

Icebox Watermelon Variety Trial

Carol Miles, Kathryn Kolker, Gail Becker, Lydia Garth, Jenn Reed,
Tracy Smith, Liz Nelson, and Jeannie Garth
Washington State University, Vancouver Research & Extension
Unit, 1919 NE 78th Street, Vancouver, WA 98665
Phone: 360-576-6030 x 20 Email: milesc@wsu.edu

Introduction

The first icebox watermelon variety was introduced in the U.S. almost 50 years ago (Maynard, 2004), but it was only in 2005 that icebox watermelons became commonly available in grocery stores throughout the U.S. Icebox watermelon weigh between 6 and 12 pounds, they come in a variety of shapes and colors, and there are more than 100 varieties to choose from. Icebox watermelons are rapidly increasing in popularity due to their small size, which is ideal for small families and for storage in home refrigerators. With a rising interest in local food, direct marketing and organic production, farmers in Washington are looking to diversify crop types to meet these demands. Icebox watermelons offer farmers throughout Washington a means of producing high quality watermelons locally. The purpose of this study was to determine which varieties of icebox watermelon are most suitable for organic production in our region.

Methods

This study was conducted at Washington State University Vancouver Research and Extension Unit. We evaluated 44 watermelon varieties in 2004, 101 varieties in 2005, and 117 varieties in 2006. Our seed choice was first organic, then untreated and then treated seed for each variety (many varieties were not available as organic or untreated seed). All years, the greenhouse for transplant production was managed organically, and varieties were evaluated in a certified organic field or an organically managed field. In 2004 and 2005, untreated and organic seed varieties were evaluated separately but adjacent to treated seed varieties. In 2006, all varieties were evaluated in our certified organic field.

In addition to our large variety trial in Vancouver, we evaluated 4 watermelon varieties in Pullman in 2005 and 7 varieties in 2006. In addition in 2006, we evaluated 12 varieties in Mount Vernon, 8 in Olympia and 20 in Montessano. These were observation plots only and no results will be presented in this report.

All three years at WSU VREU the study design was a randomized complete block with three replications. Plots were single rows, 21 feet long, with 7 plants per plot. Spacing was three feet between plants in the rows, and 10 feet between rows. Varieties were seeded in the greenhouse on April 12, 2004, April 21 2005, and April 12, 2006. Watermelons were then transplanted into the field on May 26, 2004, June 6, 2005, and June 1, 2006.

Plants were drip-irrigated twice weekly for 4 hour intervals for a total of 1-inch of water per week each year. Rows were mulched with black plastic (1.0 mil polyethylene) with drip tape beneath. Fertilization took place immediately after transplanting and four times throughout the growing season. All three years, the fertilizer was soluble BioLink (5-5-5) and soluble seaweed extract powder (Acadian 1-0-4 w/ trace minerals), applied through the irrigation system at a rate of 5 lb/A and 3 lb/A, respectively. In 2006, the first 2 field applications were with Biogan (12-2-1) instead of BioLink.

Ripe fruit were harvested twice weekly all three years from August 12 to October 4, 2004, August 22 to September 28, 2005, and August 8 to October 13, 2006. Due to difficulties in determining ripeness in the field in 2004, in 2005 we investigated techniques for determining ripeness in the field.

Techniques included evaluating optimum ground spot color, hollow sound of fruit, color/maturity of axial leaf at harvest, and color/maturity of axial tendril at harvest. We measured harvested melons for weight, length and width, and number of fruit per plot. After each harvest, one watermelon per plot was measured for percentage of soluble solids using a Brix meter. The percent of soluble solids is an estimate of sugars, and is used to evaluate sweetness and ripeness.

Results & Discussion

Although this study was designed to investigate productivity of icebox watermelons (6-12 lbs), we received, planted and evaluated several personal-size or mini watermelon varieties (<6 lbs) and picnic varieties (> 12 lbs). Results are presented for varieties in each market group, personal/mini, icebox and picnic. All years, varieties differed significantly in yield, average watermelon weight, and number of marketable watermelons (Tables 1-5). It is interesting to note that some varieties were variable in their classification from year to year. For example, Sugar Baby produced an average fruit weight greater than 6 lbs in 2004 (thus it was classified as an icebox type), but in 2005, average fruit weight was less than 6 lbs (thus it was classified as a personal/mini type). In this report, varieties are classified according to their mean fruit weight calculated each year, and in the overall results are classified according to their mean fruit weight calculated over all years.

Personal/Mini Varieties. In 2004, Solitaire produced the highest total marketable yield followed by Precious Petite, Vanessa, and Little Boy. Yellow Doll, Golden Midget, Belle 460 and Solitaire produced the greatest number of fruit. Thai Baby also produced a large number of fruit, but we later learned that this watermelon is not eaten as a mature fruit, but rather is harvested at an immature stage and cooked as a vegetable. In 2005, Vanessa, Extazy, Mini Yellow and Jade Star were the highest yielding varieties, while varieties that produced the most fruit were Yellow Doll, New Hampshire Golden Midget and Diana. In 2006, Solitaire, Gold Flower, Vanessa, and Wonder were the highest yielding; and Solitaire, Gold Flower, Wonder, Precious Petite, and Gold Midget produced the most fruit.

Icebox Varieties. In 2004, Baby Doll, Imagination, Valdoria and Tiger Baby were the highest yielding varieties while Winter King and Queen, Navajo Sweet, Tiger Baby and Early Crimson Treat produced the greatest number of fruit. In 2005, Imperial, Early Moonbeam, Sugar Baby, Crimson Sweet and Verona were the highest yielding varieties while New Queen, Summer Sweet #3521Y, 7187 HQ and Malali produced the greatest number of fruit. In 2006, Treasure Chest, Sweet Delight, Sorbet Swirl, Petite Yellow, and Amarillo produced the highest yield; and Amarillo, Cream of Saskatchewan, Mickylee, Petite Perfection, Sorbet Swirl, and Treasure Chest produced the greatest number of fruit.

Picnic Varieties. In 2004, the single picnic variety included was Desert King, and it produced a low yield and number of fruit. In 2005, Lamar (HSR 2920) and Moon and Stars were highest yielding while Lamar (HSR 2920) and Yellow Shipper (Daisy) produced the greatest number of fruit. In 2006, Imperial, Moon and Stars, Crimson Sweet, Vista, and Orangeglo produced the highest yield; and Imperial and Moon and Stars produced the greatest number of fruit.

Overall Yield Results. In summarizing the yield data from 2004, 2005 and 2006, the varieties showing the highest mean yield in the personal/mini category were Solitaire, Gold Flower, Vanessa, and Wonder; while Solitaire, Golden Midget, New Hampshire Golden Midget, and Red Doll produced the greatest number of fruit. In the Icebox category, Treasure Chest, Petite Yellow, 9651 HQ(ACX651T), and Imagination produced the greatest overall mean yield; while Sorbet Swirl, Yellow Doll, Sweet Beauty and Petite Perfection produced the greatest number of fruit. In the Picnic category, the varieties with the highest overall mean yield were Moon and Stars, Baby Doll, Imperial,

and Yellow Shipper (Daisy); while 7187 HQ, Imperial, and Baby Doll produced the greatest number of fruit. In ranking these overall results, data were considered only for those varieties that had been tested for 2 or 3 years.

Length and Width. Varieties differed significantly in fruit length and width each year. For all three market classes, shape varied from round, to oval, to elongated. We collaborated with farmers at farmer's markets all three years and found that consumers generally appeared to perceive smaller round watermelons to be cantaloupe or other melon types. In addition, most consumers do not associate dark green, light green or yellow rind colors with watermelons. Including a display of cut watermelons and providing taste samples greatly enhanced consumer's willingness to purchase novel types of watermelon.

Days to Maturity. There were no significant differences in days to maturity among the three market classes of watermelon. That is, in this study personal/mini varieties did not mature earlier than either icebox or picnic varieties. This is because all varieties that were included in this study were selected based on their early days to maturity. Within each watermelon class, varieties did not differ significantly in days after transplanting to maturity, and in 2004 days to maturity ranged from 82 to 103 days, in 2005 the range was from 82 to 110 days, and in 2006 the range was 68 to 134 days.

In 2004, 42 varieties, all except Lycosweet (5109) and Precious Petite, were ready for first harvest within 100 days after transplanting. The earliest varieties produced mature fruit by 82 days after transplanting and were Japanese Cream Fleshed Suika, Navajo Sweet, Small Shining Light, Cathay Belle and Golden Midget. Of the 101 varieties included in this study in 2005, 80 matured within 100 days after transplanting, making them suitable for production in western Washington. The earliest varieties produced mature fruit by 82 days after transplanting and were Imagination (primed), Freedom, and Sunrise One. In 2006, of the 117 varieties tested, 89 were ready to harvest within 100 days after transplanting. The earliest varieties were harvested by 75 days after transplanting and were Butterball, Jade Star, Petite Perfection, WT-04-65, and SXW 0017.

The demand for watermelon is highest in the summer, and our informal market surveys indicate that demand tapers off dramatically after Labor Day (first weekend in September). Decreasing market demand in September combined with decreasing temperatures make early maturity a highly desirable trait for growers in Washington. In general, we recommend varieties that are ready for harvest 92 days after transplanting.

Brix. The Brix meter is the standard tool for rapidly measuring percent soluble solids in a fruit, which is an indicator of percent sugars and ripeness. Brix readings differed significantly among varieties in some market classes all three years (Tables 1-5). In 2004, Brix ranged from 7–10% at maturity and varieties with the highest Brix were Fenway (10.0), Petite Perfection (9.9), Hime Kansen (9.7), and 5130 (HA5130) (9.7). We had difficulty determining whether or not a variety was mature prior to harvest in 2004, and as a result we harvested many fruit prior to their optimum maturity. In 2005, we were able to distinguish a ripe fruit in the field prior to harvest (see "Determining a Ripe Fruit," below), and as a result Brix readings were generally higher than in 2004. In 2005, Brix ranged from 6–19%, and varieties with the highest Brix were Boston (19.4), Treasure Chest (16.9), Summer Sweet (15.7), Super Crisp (14.2), and Sunrise (14.0). All varieties except 3 (Atranhanski, Jenny and Malali) had Brix above 8.0% and were considered sweet. In 2006, Brix ranged from 7-12% at harvest. The varieties with the highest Brix were Sweet Beauty (11.7), Little Boy (11.6), Rugby (41020016) (11.), Yellow Doll (11.4), and Summer Sweet #3521Y (11.3).

Yellow Flesh Color. The majority of the varieties included in this study, and the majority of icebox watermelon varieties that are commercially available, are red fleshed. However, there are varieties of watermelon with white, cream, yellow, orange, and pink flesh. Yellow and orange fleshed watermelons tended to have average Brix readings (around 10), and did well in our taste tests. Watermelon with yellow and orange flesh color are not yet commonly available at grocery stores and so local farmers may be able to capture this niche market. In 2004, 5 varieties were yellow flesh, and 2 of these were icebox types (Baby Doll and Orchid Sweet) while 3 were personal/mini types (Gold Baby, New Queen, and Yellow Doll). In 2005, 25 varieties had yellow or orange flesh, and of these, 18 were icebox types: Butterball, Buttercup, Early Moonbeam, Golden Honey, New Orchid, New Queen, Orange Julius, Orange Sweet, Orangelo, Solid Gold, Sorbet Swirl, Summer Sweet #3521Y, Sun Ray, Sunshine, Treasure Chest, Yellow Bird, WT-04-65, and Yellow Petite. Six varieties were personal/mini types: Amarillo, Gold Flower, Golden Sunrise, Mini Yellow, Rugby (41020016), and Yellow Doll; and 1 variety was a picnic type: Yellow Shipper (Daisy). In 2006, 26 varieties were yellow or orange flesh and of these 16 were icebox types: Amarillo, Butterball, Buttercup, Early Moonbeam, Gold Flower, Golden Honey, Mini Yellow, New Orchid, Sorbet Swirl F1, Summer Sweet #3521Y, Sun Ray, Sunshine, Treasure Chest, WT-04-65, Yellow Bird, and Yellow Doll. Three varieties were personal/mini types: Golden Sunrise, New Queen, and Rugby (41020016); and 7 varieties were picnic type: Baby Doll, Orange Julius, Orange Sweet, Orangello, Petite Yellow, Solid Gold, and Yellow Shipper (Daisy).

In 2004, three varieties had cream-colored flesh: Cream of Saskatchewan, Desert King and Japanese Cream-Fleshed Suika. In 2005, only 2 varieties had cream-colored flesh: Cream of Saskatchewan and White Wonder. In 2006, three varieties were cream-colored: Cream of Saskatchewan, Desert King, and White Wonder. All of these varieties had below average Brix readings, and tended to be mildly sweet and/or slightly tart. Japanese Cream Fleshed Suika was the best overall in terms of flavor, yield and days to maturity. These watermelons were preferred by some people in farmers market taste tests, and some suggested eating them with lime and salt.

Seedless Varieties. In 2004, this trial included 10 seedless varieties: Bobbie, Extazy, Gypsy, Lycosweet, 5130, Orchid Sweet, Solitaire, Ultra Cool, Valdoria and Vanessa. All were red-fleshed except for Orchid Sweet, which was yellow fleshed. In 2005, this trial included 48 seedless varieties, and of these 35 were red fleshed and 13 were yellow fleshed. Red fleshed varieties were: 7167, 7177 HQ, 7187 HQ, 9601 HQ (ACX 601T), 9651 HQ (ACX 651T), Afternoon Delight, Betsy 8103, Bobbie 8101, Boston, Constitution, Demi-Sweet, Extazy, Freedom, Imagination, Independence, Lamar (HSR2920), Liberty, Millenium, Millionaire, Petite Treat, Promise, Revolution, Ruby, Solitaire, Summer Sweet #2532, Super Crisp 85, Sweet Delight, Sweet Eat'n, SXW 0016, SXW 0017, Triple Play, Valdoria, Vanessa, Wonder and WT-04-68. Yellow fleshed varieties were: Amarillo, Butterball, Buttercup, Mini Yellow, Orange Julius, Orange Sweet, Rugby (41020016), Solid Gold, Summer Sweet #3521Y, Sun Ray, Treasure Chest, WT-04-65, and Yellow Bird. In 2006, 54 seedless varieties were tested and in addition to those grown in 2005, 8 red-fleshed varieties were included: Fenway, Gypsy, Lycosweet 5109, 5130, Nova, Petite Perfection, Precious Petite, Tri X Palomar. Triple Play and SXW 0016 were the only seedless varieties not grown again in 2006.

Determining a Ripe Fruit. Perhaps one of the greatest challenges we faced in this study was determining a ripe fruit in the field. In 2004, we were not able to determine if a fruit was fully mature prior to harvest and this resulted in our harvesting many fruit that were not fully mature. As a result, fruit weight and Brix readings were not as great as they could have been. In 2005, we investigated the four common techniques used for determining fruit ripeness in the field: ground spot color, hollow sound of fruit, color/maturity of axial leaf, and color/maturity of axial tendril. We found that a

brown axial leaf in combination with a brown axial tendril was the most consistent and reliable indicator of fruit ripeness. Although a few varieties tended to ripen before their leaf and/or tendril had fully turned brown, determining fruit ripeness based on the color/ maturity of the axial leaf and axial tendril proved to be a very reliable method.

Organic Seed. When we initiated this study in 2004, many watermelon varieties were not available as organic or untreated seed. By 2006, 8 varieties that had previously been available as untreated or treated seed became available as organic seed, and 15 varieties that had previously only been available as treated seed became available as untreated seed.

Conclusions

Results of this study indicate that many varieties of icebox watermelon produce well when grown organically in our region. Of the 125 varieties that we tested, 71 matured in 92 days or less. There is great diversity among varieties in fruit yield, number, color, Brix (sugar content), flavor, size, shape and length of growing season. Most of the varieties evaluated in this trial had excellent color, flavor, and appearance. Preferences for fruit taste and appearance appear to vary among different consumer groups, and growers should test several varieties for productivity and taste preferences in their area.

Another major accomplishment of this study has been to determine how to identify a ripe fruit in the field prior to harvest. We found that a brown axial leaf in combination with a brown axial tendril was the most consistent and reliable indicator of fruit ripeness. However, a few varieties tended to ripen before their leaf and/or tendril had fully turned brown. We recommend that growers test this method in their own field with every variety they grow.

Watermelon weight has been used to distinguish between market groups of watermelon (personal/mini, icebox, or picnic), and traditionally, icebox watermelons are considered to be between 8 and 12 lbs. However, in this study we found that a large number of varieties produced an average watermelon weight between 6 and 8 lbs, but showed average lengths and widths that correspond with the general size concept of an icebox type. Based on these results, we suggest that the categories for watermelon should be: personal/mini (<6 lbs), icebox (6-12 lbs), and picnic (>12 lbs).

A major challenge faced by organic growers is obtaining organic or untreated seed. Although placing a seed order early may help to ensure that untreated seed will be available, it is no guarantee. It is only through increased general demand for untreated and organic seed that seed companies will begin to fill this need. It is work such as this study that has the potential to help increase demand for seed which will then result in increased availability of untreated and organic seed.

References:

Maynard, Donald. 2004. Professor emeritus, University of Florida. Personal Communication.

Wehner, T.C. and Barrett, C. 1996. Watermelon Cultivars.

<http://cuke.hort.ncsu.edu/cucurbit/wmelon/wmcults.html>

Table 1. Marketable yield of icebox and personal/mini watermelon varieties grown from untreated seeds at Washington State University Vancouver REU in 2004.

ICEBOX TYPE Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
Blacktail Mountain	18.6	85.4	8	8.1	7.6	7.3	85.3
Cream of Saskatchewan	12.4	78	8.9	7.4	7.6	7.7	85.3
Early Crimson Treat	20.8	106.8	9.4	8.1	7.4	9	85.3
Genesis	14	84.7	8.9	8.1	7.5	9.3	83.5
Japanese Cream Fleshed Suika	15.1	89.5	10.1	8.3	7.9	8.5	81.7
Jubilee	19	67.9	9.1	7.5	7.2	8.6	84
Melitopolski	10.5	75.9	11.5	9	8.9	6.5	85.3
Navajo Sweet	23.8	102.4	10.6	8.2	8.2	8.6	81.7
Orchid Sweet	17.1	92.8	9.4	8.3	8.1	9.1	83
Small Shining Light	17.1	81	7.8	7.1	7.5	7.4	81.7
Southern Light	13.2	58.1	7	7.3	6.7	8.1	84
Sugar Baby ^z	10.5	36.2	8.7	7	7.4	7.7	83
Sweet Beauty	19	65.8	6.5	9.7	5.5	9.4	83
Tiger Baby	22.9	68.2	7.6	7.3	6.9	9.3	89
Ultra Cool	11.9	108.3	11	8.7	8.3	8.3	83
Winter King & Queen	24.8	120.4	9.3	7.6	7.2	7.9	93.3
Mean	16.9	82.6	9	8	7.5	8.3	84.5
P Value	0.5151	0.0392	0.0482	0.0226	0.0055	0	0.7591

PERSONAL/MINI TYPE Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
Belle 460	20.7	50.8	5.3	7.8	5.8	9.2	86.7
Cathay Belle	13.6	39.6	4.5	6.8	5.9	7.9	81.7
Gold Baby	15.2	41.7	5	6.8	6.4	9.1	91.3
Golden Midget ^z	24.9	32.7	3.8	6.4	5.4	7.4	81.8
Hime Kansen	18.6	32.6	3.6	6.2	5.1	9.7	90
Little Boy	17.6	57.1	5.7	7.6	6.2	9.6	83
New Queen	16.7	55	5.6	7.3	5.7	8.5	86.7
Petite Perfection	14.1	43.5	5.6	7	6.3	9.9	85.3
Red Doll	14.8	27.8	3.5	6.6	5.7	9.2	89.7
Thai Baby	27.1	36.2	4	5.9	4.4	6.3	86.7
Yellow Doll	25.7	54.9	5.6	7.6	6.7	9.3	85.3
Mean	19	42.9	4.7	6.9	5.8	8.7	86.2
P Value	0.5418	0.3096	0.0272	0.0884	0.0121	0	0.2729

x Number of watermelons and total yield of 10 plants

y Days to maturity from transplanting

z Values are the mean of two replications.

Comparison of types: P Value	0.2749	0	0	0.0006	0	0.249	0.1744
-------------------------------------	---------------	----------	----------	---------------	----------	--------------	---------------

Table 2. Marketable yield of icebox, personal/mini and picnic watermelon varieties grown from treated seeds at Washington State University Vancouver REU in 2004.

ICEBOX TYPE Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
5130	18.4	117.8	6.4	6.9	6.1	9.7	91
Baby Doll	15.3	222.6	14.6	9.8	8.8	8	87.7
Bobbie (8101)	15.7	100.8	6.2	6.8	6.6	8.4	97
Extazy (6008)	17.9	125.1	7	7.2	7.1	8.6	92.3
Fenway	13.3	114	8.5	7.6	7.5	10	87.7
Gypsy	9.5	116.2	12.2	9.1	8.8	9.5	91.3
Imagination	17.9	182.6	10.1	8.6	8.1	8.8	90.7
Jade Star	7.3	73.8	9.4	8.3	7.5	8	96
Lycosweet (5109)	7.7	72.1	7.9	7.4	7	9.3	100.3
Nova	10.5	110.4	10.4	8	7.8	9	90
Quetzali	11.9	124.1	9.3	7.6	6.8	8.7	97
Sugar Baby	14.4	120.4	8.3	7.6	7.3	7.6	94.7
Thai Black	9	89.6	8.2	7.2	6.8	7.2	96
Tiger Baby	16.2	139.2	7.8	7.9	7.3	9.1	92.3
Valdoria	17.5	161.6	8.6	7	7.1	8.3	91
Yellow Doll	17.4	131	7.7	7.9	7.3	8.7	85.3
Mean	13.7	125.1	8.9	7.8	7.4	8.7	92.5
P Value	0.6721	0.7578	0.0043	0.0004	0.0022	0.0003	0.3466

PERSONAL/MINI TYPE Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
Precious Petite	12.7	74.7	4.9	6.5	6	8.3	103
Vanessa	12.7	68.3	5.2	6.7	6.4	9.1	96.7
Solitaire	20	119.3	5.9	6.9	6.8	8.9	86.7
Mean	15.1	87.4	5.4	6.7	6.4	8.8	95.4
P Value	0.5196	0.5252	0.7926	0.8973	0.5466	0.5982	0.3083

PICNIC TYPE Variety	Total Watermelon		Average Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
Desert King	4	71.2	18.6	10.5	9.6	7.4	91

x Number of watermelons and total yield of 10 plants

y Days to maturity from transplanting

Comparison of types: P Value	0.0675	0.1574	0.0001	0.0025	0.0032	0.246	0.5773
-------------------------------------	---------------	---------------	---------------	---------------	---------------	--------------	---------------

Table 3. Marketable yield of icebox, personal/mini and picnic watermelon varieties grown from untreated seeds at Washington State University Vancouver REU in 2005.

ICEBOX TYPE Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
7167	6.4	91.6	9.2	8.9	7.6	9.6	105
7177 HQ	9.3	96	9.6	8.6	7.7	11.9	96
7187 HQ	15.5	102.3	10.2	8.7	8	10.2	95
9601 HQ (ACX 601T)	8.6	128.5	12.8	8.7	8.5	9.7	85
9651 HQ (ACX 651T)	10.1	110.3	11	8.5	8.2	10.4	93
Atranhanski	10.1	118.7	11.9	8.7	8.4	6.8	106
Blacktail Mountain	10	82.5	8.2	8	7.7	10.2	90
Butterball	11.3	85.4	8.5	7.6	7.9	9.3	94
Cream of Saskatchewan	11.9	89.3	8.9	7.9	7.9	9.7	88
Crimson Sweet	6.5	144.5	14.5	9.8	9.1	9.4	91
Demi-Sweet	11.4	98.5	9.8	8.3	8.4	10.7	92
Early Crimson Treat	11.1	80.8	8.1	7.8	7.3	10.4	90
Early Moonbeam	19	64.6	6.5	7.4	7	11	88
Early Moonbeam (black seed)	11.1	62.9	6.3	8.7	8.3	9.1	92
Early Moonbeam (brown seed)	9	144.7	14.5	8.6	8.8	10.4	99
Festival	6.4	101	10.1	8	7.9	10.8	94
Golden Honey	9	94.1	9.4	8.7	7.9	10.1	100
HSR 2945	7.1	79.8	8	8	7.7	8.9	102
Imperial	9.2	144.8	14.5	10.7	8.3	9.4	96
Jubilee	9.5	102.7	10.3	8	7.8	11.9	102
Malali	14.2	66.6	6.7	7.1	7.3	6.3	106
Melitopolski	10.2	98.4	9.8	8.4	8	8.8	105
Millenium	8.6	79	7.9	8.1	7.7	11.1	83
Millionaire	9.5	80.8	8.1	7.9	7.5	11.2	103
Moon and Stars	9	134.7	13.5	9.7	8.8	10.2	95
Navajo Sweet	9.5	94.3	9.4	8	8	10.7	97
New Orchid	11	105.3	10.5	7.5	6.9	10.4	99
New Queen	19.2	61	6.1	7.7	6.4	11.3	87
Orange Sweet	9	111.4	11.1	8.7	8.9	8.4	101
Oranpeglo	7.1	94.5	9.4	12.1	8.6		99
Osh Kirgizia	9	86	8.6	7.9	7.6	10.1	98
Petite Yellow	9.3	106.9	10.7	8.8	8.1	9.6	100
Quetzali	9.8	82.2	8.2	8.2	7.5	10.3	91
Sangria	8.1	118.8	11.9	12.7	6.9	9.8	102
Sorbet Swirl F1	19	82.9	8.3	7.9	7.3	13	88
Sugar Baby	6.7	144.6	14.5	10	9.1	10.3	97
Summer Sweet #2532	11.7	129.1	12.9	16.2	15.5	15.7	83
Summer Sweet #3521Y	16.7	75.1	7.5	7.5	7.4	10.4	99
Sunrise One	11.4	76.6	7.7	7.8	7.3	14	82
Sunshine	9.8	85	8.5	8.5	7.3	9.9	103
Sweet Diane	10.9	90.5	9	8.7	7.4	9.5	97
Sweet Favorite	7.1	124	12.4	11.6	7.8	10.6	110

ICEBOX TYPE (cont'd) Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
Tiger Baby	12.4	74.9	7.5	7.6	6.9	10.1	96
Treasure Chest	12.5	114.2	11.4	8.7	8.4	16.9	83
Triple Play	22	106.5	10.7	8.3	8.1	13.3	83
Vanguard(HSR 2866)	8.6	97.1	9.7	9.5	8.8	9.3	95
Verona	9.5	142.6	14.3	10	8.2	8.6	97
White Wonder	11.2	83.2	8.3	7.8	7.6	10.3	100
Winter King & Queen	11	78	7.8	7.1	7.1	8.3	107
WT-04-68	6.7	90.9	9.1	9.1	7	10.1	96
Yellow Bird	12.9	114.8	11.5	7.8	7.9	10.6	90
Mean	10.4	99.8	10	8.8	8.04	10.3	95.7
P Value	0.1761	0.0015	0.0044	0	0	0.033	0.4049

PERSONAL/MINI TYPE Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
Diana	16.2	49.1	4.9	8.6	5.7	10.6	86
Gold Flower	14.8	53.3	5.3	9.6	4.3	10	92
Golden Sunrise	8.6	45.8	4.6	6.7	6	9.6	96
Hime Kansen	6.9	29.6	3	6	5.3	9.8	105
Jade Star	13.8	59.9	6	7.1	7.1	8	105
New Hampshire Golden Midget	23.9	39.8	4	6.2	6.1	8.8	88
Red Doll	12.9	37	3.7	6.3	5.4	10	93
Solitaire (GV)	11	44.2	4.4	6.3	6.1	9.3	96
Sugar Baby	7.9	54	5.4	6.9	6.8	8	95
Sweet Beauty	5.3	53.5	5.4	9.6	5.4	10.5	107
Yellow Doll	24.3	55.4	5.5	7.3	6.6	10.4	92
Yellow Jubilee	15.1	50.1	5	6.8	6.6	10.6	91
Mean	13.8	48.7	4.9	7.3	6	9.7	94.9
P Value	0.0003	0.0021	0.291	0	0	0.4474	0.2044

PICNIC TYPE Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
Crimson Sweet	6.5	159.9	16	9.7	9.6	9.2	95
Lamar(HSR 2920)	10	200.1	20	7.1	7.2	12.1	83
Moon and Stars	6.6	174.3	17.4	10.4	9.7	9.1	88
Sultan	7.5	154	15.4	10.2	7.1	13.5	99
Yellow Shipper (Daisy)	10	162.3	16.2	12	9.1	8.6	90
Mean	8.1	170.1	17	9.9	8.5	10.5	91
P Value	0.129	0.7377	0.8012	0.5164	0.0822	0.1894	0.5073

x Number of watermelons and total yield of 10 plants

y Days to maturity from transplanting

Comparison of Types: P Value	0.0066	0	0	0	0.0022	0	0.7587
-------------------------------------	---------------	----------	----------	----------	---------------	----------	---------------

Table 4. Marketable yield of icebox, mini and picnic watermelon varieties grown from treated seeds at Washington State University Vancouver REU in 2005.

ICEBOX TYPE Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
Boston	8.1	71.1	8.5	7.9	7.7	19.4	87
Buttercup	9.2	82	9.1	7.8	8.2	9.5	94
Constitution	6.7	51.4	7.7	8.1	7.6	9.7	92
Crimson Tide	5.7	49.1	8.8	6.4	7.4	8.8	91
Freedom	9.3	83.1	8.9	9.3	6.9	9.9	82
HSR 2695 (Viking)	3.3	30.4	9.2	9.7	9.4	8.5	99
HSR 2698 (Lantha)	10	63.2	6.3	7.5	7	9.2	84
Imagination (primed)	10	73.6	7.4	7.4	7.2	9.4	77
Independence	7.1	58.1	8.1	8.4	7.6	10.5	92
Jade Star	7.6	62.4	8	8.7	8.4	9.1	89
Liberty	9.3	83.8	8.3	8.1	7.3	10.1	89
Madrid	7.9	90.8	11.8	12.1	7.2	9.4	102
Montreal	5.7	55.3	9.6	10.2	7.2	8	105
Orange Julius	9.3	79.9	8.7	7.5	8	9.9	91
Petite Treat	7.1	43.7	6.1	7.3	6.9	8.7	87
Promise	10	74.4	7.7	8.5	7.3	9.2	88
Quetzali	10	86.2	8.6	7.7	7.8	10	94
Revolution	5.7	54.5	9.5	9.4	7.1	10.2	87
Ruby	2.9	21.2	7.3	7.5	7.3	10	95
Solid Gold	7.1	62.8	8.8	8.8	8.4	9.3	91
Sugar baby	9	56.1	6.6	4.7	4.6	8.4	89
Sun Ray	10.5	66.6	6.6	7.1	7.3	10	91
Super Crisp 85	10.7	95	8.8	8.3	7.7	14.2	84
Sweet Delight (primed)	10	81.7	8.2	8.1	7.5	9.8	87
Sweet Eat'n	6	64.1	10.6	8.9	7.9	10.2	92
SXW 0016	7.6	62	8	8	7.5	10.2	89
SXW 0017	11.7	83.4	7.2	7	7.3	10.3	89
Vista	5.2	65.8	12.8	10.5	8.3	9.9	97
WT-04-65	10	71.4	8	7.4	7.8	10.5	88
Mean	8	65.6	8.4	8.2	7.5	10.1	90
P Value	0.1259	0.207	0.006	0	0	0.894	0.1165

PERSONAL/MINI TYPE Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
Afternoon Delight	5.7	23.6	4.1	6.2	5.9	8.9	87
Amarillo	10.7	62.2	5.6	7.9	8.1	10	88
Betsy (8103)	15	49.4	3.3	4.9	4.7	9.3	98
Bobbie (8101)	10	52.4	5.2	6.7	6.5	10.6	86
Extazy	12.4	65.9	5.3	6.6	6.4	9.8	89
Jenny	6.9	36.7	5.4	7.1	6.4	7.8	87
Mickylee	9.5	50.1	5.3	6.7	6.3	8.3	94
Mini Yellow	12.1	63.4	5.2	8.3	8.2	9.7	84
Rugby (41020016)	5.7	28.3	4.9	8.4	5.6	9.5	100
Solitaire	9.3	47.6	5.2	7	6.9	9.6	88
Sweet Beauty	10	41.2	4.2	7.8	5.8	9.5	87
Valdoria	10.5	53.4	5.1	6.6	6.6	9.9	99
Vanessa	13.8	69.2	5	6.3	6.5	9.5	92
Wonder	14.3	57.7	4.1	5.5	5.7	9.7	87
Yellow Doll	8.7	36.9	5	6.9	6.2	10.4	102
Mean	10.3	49.2	4.9	6.9	6.4	9.5	91
P Value	0.1003	0.2248	0.001	0.019	0.021	0.029	0.1431

PICNIC TYPE Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
Sangria	5.2	75.8	24.2	11.4	6.7	9.2	99

x Number of watermelons and total yield of 10 plants

y Days to maturity from transplanting

Comparison of Types: P Value	0.007	0.008	0	0	0	0.542	0.293
-------------------------------------	--------------	--------------	----------	----------	----------	--------------	--------------

Table 5. Marketable yield of icebox, personal/mini and picnic watermelon varieties grown at Washington State University Vancouver REU in 2006.

ICEBOX TYPE Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
5130	7.3	50.3	7.2	8.2	7.2	10.2	82
7167	6.0	53.2	10.2	9.1	7.7	10.1	111
9651 HQ (ACX 651T)	9.0	108.0	11.9	9.4	8.4	10.1	78
Afternoon Delight	5.3	62.1	11.6	9.2	8.3	10.8	85
Amarillo	11.0	110.1	10.5	8.6	8.3	10.8	90
Atranhanski	5.0	55.1	11.7	8.7	8.4	6.9	101
Betsy 8103	5.5	41.7	7.7	7.5	7.0	10.7	76
Blacktail Mountain	6.7	65.0	9.9	8.9	8.1	9.2	90
Bobbie 8101	4.5	35.3	7.8	7.6	7.4	10.1	84
Boston	7.7	88.3	11.4	8.9	8.3	10.7	84
Butterball	9.3	95.7	10.1	8.2	8.1	10.3	73
Buttercup	9.3	105.5	11.3	8.5	8.5	10.6	87
Cathay Belle	9.0	55.3	6.4	7.5	6.6	10.8	89
Constitution	5.0	57.0	10.9	9.2	8.2	10.8	86
Cream of Saskatchewan	10.0	102.0	10.3	8.6	8.2	9.3	104
Demi-Sweet	4.0	38.4	9.6	7.9	7.9	9.9	89
Early Crimson Treat	6.0	55.5	9.6	8.2	15.4	10.0	84
Early Moonbeam	8.7	63.9	7.6	8.1	7.5	9.7	106
Extazy (6008)	9.0	63.9	7.0	7.6	7.0	10.0	129
Fenway	9.3	90.7	9.4	8.2	7.7	10.6	80
Festival	6.7	74.3	10.9	9.3	8.0	9.6	79
Gold Flower	10.7	66.9	6.5	11.5	5.6	10.7	105
Golden Honey	3.7	42.0	11.1	9.2	7.9	8.2	86
Gypsy	6.5	81.7	12.0	8.4	8.6	9.4	78
HSR 2945	6.0	52.7	9.3	8.6	7.7	9.5	82
Imagination	9.3	93.8	10.1	8.4	8.0	10.2	79
Independence	6.0	69.3	11.5	9.7	8.1	10.7	79
Jubilee	2.0	21.5	9.6	8.9	8.6	8.7	101
Lamar (HSR 2920)	4.0	42.4	10.0	8.7	7.8	9.2	91
Little Boy	1.7	14.0	8.3	8.3	6.9	11.6	94
Lycosweet 5109	4.0	25.4	6.7	7.5	7.1	9.8	115
Malali	5.3	34.9	6.7	8.1	7.4	7.1	101
Melitopolski	4.3	44.9	10.5	8.9	8.1	7.7	96
Mickylee	11.3	82.9	7.3	7.7	7.0	10.1	79
Millenium	4.7	51.6	10.5	9.7	7.5	10.1	79
Millionaire	6.7	77.5	11.6	8.5	7.7	9.6	79
Mini Yellow	8.5	66.8	7.9	7.8	7.4	11.2	78
Navajo Sweet	4.3	33.8	8.1	8.3	7.9	9.5	136
New Orchid	6.0	45.8	7.5	8.3	7.3	9.9	91
Nova	4.5	41.5	8.8	8.1	7.8	10.2	84
Osh Kirgizia	7.0	82.5	11.9	8.8	8.6	10.4	80
Petite Perfection	12.0	75.7	6.3	7.4	6.6	10.9	74
Petite Treat	9.3	58.5	6.4	7.5	6.8	11.2	106
Promise	3.0	30.6	10.2	9.1	8.1	10.0	100
Quetzali	6.0	56.5	9.4	8.6	8.0	10.3	134

ICEBOX TYPE (cont'd) Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
Revolution	7.3	86.4	11.5	10.8	7.2	10.3	85
Ruby	3.3	38.2	11.0	9.1	7.7	10.6	90
Small Shining Light	4.7	36.0	6.8	6.9	5.8	9.2	125
Smile	8.0	50.3	6.5	8.0	6.8	11.2	83
Sorbet Swirl F1	11.3	113.9	10.1	8.6	7.7	10.0	84
Summer Sweet #2532	3.5	36.9	11.3	8.6	8.4	9.0	103
Summer Sweet #3521Y	3.0	23.7	7.9	7.5	7.4	11.3	84
Sun Ray	9.7	88.4	9.2	7.8	8.0	9.7	83
Sunrise One	4.0	32.2	6.1	7.0	6.5	9.2	117
Sunshine	4.0	36.9	9.9	9.1	7.7	10.8	89
Sweet Beauty	3.3	20.8	6.8	10.2	5.8	11.7	98
Sweet Eat'n	6.0	72.0	11.9	9.2	7.3	10.6	83
SWX 0017	9.5	96.2	9.8	8.7	8.0	11.0	68
Tiger Baby	4.7	37.2	7.6	8.1	7.2	10.1	82
Treasure Chest	11.3	131.8	11.6	8.3	8.5	10.7	82
Tri-X Palomar	5.0	51.1	9.8	8.4	8.2	9.9	80
Valdoria	2.0	16.2	8.1	7.8	7.5	9.7	96
Vanessa	8.3	57.2	6.6	7.6	9.3	10.0	91
White Wonder	7.3	62.5	8.5	9.7	9.3	9.6	87
Winter King & Queen	6.7	67.7	10.4	8.4	8.0	9.5	99
WT-04-65	7.0	72.8	10.0	8.2	8.0	10.6	71
WT-04-68	6.0	61.1	11.3	9.5	8.4	9.9	87
Yellow Bird	6.7	72.0	10.6	8.7	8.3	11.0	104
Yellow Doll	8.3	56.7	6.8	8.1	6.8	11.4	81
Yellow Jubilee	6.7	56.4	8.7	8.6	7.8	9.2	88
Mean	6.6	60.6	9.3	8.5	7.8	10.0	90.7
P-Value	0.0647	0.0152	0.0001	0.0001	0.5592	0.0000	0.0254

PICNIC TYPE Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
7177 HQ	8.7	104.5	12.1	9.9	8.2	10.9	82
7187 HQ	5.0	75.0	15.2	10.4	8.9	11.2	129
9601 HQ (ACX 601T)	5.0	74.2	15.4	10.1	9.2	10.8	108
Baby Doll	4.7	68.2	14.8	10.3	8.9	9.8	91
Crimson Sweet	6.3	102.0	15.8	9.8	8.6	10.5	85
Desert king	2.3	48.5	20.1	11.3	9.5	9.9	118
Freedom	4.0	52.1	12.1	11.3	8.1	10.8	124
Imperial	8.3	115.9	14.2	10.3	8.3	9.3	113
Jade Star	5.7	73.9	13.1	9.7	8.6	10.3	75
Lantha (HSR 2698)	5.3	65.5	13.2	9.7	8.7	10.6	89
Liberty	7.0	84.6	12.8	9.7	8.2	10.9	87
Madrid	5.7	71.2	12.4	13.4	7.1	10.1	118
Montreal	4.0	78.4	19.4	13.7	8.2	10.1	87
Moon and Stars	7.0	122.1	18.0	10.8	9.4	9.8	81
Orange Julius	4.7	60.3	13.3	9.4	9.3	9.5	81

PICNIC TYPE (cont'd) Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
Orange Sweet	2.5	42.5	17.0	9.7	9.6	10.0	78
Orangeglo	5.3	93.4	17.0	14.0	8.8	10.7	89
Petite Yellow	9.3	113.2	12.3	9.6	7.7	9.6	78
Sangria	5.3	62.1	13.8	13.9	7.4	10.4	99
Solid Gold	5.3	77.9	13.9	9.8	9.0	10.1	89
Southern Light	4.0	48.2	12.1	9.1	8.3	10.0	111
Sugar Baby	2.7	45.6	16.3	10.7	9.2	9.5	125
Sultan	3.0	42.1	14.0	13.3	7.4	11.1	89
Super Crisp 85	2.0	26.4	13.7	10.7	8.3	10.7	90
Sweet Delight	8.7	123.3	14.1	10.3	8.6	10.5	81
Sweet Diane	6.7	91.4	13.7	11.6	7.9	10.1	79
Sweet Favorite	4.7	82.1	18.9	15.8	9.8	10.4	84
Vanguard (HSR 2866)	2.3	32.2	13.8	10.3	8.8	10.4	107
Verona	3.0	47.6	16.3	11.6	9.4	8.9	95
Viking (HSR 2695)	3.0	56.4	21.7	16.7	14.7	9.8	103
Vista	4.7	93.7	19.9	13.6	8.8	11.0	97
Yellow Shipper (Daisy)	6.3	89.9	14.5	11.1	8.0	9.0	119
Mean	5.1	73.9	15.1	11.3	8.8	10.2	96.2
P-Value	0.1253	0.1692	0.0077	0.014	0.3467	0.1499	0.2703

PERSONAL/MINI TYPE Variety	Total Watermelon		Mean Watermelon				Days to Maturity ^y
	Number ^x	Yield (lb) ^x	Weight (lb)	Length (in)	Width (in)	BRIX	
Belle 460	6.0	30.2	5.0	8.2	6.0	9.7	113
Diana	8.7	48.9	5.8	9.9	5.7	10.0	87
Golden Midget	9.3	41.3	4.5	6.8	5.8	7.4	117
Golden Sunrise	2.7	14.1	5.3	6.9	6.0	9.5	84
Hime Kansen	4.0	14.6	3.7	6.6	5.6	10.3	89
Jenny	5.7	33.8	5.9	7.7	6.5	10.1	109
New Hampshire Golden Midget	7.0	25.9	3.1	6.2	5.6	8.5	80
New Queen	3.3	18.4	5.9	8.0	5.9	10.2	97
Precious Petite	7.0	31.7	4.2	6.6	6.0	10.4	107
Red Doll	3.7	18.5	4.9	7.0	6.2	10.1	83
Rugby (41020016)	6.7	27.8	4.0	8.7	4.9	11.5	93
Solitaire	14.0	82.8	5.9	7.3	6.8	10.0	129
Wonder	9.3	54.6	5.8	7.0	6.5	10.2	109
Mean	6.7	34.0	4.9	7.4	5.6	9.8	99.6
P-Value	0.1812	0.0199	0.2759	0.0001	0.0002	0.0018	0.7175