Organic Personal Watermelon Variety Trial - 2006

UC Kearney Field Station – Parlier, California

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INTRODUCTION

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). Watermelons are considered to have originated in Africa. In the United States, Florida produces the most melons, followed by Texas, Georgia, California, and Arizona. Mini personal watermelons make up only about 8.5% of the total production. Seedless melons have been around for at least 50 years being first produced in Japan in 1939. They are a cross between a diploid male (the normal 2 sets of chromosomes, 22) and a tetraploid female 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 or ovules) present. The tetraploid melon is usually made by treating the diploid seed with a chemical.

Four types of watermelons are available in supermarkets. Older *diploid (seeded)* watermelons have been a major part of the market for many years (since 1629) and weigh 18-35 pounds. The large *seedless triploid* watermelons usually weigh 15-22 pounds and have been a popular item since 1988. The *icebox size* melons are generally 6-12 pounds each and have been available for at least eight years. The newest melons in the marketplace are *seedless "mini or personal"* watermelons (sometimes called "palm" melons). 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 2006 to evaluate 9 varieties of mini watermelons. A winter crop of vetch was planted and disked in for organic matter and nitrogen additions. Transplants were set in the ground on May 30, 2006 into black plastic mulched beds spaced 80" from center to center with 3-inch buried drip irrigation. 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

SP1 was transplanted at the same time using the in-row ratio of 3:1 (3 triploid plants:1 pollenizer). Honeybees set out just prior to bloom for pollination.

Phytamin 800 (7-0-0) organic fertilizer was applied biweekly at the rate of 2.5 gallons per acre for a total of 4 applications (10 gallons) beginning June 13, 2006. Pest control included applications of Pyganic® pyrethrin insecticide, Trilogy® (2 applications), and Organocide® (sesame oil) for the control of melon aphids. Weeds were controlled with the black plastic mulch and hand pulling.

Each plot consisted of 18 triploid plants and 5 pollenizer SP-1 plants.

A 30-foot section (.0045914 acre) from each plot of the trial was harvested three times – 7/26/06, 8/2/06, 8/8/06 and evaluated for total number, total weight, and marketable fruits ((57 days after transplanting)). In addition, other quality parameters measured were melon diameter, rind thickness, rind color, flesh color, and Brix (soluble solids, or sugar). The quality parameters were measured from five randomly selected melons from each plot, each replication, and each harvest. 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). Rind color was described as striped or solid, light or dark backgrounds, and the flesh color was rated on a 4-point scale where 1 = pink/red, 2 = orange-red, 3 = yellow, and 4 = dark red.

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 $p \leq 0.05$.

RESULTS:

YIELD

Melons were harvested when the tendrils began to dry and turn brown; collected, counted, and weighed for each of three harvests. For each of the three harvests there were significant differences in numbers of fruits harvested and yields. For example, Valdoria had significantly higher ($p = 0.0033$) numbers of fruits and the highest yield in the first harvest, but not at the end of three harvests. There was no significant difference in total numbers of melons at the end of three harvests. Poquito had the highest yield ($p = .0198$) in the second harvest. The yield in pounds for Poquito at the end of three harvests was significantly higher than Little Deuce Coupe, Precious Petite, RWT 8189, and Bibo; but not significantly different from Mini Yellow, Valdoria, Vanessa, or Petite Perfection (Table 1).

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. The average weight of the melons ranged from 3.0 to 7.2, all within the "mini" personal watermelon

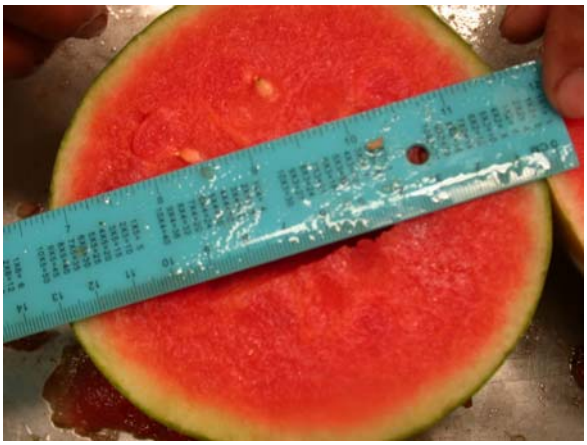
classification. The smallest melon in this trial was Bibo, averaging 3 pounds per melon over the season. Poquito (7.2) and Mini Yellow (6.2) were clearly the largest melons in the trial and were significantly different from all of the rest and from each other ($\underline{p} = 0.000$).

°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 three 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. There were highly significant differences in sugar content between varieties ($\underline{p} = 0.000$). RWT 8189, Bibo, and Little Deuce Coupe were significantly higher in sugars than all of the rest with BRIX measurements of 12, 11.9, and 11.7 respectively) but did not differ from each other. The lowest BRIX reading was from Valdoria at 9.9 (Table 1)

MELON DIAMETER – RIND DIAMETER – FLESH COLOR

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



MELON DIAMETER

The diameter across the melon was measured in centimeters (cm) and reported below. The largest melon, which correlated to the yields above, was Poquito with a mean diameter of 19.3 cm and was significantly different from the next largest melon, Valdoria, at 17.3 cm. The smallest diameter was found in RWT 8189 and Precious Petite with diameters of 13.9 and 14.2 cm respectively (Table 1).

RIND DIAMETER

We did find very significant differences in rind thickness of the varieties as reported below. The thinnest rinds were found in Bibo, RWT 8189, and Petite Perfection (0.45, 0.48, 0.55 cm) which were significantly different from the rest, however, Petite Perfection did not differ from Precious Petite (0.60) or Little Deuce Coupe (0.60). The thickest rind and significantly different from all of the rest was Poquito (1.8 cm).

COLOR

Flesh color of the melons were rated on a scale of 1-4; 1 = pink, 2 = orange/red, 3 = red, and 4 = yellow. Mini Yellow was of course yellow fleshed, but more interesting was Poquito appeared a little more

pinkish or light red, while Valdoria and Vanessa were rated more dark red. Petite perfection, Precious Petite, and Little Deuce Coupe were rated either orange/red or dark red (Table 2).

SUMMARY

Although differences were observed between numbers of melons taken from each plot, there was not a significant difference at the end of three harvests. There was however a significant difference in the yield (lbs/acre) with Poquito giving the highest yield and Bibo the lowest yield. All melons resulted in sizes (weights) falling within the classification of a personal watermelon of 3-7 pounds. Bibo, Precious Petite, and RWT 8189 were all among the smallest of the group. RWT 8189, Bibo, and Little Deuce Coupe (and Petite Perfection) were the sweetest and had some of the thinnest rinds.

Table 1. Season total yield and quality data.

VARIETY	YIELD T/A	Number per Acre	Ave wt Melon (lbs)	Diameter (cm)	Rind Thickness (cm)	°BRIX (sugar)
Petite Perfection	24.0 abc	11216.6	4.2 cd	15.1 cde	.55 ab	10.9 b
Precious Petite	20.1 bc	11978.9	3.3 ab	14.2 de	.60 b	10.0 cd
Little Deuce Coupe	20.5 b	9964.3	4.1 bc	15.2 cde	.60 b	11.7 a
Bibo	14.6 bc	9746.5	3.0 a	13.4 e	.45 a	11.9 a
RWT 8189	16.1 bc	9365.3	3.4 ab	13.9 e	.48 ab	12.0 a
Poquito	31.8 a	8711.9	7.2 g	19.3 a	1.8 e	10.1 cd
Mini Yellow	25.3 ab	8330.8	6.2 f	15.9 bcd	1.15 c	10.5 bc
Vanessa	24.2 abc	9038.6	5.3 e	16.6 bc	1.30 d	9.9 cd
Valdoria	24.7 ab	9855.4	5.1 de	17.3 b	1.23 cd	9.9 d
Lsd (0.05)	9.58	ns	0.828	1.921	0.13	0.635
C.V. (%)	29.37		12.24	8.42	9.9	4.05

Table 2. Flesh and rind color

VARIETY	Flesh color	Rind color
Petite Perfection	Orange/red	Thin dk-green lines on med-green background
Precious Petite	Orange/red	Wide med-green stripes on lt-green background
Little Deuce Coupe	Orange/red	Medium dark-green rind
Bibo	red	Thin dk-green stripes on med-green background
RWT 8189	Dk red	Thin dk-green stripes on med-green background
Poquito	Lt red	Wide med-green stripes on lt-green background
Mini Yellow	yellow	Solid dark green
Vanessa	med red	Solid dark green
Valdoria	Dk red	Solid dark green

Variety	Seed Source
Petite Perfection	Syngenta
Precious Petite	Syngenta
Little Deuce Coupe	Syngenta
Bibo	Syngenta
RWT 8189	Syngenta
Poquito	D. Palmer
Mini Yellow	D. Palmer
Vanessa	Nunhems
Valdoria	Nunhems

HARVEST CREW

REMOVING CORES FOR BRIX MEASUREMENTS

DIGITAL REFRACTOMER FOR °BRIX

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
WATERMELON: Citrullus lanatus..Diploid + Tatraploid = Triploid. Jefferson Lowe, Corona Seed Co.