae for the control of melon aphids, purchased from Rincon Vittova insectaries (650 larvae/honeycomb card). Weeds were controlled with the black plastic mulch and hand pulling.

STATISTICAL ANALYSIS for each harvest and for the entire season was performed using standard analysis of variance (ANOVA) in MSAT (Michigan State University). Significant means were separated using Fischer's LSD. Treatments were determined to be significant when $p \leq 0.05$. In the following tables of this report, * means with no letters in common are significantly different on Fishers' Protected LSD test at P=0.05. Thus, in the example of three means with values of 3 a, 5 ab, and 7 b: 3 is significantly different from 7, but not significantly different from 5.

RESULTS:

YIELD

Melons were harvested when the tendrils began to dry and turn yellow-brown; fruits were collected, counted, and weighed for each of 5 harvests. The season totals for number of melons and tons per acre for the 5 harvests are listed in **TABLE 1** and to the right**.** There was not a good correlation between total numbers of melons, tonnage, or average weight of the melon. KnownYou's Orchid Sweet, Seminis 5378, and Hazera's Petite Envy&9019 varieties all performed well with overall yields but were not significantly different from one another. There was no significant difference between Orchid sweet and 19 other varieties with yields between 18.2 and 16.5 t/acre (varieties with the same letter in common - "a" see table at the right. We did see a significant difference between Orchid Sweet and all varieties with yields equal to or less than Vanessa

SEASON YIELD – ton per acre		Number/acre
22.2 a	24-Orchid Sweet	7623 bcdef
21.2 ab	1-PX 8033 5378	8821 abcde
20.5 abc	19-Petite Envy	7678 bcdef
20.3 abcd	20-WTP 9019	9039 abcde
19.9 abcde	23-Queenlet	8930 abcde
19.8 abcde	17-Stripe Trigon	7024 defg
19.1 abcdef	2-PS 049 11714	9093 abcde
19.4 abcdef	10-SSC2438	7405 bcdef
18.7 abcdef	13-Fantasy	7841 abcdef
18.4 abcdef	8-XW-5	6970 defg
18.3 abcdef	30-USX 7001	9366 abc
18.2 abcdefg	31-USX 7003	9420 ab
18.1 abcdefg	18-Petite Crisp	6371 fg
17.8 abcdefg	12-HA 5161	6861 efg
17.4 abcdefgh	15-Bravo	9148 abcd
17.0 abcdefgh	32-USX 7005	7841 abcdef
17.0 abcdefgh	29-Solitaire	8113 abcdef
16.7 abcdefgh	7-XW-4	8113 abcdef
16.5 abcdefgh	25-Little Deuce Coupe	8222 abcdef
16.1 bcdefgh	3-Vanessa	7133 cdef
15.5 bcdefghi	27-Petite Perfection	8059 abcdef
15.5 bcdefghi	4-Bobbie	6207 fg
15.3 cdefghi	5-XW-1	7895 abcdef
15.0 cdefghi	22-WTT 9145	**10019 a**
14.7 cdefghij	21-WTT9141	7569 bcdef
14.6 defghij	14-HA 5157	7895 abcdef
14.4 efghij	9-XW-7	7950 abcdef
13.8 fghij	6-XW-2	7950 abcdef
12.6 ghij	28-Bibo	7678 bcdef
11.9 hij	26-Rosa Sweet	7296 bcdef
10.3 ij	11-HA 5158	6262 fg
8.9 j	16-Syngenta -Little Deuce Coupe no plastic mulch	**4846 g**

NUMBER OF MELONS PER ACRE

There was not a good correlation between numbers of melons and total yield as seen in the table at the right. Orchid Sweet, with the highest yield, had only an average number of melons produced for the season. WTT 9145 had the most melons produced for the season, but only average in the total yield.

AVERAGE MELON WEIGHT

This calculation was made by dividing the total yield from each plot by the number of melons harvested. Weights were determined for each harvest and for the overall season. As seen in **TABLE 1**, the season average weight of the melons (5 harvests) ranged from 3.0 lbs. WTT9145 to 5.9 lbs. for Orchid Sweet. All varieties were within the usual industry accepted melon weights of 3-7 pounds. It was interesting that the variety with the highest number of melons (Zeraims 9145) had the smallest melons (averaging 3 pounds per melon). Other watermelons in the 5-6 pound range were Petite Crisp, StripeTrigon, SSC2438, XW-5, Petite Envy,and HA 5161.

FIRST HARVEST

To evaluate earliness, Numbers of melons and tonnage for first harvest on July 10 showed Orchid Sweet, Queenlet, 5378, XW-1, and WX-4 were in similar rankings in the top 5 spots. Orchid Sweet was significantly higher in yield than all other varieties not mentioned above. The yield pattern for the first harvest was very similar for the seasonal averages.

°BRIX (Soluble Solids, Sugar)

From each harvest and each replication, five melons were randomly selected and a core sample removed and placed in a plastic bag and cooled. They were taken to our laboratory where the °BRIX was determined for each sample. An average for the five samples was then taken for each variety, each harvest, for the four replications. The average for all 5 harvests was then made. A digital refractometer (model RF 80 from Spectrum Technologies) was calibrated with distilled water prior to measuring the samples for soluble solids. While BRIX measurements seemed lower than other years there were significant differences in sugar content between varieties ($p \leq 0.05$). The highest average BRIX measurements were from Rosa Sweet, Little Deuce Coupe, Petite Perfection, Bibo, and XW-7. Rosa Sweet was significantly higher in sugar than all other 26 varieties not mentioned in the previous sentence.

°Brix	Company & Variety
10.5 a	26-Rosa Sweet
10.3 ab	25-Little Deuce Coupe
10.2 abc	27-Petite Perfection
10.0 abcd	28-Bibo
9.8 abcde	9-XW-7
9.7 bcdef	8-XW-5
9.6 bcdef	16-Syngenta -Little Deuce Coupe

MELON DIAMETER

The melons from which the cores were taken were than halved and diameters of the melon and rind taken, as well as flesh color. Measurements from the individual melons were averaged together.

The diameter across the melon was measured in centimeters (cm) and reported below. The range of melon diameters was 12.4-17.1 cm., in the range of previous trials. Shamrocks 2438 had the largest diameter, followed by Petite Crisp, Stripe Trigon, and Petite Envy.

Melon diameter cm	Company & Variety
17.1 a	10-SSC2438
17.0 ab	18-Petite Crisp
16.8 abc	17-Stripe Trigon
16.8 abc	19-Petite Envy

RIND DIAMETER

Some references suggest a thicker rind makes the melon less susceptible to bruising and rough handling. Thinner rinds result in more edible flesh. Therefore different situations have individual preferences. We did find significant differences in rind thickness of the varieties as reported below. The thinnest rinds were found in Little Deuce Coupe, Bibo, Petite Perfection,WTT9141, and Rosa Sweet. Thickest rinds were with SSC2438, WIP9019,and USX 7001.

Rind diameter cm	Company & Variety **Top 3 thickest, 6 thinnest**
1.4 a	10-SSC2438
1.4 a	20-WTP 9019
1.4 a	30-USX 7001
.8 h	25-Little Deuce Coupe
.8 h	26-Rosa Sweet
.7 h	21-WTT9141
.7 h	27-Petite Perfection
.7 h	28-Bibo
.7 h	16-Syngenta -Little Deuce Coupe

COLOR

Flesh color of the melons were rated on a scale of 2-4. Orchid Sweet was a yellow fleshed variety. The most important finding with this quality characteristic
was the lighter fleshed melons. Color is the hardest to document since it depends on an individual's perception of color. Those numbers closer to 2.0 tend to be lighter in red color and generally undesirable. To the right are the 5 darkest red or red-orange shaded, and the lightest in color at the bottom of the table

Color 2= lt red 3=red 4=red/orange	Company & Variety
yellow	24-Orchid Sweet
3.6	28-Bibo
3.6	26-Rosa Sweet
3.5	21-WTT9141
3.4	27-Petite Perfection
3.3	9-XW-7
2.7	31-USX 7003
2.6	2-PS 049 11714
2.6	3-Vanessa
2.6	18-Petite Crisp
2.6	13-Fantasy

PENETROMETER

Five (5) melons from each variety and each replication were probed during the 2nd harvest and the readings averaged together. Fruit pressure was taken half-way between the rind and the center of each melon. Using a hand held tester with a 5/16 (8mm) tip the pressures ranged from a high of 2.7 to a low of 1.4. Below are the top 7 readings, which usually relate to crispness.

Company & Variety	Penetrometer
30-USX 7001	**2.7 a**
29-Solitaire	**2.7 ab**
20-WTP 9019	2.6 abc
19-Petite Envy	2.6 abc
32-USX 7005	2.6 abc
31-USX 7003	2.4 abc
7-XW-4	2.4 abcd

SUMMARY

This was a large experiment with a large number of entries. In general, all 32 entries fell within the 'mini' classification with individual melon weights of 7 pounds or less. The individual melon weight ranged from 3.0 pounds to 5.9. Orchid sweet was a high yielding variety with 22.2 tons per acre, which was significantly better than 12 other varieties. This variety was only average in the number of actual melons produced. For earliness (first harvest) there was not an outstanding variety. They all followed the pattern for the season. Rind diameters varied from .7 to 1.4 centimeters. Petite Perfection, noted for its' thin rind, was among the thinnest in this trial at .7 (similar to previous experiments) Also comparable in thinness were Little Deuce Coupe, Bibo,WTT9141, and Rosa Sweet. Several varieties had rinds twice as thick as the thinnest (1.4 cm.) including SSC2438, WIP9019,and USX 7001. Color ratings were subjective and variable based on visual ratings. Bibo, Rosa Sweet, 9141, Petite Perfection tended to be darker flesed melons. USX 7001 and Solitare had among the highest penetrometer readings, usually associated with crispness.

Sources of information:

National Watermelon Board - http://www.watermelon.org
Triploid Watermelon Production - http://watermelons.ifas.ufl.edu/Triploid_Production_Guide/triploid_watermelon_production.htm
Creating Seedless Watermelons - http://www.ccmr.cornell.edu/education/ask/index.html?quid=651
Pressure testers - http://www.qasupplies.com/suleoffifors.html

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Seminis - David Scheidt
Shamrock - Daniel Riley
Syngenta – Dean Liere
Zeraim - Meir Peretz
Harris Seeds - Mark Willis
Ultimate Seed Co. – Mike Bushman

TABLE 1. SEASON TOTALS		**Highs are in fuschia ….. Lows are in blue**							
Company & Variety		Number Per acre	Tons Per acre	ave wt per melon lbs.	°Brix	Melon diameter cm	Rind diameter cm	Penetrometer	Color 2= lt red 3=red 4=red/orange
Seminis									
1-PX 8033 5378		8821 abcde	**21.2 ab**	4.8 cde	9.4 defgh	15.7 abcde	1.4 ab	2.3 abcde	2.7
2-PS 049 11714		9093 abcde	19.1 abcdef	4.2 efghi	9.5 cdefgh	15.6 abcdef	1.3 abc	2.0 bcdefgh	2.6
Nunhems									
3-Vanessa		7133 cdef	16.1 bcdefgh	4.4 defgh	9.0 fghijk	14.8 defg	1.2 abcde	2.1 abcdefg	2.6
4-Bobbie		6207 fg	15.5 bcdefghi	5.0 cd	8.9 ghijkl	14.0 efgh	1.3 abc	1.7 defgh	2.9
Known-you									
5-XW-1		7895 abcdef	15.3 cdefghi	3.8 hijklm	9.0 fghijk	14.4 defg	1.1 ef	2.4 abcde	2.8
6-XW-2		7950 abcdef	13.8 fghij	3.5 klmn	9.3 defghi	14.7 defg	.9 gh	2.2 abcdefg	3.3
7-XW-4		8113 abcdef	16.7 abcdefgh	4.2 fghij	9.1 efghijk	15.1 cdef	1.0 fg	2.4 abcd	2.7
8-XW-5		6970 defg	18.4 abcdef	5.2 abc	9.7 bcdef	16.6 abc	1.1 def	2.0 abcdefgh	2.8
9-XW-7		7950 abcdef	14.4 efghij	3.5 klmn	9.8 abcde	14.4 defg	.8 gh	1.7 efgh	3.3
Shamrock									
10-SSC2438		7405 bcdef	19.4 abcdef	5.3 abc	**8.2 l**	**17.1 a**	**1.4 a**	2.4 abcde	2.7
Hazera									
11-HA 5158		6262 fg	10.3 ij	3.3 lmn	9.4 defgh	13.9 fgh	1.2 bcde	2.1 abcdefg	2.8
12-HA 5161		6861 efg	17.8 abcdefg	5.2 bc	9.2 efghij	14.8 defg	1.3 abcde	**1.4 h**	2.7
13-Fantasy		7841 abcdef	18.7 abcdef	4.8 cdef	9.0 fghijk	14.7 defg	1.2 bcde	2.1 abcdefg	2.6
14-HA 5157		7895 abcdef	14.6 defghij	3.8 ijklm	8.8 ghijkl	14.6 defg	1.2 bcde	2.3 abcde	2.9
15-Bravo		9148 abcd	17.4 abcdefgh	3.8 ijklm	9.2 efghij	14.0 efgh	1.2 cdef	2.1 abcdefg	2.8
16-Syngenta -Little Deuce Coupe No plastic mulch		**4846 g**	**8.9 j**	3.5 jklmn	9.6 bcdef	**12.4 h**	**.7 h**	1.5 gh	3.1
Takii									
17-Stripe Trigon		7024 defg	19.8 abcde	**5.7 ab**	8.9 ghijkl	16.8 abc	1.2 abcde	2.3 abcdef	2.7
Zeraim									
18-Petite Crisp		6371 fg	18.1 abcdefg	**5.8 ab**	9.1 efghijk	**17.0 ab**	1.4 ab	2.0 abcdefgh	2.6
19-Petite Envy		7678 bcdef	20.5 abc	5.2 bc	9.6 bcdefg	16.8 abc	**1.4 ab**	2.6 abc	2.8
20-WTP 9019		9039 abcde	20.3 abcd	4.5 defg	8.8 hijkl	15.7 abcde	**1.4 a**	2.6 abc	2.8
21-WTT9141		7569 bcdef	14.7 cdefghij	3.8 hijklm	9.3 defghi	14.6 defg	**.7 h**	2.1 abcdefg	3.5
22-WTT 9145		**10019 a**	15.0 cdefghi	**3.0 n**	8.5 jkl	14.0 efgh	1.1 def	2.3 abcde	3.1
Known-You									
23-Queenlet		8930 abcde	19.9 abcde	4.4 defgh	9.4 defgh	15.9 abcd	1.1 ef	2.0 abcdefgh	3.0
24-Orchid Sweet		7623 bcdef	**22.2 a**	**5.9 a**	8.6 ijkl	16.7 abc	1.2 abcde	1.9 cdefgh	yellow
Rogers (Syngenta)									
25-Little Deuce Coupe		8222 abcdef	16.5 abcdefgh	3.9 ghijkl	**10.3 ab**	14.6 defg	.8 h	2.2 abcdef	3.2
26-Rosa Sweet		7296 bcdef	11.9 hij	3.2 mn	**10.5 a**	13.9 fgh	.8 h	2.2 abcdefg	3.6
27-Petite Perfection		8059 abcdef	15.5 bcdefghi	3.8 hijklm	**10.2 abc**	14.0 efgh	**.7 h**	2.2 abcdefg	3.4
28-Bibo		7678 bcdef	12.6 ghij	3.3 lmn	**10.0 abcd**	13.2 gh	**.7 h**	1.6 fgh	3.6

Harris Seeds									
29-Solitaire		8113 abcdef	17.0 abcdefgh	4.1 ghijk	9.1 efghijk	15.4 bcdef	1.4 ab	**2.7 ab**	2.9
Ultimate Seeds									
30-USX 7001		9366 abc	18.3 abcdef	4.0 ghijk	8.8 ghijkl	14.8 defg	1.4 a	**2.7 a**	2.8
31-USX 7003		9420 ab	18.2 abcdefg	3.9 hijkl	8.4 kl	14.7 defg	1.2 bcde	2.4 abc	2.7
32-USX 7005		7841 abcdef	17.0 abcdefgh	4.3 efghi	8.5 jkl	15.9 abcd	1.3 abcd	2.6 abc	2.8

Figures above are averages of the 4 replications . Season totals are converted from plot yields to acre yields

* means with no letters in common are significantly different on Fishers' Protected LSD test at P=0.05

Highs are in fuschia ….. Lows are in blue		
First harvest –July10, 2008		
variety	# melons/acre	Tons/acre
PX80335378	1524 abcd	3.8 abc
PS04911714	1198 bcdefg	2.7 cdef
Vanessa	1089 bcdefg	2.6 cdef
Bobbie	708 defgh	2.0 cdefg
XW-1	1742 abc	3.7 abcd
XW-2	817 defgh	1.3 efg
XW-4	1472 abc	3.7 abcd
XW-5	980 bcdefg	2.3 cdef
XW-7	980 bcdefg	1.4 efg
SSC2438	926 cdefg	2.7 cdef
HA5158	436 fgh	.7 fg
HA5161	817 defgh	1.9 cdefg
Fantasy	1361 abcde	3.3 bcde
HA5157	980 bcdefg	1.7 defg
Bravo	1307 bcde	2.6 cdef
Little Deuce Coupe	**55 h**	**.1 g**
Stripe Trigon T-119	762 defgh	2.7 cdef
Petite Crisp	381 gh	1.3 efg
Petite Envy	871 defgh	2.3 cdef
WTP9019 F1	1198 bcdefg	3.1 bcde
WTT-9141 F1	762 defgh	1.5 efg
WTT-9145 F1	1361 abcde	1.9 cdefg
Queenlet	**2178 a**	4.9 ab
Orchid Sweet	1797 ab	**5.6 a**
Little Deuce Coupe	871 defgh	1.7 defg
Rosa Sweet	817 defgh	1.4 efg
Petite Perfection	1035 bcdefg	2.2 cdefg
Bibo	654 efgh	.9 fg
Solitare	1035 bcdefg	2.7 cdef
USX 7001	1144 bcdefg	2.3 cdef
USX 7003	1252 bcdef	2.3 cdef
USX 7005	1361 abcde	3.0 bcde

Mowing and disking under cover crop

Field 15 days after transplanting

August 4 harvest and field day

Taste test

varieties 1-16

varieties 17-32