The Connecticut Agricultural Experiment Station, New Haven

Personal-Sized Watermelon Trials 2005-2007

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Bulletin 1014
June 2008

PERSONAL-SIZED WATERMELON TRIALS 2005-2007

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SUMMARY

In 2005-2007, eleven cultivars (8 named and 3 experimental) of personal-sized (3-7 pound) seedless watermelons and two seeded pollinator varieties were grown on a sandy terrace soil (Windsor, CT) and a loamy upland soil (Mt. Carmel, CT). The average total estimated yield of personal-sized watermelons of all cultivars in 2005-2006 was 8,952 fruit/acre (A) at Windsor compared to 6,778 fruit/A at Mt. Carmel. At Windsor, the average number of fruit/plant was 3.0 with an average of 61% of the fruit in the 3-7 pound range. At Mt. Carmel, the average number of fruit/plant was 2.3 with 64% of the fruit in the 3-7 pound range. In 2007, the yield of Vanessa, the only cultivar evaluated, was 13,674 fruit/A in Windsor compared to 11,456 fruit/acre at Mt. Carmel, a 19% difference. Compared to plots with no mulch, yields on black plastic mulch increased at both sites in all years. Size distribution, fruit characteristics, Brix (percent soluble solids), and rind thickness were also evaluated. Experimental varieties 5133 and 5130, Vanessa, Valdoria, and Solitaire had the greatest yields of personal-sized watermelons. Experimental varieties 5130 and 6008 as well as Extazy, Valdoria, and Vanessa produced the largest percentage of melons in the 3-7 pound personal-sized watermelon range. Miniput, Solitaire, and Experimental variety 6008 had significantly thicker rinds, averaging 0.59 of an inch. The varieties producing the thinnest rinds were Experimental variety 5130, Petite Treat, Bobby, Vanessa, and Valdoria, averaging 0.45 of an inch. The cultivar, Bobbie, had the greatest sugar content (Brix 13.5), but had the poorest germination. Management strategies are discussed to provide maximum yield by cultivar selection and management.

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INTRODUCTION

History. The culture of watermelon has been traced back thousands of years. Ancient hieroglyphics revealed that it was grown in Egypt, as well as in lands around the Mediterranean and east as far as India (Robinson and Decker-Walters, 1997). Its culture subsequently spread to the warmer parts of Russia, Asia Minor, the Near East, and The Middle East. It appears to have reached China only about a thousand years ago. The long history of the watermelon from North Africa to middle Asia led to the view that it was of Asiatic origin, although it has never been found growing wild in Asia. In 1850, David Livingston, the great missionary-explorer, settled the question of its origin. He found large tracts in central Africa literally covered with wild watermelons. In the wild, bitter and sweet melons occur side by side, but to the eye, they are indistinguishable. Local natives had to puncture each fruit and taste its juice before using it for food or drink.

In the early 1600's, traders brought watermelon to the Americas, where it was first cultivated in Massachusetts in 1629. Native Americans in Florida were reported to be growing watermelons by the mid-1600's. Father Marquette, French explorer of the Mississippi, reported them being grown along the Mississippi River in 1673.

Uses. In America, watermelons are used almost entirely as a dessert, eaten fresh and cold. The rind is sometimes made into preserves, but the seeds are used in this country only for planting. In southern Russia, beer is made from watermelon juice or the sugary juice may be reduced to a heavy syrup like molasses. In Iraq, Egypt, and elsewhere in Africa, the flesh of the melon is used as a staple food and animal feed. In semi-desert districts, watermelon is an important source of water during dry periods; even today there are districts in Africa where it is cultivated solely for that purpose. In many parts of Asia, the seeds are often roasted, with or without salting, and eaten. Asians also preserve watermelon by salting or brining large pieces or halves in barrels.

Production of seedless watermelon seeds. Standard seeded watermelon varieties may contain as many as 1,000 seeds in each fruit. Some consumers find the seeds scattered throughout the flesh annoying. This led to the development of hybrid seedless watermelons over 40-years ago. Recently improved varieties, aggressive marketing, and increased consumer demand created a rapidly expanding market for seedless watermelons. A question often asked about growing seedless watermelons is: "How does one obtain seeds of a seedless watermelon?" Knowledge of the genetic makeup of the watermelon fruit is informative. The number of chromosomes in a normal watermelon plant is doubled by the use of the chemical colchicine. Doubling the chromosomes in a normal (diploid) watermelon produces a tetraploid plant (one having 4 sets of chromosomes). When the tetraploid plant is bred back, or pollinated, by a diploid or normal plant, a sterile triploid plant is produced that contains no seeds. The tetraploid seed parent produces only 5-10% as many seeds as a normal diploid plant, resulting in a seed cost 10 to 100 times more than that of standard, open-pollinated varieties and 5 to 10 times that of hybrid diploid watermelon varieties.

Watermelons bear separate male and female flowers on the same plant (monoecious). Only female flowers set fruit. Hybrid triploid watermelon plants do not produce sufficient viable pollen to induce fruit set and development. Therefore, pollen from a normal diploid seeded watermelon variety must be provided. Approximately one–third of the plants in the plot should be pollinators. Planting pollinators in the guard rows and then every third row in the plot provide optimum coverage. Honey bees are the principal insects that pollinate watermelons.

Personal-sized watermelons. Four types of watermelons are available in supermarkets. Traditional seeded watermelons have been a major part of the market for many years and weigh 18-35 pounds. Large seedless watermelons have been available since 1988 and usually weigh 15-25 pounds. Icebox-size melons, seeded and seedless, generally weighing 7-12 pounds each, have been available for about 5 years. Personal-sized seedless watermelons, weighing 3-7 pounds, first became available in markets in 2003. They offer an attractive alternative for small families or for consumers that have limited refrigerator space. They are just the right size for a single-meal serving without the storage and bulk issues associated with traditional seedless watermelon. Besides its smaller size, personal-sized watermelons have a thinner rind, which reduces waste and yields more edible flesh. The thin rind, however, makes long distance shipping difficult. Thus, personal-sized watermelons are an ideal

crop for Connecticut's local farmers' markets and roadside stands. It has been reported that watermelon growers in the South have resisted growing personal-sized watermelons because of changes in cultural requirements and the need for different harvesting equipment which makes them less profitable.

Researchers have found that concentrations of lycopene, vitamin C, and beta-carotene are especially high in personal-sized watermelons. Watermelon contains 8-10 milligrams of lycopene/cup (fresh weight) compared to 4 milligrams in a medium size tomato (Womack, 2006). Personal-sized watermelons average 9-20 milligrams of lycopene/cup (The Grower, 2005). Lycopene, an antioxidant, has been linked to the possible prevention of cancer and heart disease. Watermelon is listed by the American Heart Association as one of the best foods for cardiovascular health (Womack, 2006)

Since 2003, cultivar trials of personal-sized watermelon have been conducted in California, Florida, North Carolina, South Carolina, and Oklahoma. There had been no personal-sized watermelon trials in the Northeast. It was important that trials be conducted locally because differences in climate and soils may alter the growth and quality of the fruit, and affect cultivar choices and management decisions, such as use of plastic mulch.

Because of an expanding market and willingness of consumers to pay a premium price ($4.99 per fruit) for these melons, personal-sized watermelons were added to our New Crops Program. We began cultural and varietal trials in 2005. In this bulletin, I report yield and quality of 11 personal-sized watermelon cultivars grown from 2005-2007 at our research farms in Windsor and Mt. Carmel. Characteristics of each cultivar are discussed as well as management and cultural techniques.

METHODS AND MATERIALS

Sites and soils. Trials of personal sized watermelons were conducted for two years at the Valley Laboratory, Windsor, on Merrimac sandy loam (Entic Haplorthod), a inland sandy terrace soil with somewhat limited moisture holding capacity (Shearin and Hill, 1962); and at Lockwood Farm, Mt. Carmel, on Cheshire fine sandy loam (Typic Dystrochrept), a coastal loamy upland soil with moderate moisture holding capacity (Reynolds, 1979).

Cultivars. Six cultivars were grown in 2005 and 2006 at both sites. The cultivars evaluated in 2005 were: Extazy, Vanessa, Experimental cultivar 6008, Experimental cultivar 5130, Experimental cultivar 5133, and Bobby. Because of poor germination, Bobby was only planted at Windsor. The cultivars evaluated in 2006 were: Miniput, Petit Treat, Poquito, Solitaire, Valdoria, and Vanessa. The pollinator cultivar for both years was Jenny. In 2007, Vanessa was the only cultivar grown and the pollinator cultivar was Sidekick. Rind characteristics of each cultivar are described in Table 1.

Culture. The personal sized watermelon cultivars and the pollinator cultivar were seeded on April 25-27. The seedlings were grown in Promix BX (Premier, Red Hill PA) in 3x3x3-inch Jiffystrips and placed in a greenhouse maintained at 75°-90°F. Under these conditions, germination was excellent for all cultivars except for Bobbie. After germination, plants were thinned to one per pot. Seedlings were moved to a cold frame for hardening before transplanting in the field. Water-soluble 20-20-20 fertilizer (one tbsp/gal) was added to the seedlings before they were transplanted. In mid-June, plants of each cultivar were transplanted 2 feet apart in 50-foot rows. The pollinating cultivar was planted in every third row except in 2007 where the pollinator was planted every other row. Twenty-five feet of each row was mulched with 1.25 mil black plastic (3 ft wide). Row centers were alternatively 5 and 6 feet apart. In 2005, paired rows, 5 feet apart, were covered with Reemay spun-bonded polyester (10.5 ft x 50 ft). The Reemay was pinned to the soil with 6-inch wide staples that penetrated 5 inches into the soil to prevent loosening in high winds. The Reemay was removed in early July to allow honey bees and other insects to pollinate the first female flowers forming along the vines. Reemay was not used in 2006 and 2007 because some of the plants were flowering at planting time.

Plants were removed from all plots at the end of the growing season and the land fallowed over winter.

Fertilization. The soils were fertilized at a rate of 1000 lb/A 10-10-10 before planting. After the Reemay was removed or in mid July, the strips between the black plastic were sidedressed with 240 lb/A calcium nitrate. Total application of nitrogen during the growing season was 140 lb/A. Soil pH was about 6.5 at each site so lime was not applied.

Weed control. At Windsor, weeds were controlled by the herbicide Strategy (3 pt/A) that was sprayed in the aisles after planting. At Lockwood Farm, weeds were controlled mechanically by rototilling before vines completely carpeted the aisles.

Insect and disease control. Insects and diseases were controlled by Manzate (mancozeb), Quadris (azostobin), Asana (esferivaterate), and Bravo (chlorothalmil) applied per labeled directions as needed throughout the growing season.

Irrigation. The crops at both sites were irrigated with overhead sprinklers as needed to provide the plants with 1-inch of water weekly.

Harvest. Watermelons were harvested in September. Each fruit was weighed. Fruits weighing less than 3 pounds were not included in the analysis. The rind thickness was measured on ten random samples and the results averaged. Lycopene content was determined by Dr. Penelope Perkins, USDA/ARS, Oklahoma from samples obtained from the center of each randomly sampled fruit.

Percent soluble solids. Percent soluble solids in fruit is an indicator of percent sugars. The Brix meter is the standard tool for taking this measurement rapidly in the field. Samples were obtained from the center of randomly sampled fruit, the juice squeezed out, and its Brix measured. The 10 Brix readings for each cultivar were averaged.

RESULTS

Size Distribution. Size is one of the most critical criteria for personal-sized watermelons with three to seven pounds currently the most preferred size range. This size range accommodates standard boxes in which the fruit is shipped.

For most of the cultivars, there was a greater percentage in the 3-7 pound range from plots mulched with black plastic compared to unmulched plots. Exceptions were Extazy in 2005 and Miniput and Vanessa in 2006. At Windsor, in 2005, 78% of the watermelons from plants from plots mulched with plastic were personal-sized (3-7 lbs) compared to 72% from the unmulched plots (Table 2). From the mulched plots, Vanessa had the highest percentage of watermelons in the 3-7 pound range (86%) followed by experimental varieties 5130 and 5133 (84 and 83%, respectively). Extazy produced the greatest percentage of personal-sized watermelons in the unmulched plots (86%).

At Windsor, in 2006, 46% of the watermelons from plants from plots mulched with plastic were personal-sized (3-7 lbs) compared to 50% from the unmulched plots (Table 2). From the mulched plots, Solitaire and Valdoria had the highest percentage in the 3-7 pound range (54%). Vanessa and Petite Treat also averaged greater than 50%. From the unmulched plots, Vanessa had the highest percentage in the 3-7 pound range (90%) and, in 2007, the percentage declined to 78%. Valdoria was the only other cultivar from the unmulched plots to produce greater than 50% watermelons in the 3-7 lb range.

At Mt. Carmel, in 2005, the average percentage of all watermelon cultivars that were personal-sized was virtually the same between mulched and unmulched plots (79 and 78%) (Table 3). In the mulched plots, experimental variety 5130 averaged the highest percentage of watermelons in the 3-7 pound range (97%) while Vanessa produced 90%. Experimental varieties 5130 and 6008 had the greatest percentage of watermelons in the 3-7 lb range from the unmulched plots (84 and 83%, respectively). In 2005, all the cultivars, except for Extazy and experimental variety 6008, grown on black plastic mulch had a greater percentage in the 3-7 pound range compared to unmulched plots.

At Mt. Carmel, in 2006, the average percent of watermelons that were personal-sized from the mulched plots was 56 compared to 47% from the unmulched plots (Table 3). In the mulched plots, Vanessa averaged the highest percentage in the 3-7 pound range (76%) while Miniput averaged 74%. In unmulched plots, Valdoria and Solitaire had the greatest percentage of personal-sized watermelons (60 and 58%, respectively). In 2006, 4 of 6 cultivars from plots mulched with black plastic had greater percentages of watermelons in the 3-7 pound range. The cultivars Solitaire and Valdoria were the exceptions.

The average percentages of watermelons that were greater than 7 pounds at both sites rose dramatically from 2005 to 2006 (8% to 44%). Some of the increase can be attributed to the different cultivars that were grown. However, Vanessa, grown in both years, rose from 2% to 20%. In 2007, the percentage of Vanessa greater than 7 pounds was 14%. It appears that 2005 was an exceptional year for smaller watermelons.

Yields. Unlike other sized watermelons, personal-sized watermelons are sold by the melon, not by the pound. Therefore, estimated yields were measured in number of fruit per acre. In 2005, the average total yield was 14,982 fruit/A at Windsor compared to 10,296 fruit/A at Mt. Carmel, a 46% difference (Table 4). Bobby was excluded because it was only grown in Windsor. Because the percent watermelons in the 3-7 lb range was virtually the same at both sites (77-78%), the larger average yield at Windsor was due to a greater number of fruit/plant (4.5 fruit/plant vs. 3.0 fruit/plant).

At Windsor, in 2005, experimental variety 5133 had the greatest yield from both the mulched and unmulched plots (Table 4). In both cases, this was due to a higher number of fruit/plant. Experimental variety 5130 had the second greatest yields from the mulched plots and experimental variety 6008 was second in the unmulched plots. On average, mulched plots produced 19% more personal-sized watermelons than the unmulched plots.

In Connecticut, virtually all watermelons are sold at roadside stands and farmers markets and are not shipped long distances. Therefore, oversized watermelons (>7 lbs), even though not classified as "personal-sized", could still be sold as a seedless watermelon. Overall quality does not diminish as the size increases. In Windsor, in 2005, experimental variety 6008 produced the greatest number of fruit greater than 7 pounds from both the mulched and unmulched plots (Table 4).

At Mt. Carmel, in 2005, mulched plots produced 7% more personal-sized watermelons than the unmulched plots (Table 4). Experimental variety 5130 produced the greatest yields from both treatments with experimental variety 5133 producing the second highest. Experimental variety 6008 had the greatest number of oversized watermelons in both treatments.

In 2006, the average total yield was 3,927 fruit/A at Windsor compared to 3,847 fruit/A at Mt. Carmel, a 2% difference (Table 5). Windsor had a slightly greater number of fruit/plant (1.8 vs. 1.6) and Mt. Carmel had a greater percentage in the personal-sized range (52 vs. 48%).

At Windsor, in 2006, mulched plots produced 27% more personal-sized watermelons than the unmulched plots (Table 5). For both treatments, Vanessa produced the greatest number of personal-sized watermelons per acre and Miniput produced the greatest number of oversized (> 7 lbs) watermelons. Poquito also had a large percentage of oversized watermelons.

At Mt. Carmel, in 2006, mulched plots produced 40% more personal-sized watermelons than the unmulched plots (Table 5). The increase was due primarily to a greater percentage of watermelons in the personal-sized range. Miniput had the greatest number of personal-sized watermelons per acre in the mulched plots while Valdoria had the greatest number in the unmulched plots. Poquito had the greatest number of oversized watermelons in both treatments.

Comparing both sites, numbers of personal-sized watermelons decreased from 12,639 per acre in 2005 to 3,887 per acre in 2006, a 225% decrease. Was this decrease due to different cultivars that were grown or were the conditions in 2006 less favorable for watermelon production? The answer can be determined by comparing the 2005, 2006, and 2007 yields of the cultivar, Vanessa; the only cultivar grown in all three years. In 2005, the average yield of Vanessa was 11,437 fruit/acre compared to 6,331 fruit/acre in 2006, an 87% decrease (Table 6). The yield increased to 12,565 fruit/acre in 2007. The smaller yields in 2006 were primarily due to the lower number of fruit/plant harvested at both sites. Plants flowered earlier in 2006 compared to 2005. The lower number of fruit may be the result of fewer flowers on smaller plants at flowering time and fewer insects present to pollinate.

Rind thickness. Rind thicknesses ranged between 0.4-0.6 of an inch (Table 7). Miniput, Solitaire, and Experimental variety 6008 had significantly thicker rinds, averaging 0.59 of an inch (Table 7). The varieties producing the thinnest rinds were Experimental variety 5130, Petite Treat, Bobby, Vanessa, and Valdoria, averaging 0.45 of an inch. As most of the watermelons grown in Connecticut will not be shipped long distances, a thicker rind is not absolutely necessary. A thinner rind, however, provides less waste and more edible flesh.

Sweetness. Of all cultivars evaluated at both sites in all years, Bobby had the greatest sugar content with an average Brix (total soluble sugars) of 13.5% (Table 7). Petite Treat averaged greater than 12% but was not significantly greater than Extazy, Miniput, and Experimental variety 5130.

There appears to be year-to-year variability in sugar concentrations of the watermelons. When comparing the average Brix of Vanessa samples over the three year period, the values ranged from 10.3 to 12.1. Excessive water in the days before harvest can lower sugar concentration in the fruit; however, in the two weeks prior to harvest, the plants received about the same amount of rainfall (around 2 inches) all three years. Maturity can also affect the total soluble sugars.

MANAGEMENT STRATEGIES

Selection of cultivars. Many personal-sized watermelon varieties can be grown successfully in Connecticut. All 11 varieties evaluated produced abundant marketable personal-sized watermelons. There are several fruit characteristics to consider when choosing a variety. First is the color and the appearance of the fruit. This is a cosmetic characteristic and has little effect on taste. However, harvesting is much easier if the seedless cultivar has a different color or appearance than the seeded pollinating variety. Size is another factor to consider. All cultivars tested were classified as personal-sized in the 3-7 pound range. However, some produced a greater percentage of fruit in the 3-7 pound range. Sweetness of the fruit, seedlessness, lycopene content, and seed germination are other factors to consider. Lastly, the total yield is an important consideration, especially for commercial enterprises. Varieties with large yields at both sites should do well throughout Connecticut.

Among the named seedless cultivars, Bobby germinated poorly even though it was the sweetest cultivar tested. Poquito, Petite Treat, and Solitaire looked similar to both the pollinator cultivars, increasing the chances that a seeded melon could be sold as seedless. Miniput, Valdoria, and Vanessa (all dark green with no stripes) were the easiest to distinguish from the pollinator cultivars. Valdoria was the only cultivar with significant seeds present (Table 8). Extazy had the highest lycopene content (95-99 ug/g) or the equivalent of 21 mg /cup which is the amount of lycopene found in 5 medium-sized tomatoes. The other cultivars averaged 54-85 ug/g (Table 8).

The pollinating varieties, Jenny and Sidekick, looked very similar in appearance. However, Sidekick produced very small melons (< 2 lbs) and differed in both size and color than Vanessa in the 2007 trials.

Taking all factors into consideration including yields, it appears that Miniput, Vanessa, and Extazy provided abundant marketable fruit. Of these three cultivars, Extazy had the greatest lycopene content and was significantly sweeter than Vanessa. Miniput had the thickest rind. Sidekick provided an excellent supply of pollen throughout the growing season and its distinctive fruit made harvesting easier.

Mulches. Watermelon prefers warm soil temperatures. Plastic mulches raise the soil temperature an average 6-12^{o}F, whereas organic mulches such as compost, leaves, or grass clippings lower the soil temperature 10-18^{o}F (Hill et al. 1982). Thus, plastic mulches are preferable to organic mulches for watermelon crops. Black plastic is preferable to clear plastic because weeds can not germinate and grow under black plastic. Clear plastic creates a mini-greenhouse and favors weed growth. In this study, plastic mulch was applied by hand but, in larger operations, mulch can be applied to smoothed, fertilized soil with a tractor-drawn mulch applicator.

The warming effect of black plastic mulch compared to unamended soil is more evident early in the season. The warmed soil beneath the plastic mulch encouraged early plant growth and plants growing in plots amended with plastic mulch grew larger during the early flowering season. A greater number of flowers were produced compared to plants growing in unamended plots. At both sites, in all years, yields from plots amended with plastic mulch had greater average yields than the unamended plots. This was due to a greater number of fruit/plant. In addition, except for 2006 in Windsor, plants growing from plots amended with black plastic mulch yielded a higher percentage of melons in the 3-7 lb range of personal sized watermelon. The greatest increase in yields occurred in 2005 at Windsor with Vanessa producing 7139 more fruit/A with black plastic mulch compared to no mulch (Table 6). At $4.99 retail price/fruit, the grower would potentially gross over $35,000 more per acre with black plastic mulch compared to no mulch.

Plastic mulch also affords good weed control. Young watermelon plants can not compete with weeds early in the growing season and weed control contributes to larger plant size early in the season. Unfortunately, black plastic mulch may create water stress if the plastic is laid in dry soil. Plastic laid after a rain or irrigation alleviates this

potential problem. Holes can be punched in the plastic after a rain to drain puddles on the plastic and to allow water to penetrate the underlying soil.

Timing of planting and row covers. Plants in these trials were transplanted in the field in mid June after being seeded in the greenhouse in late April. In 2005, floating row covers (Reemay) were placed over the transplants in each row to further warm them. In early July, when the plants started to flower, the row covers were removed to allow honey bees to pollinate. In 2006 and 2007, Reemay was not used because female flowers developed on the transplants while in the cold frame before planting in the field. Compared to 2005 (with row covers), yields of Vanessa were smaller in 2006 (without row covers) and greater in 2007 (without row covers) at Windsor. At Mt. Carmel, yields of Vanessa were virtually the same in all three years. Thus, it appears that the use of row covers had no affect on yields when plants are transplanted in the field in mid-June.

In these trials, watermelons were harvested in September. It would be advantageous to have watermelons ripen earlier during the summer season before Labor Day when consumer demand is greater. It may be possible to transplant in the field in mid-May (after seeding in greenhouse in March). With a combination of black plastic mulch and Reemay row cover, ripening of the fruit might be shortened to August. New trials are needed to investigate this further.

Plant spacing. Size is critical for classification of watermelons in the 3 to 7 pound range for personal-sized watermelons. For most cultivars, there were more melons that were too large than too small. Normally, size of fruit can be controlled by closer plant spacing within the row to produce smaller fruit. However, studies with personal sized watermelons have shown that fruit size appears to be unaffected by plant spacings (Katz, 2005). It appears that, at least for personal sized watermelons, genetics plays the dominate role in determining fruit size.
In this study, plants were spaced 2 feet apart within the row. This spacing might be reduced to 18 inches to increase the number of plants per acre. However, if the plants are spaced too closely, they compete with each other for nutrients and water and the fruit could end up being too small.

Pollinator placement. To produce seedless watermelons, one third of the field should be planted with a pollinator. This can be achieved in two ways: every third row or every third plant within the row. In 2005 and 2006, every third row was planted with a pollinator. In 2007, because of a different experimental design, every other row was planted with a pollinator. Having the entire third row planted with a pollinator facilitates planting especially if mechanical planters are used. Harvesting is also easier, especially if the seedless fruit and fruit from the pollinator vary little in size and color.

Harvest. For roadside and farmers' markets sales, only mature fruit should be harvested. Watermelons should be cut from the vine rather than pulled, leaving about an inch of stem. Immature fruit will not ripen off the vine and Brix levels will not increase. Ripeness of watermelons can be judged by the withering of the tendril adjacent to the stem attachment to the vine. The ground patch (uncolored area where the fruit lies on the ground) also changes from white to yellow. With experience, ripeness can be detected by sound. A mature fruit has a hollow tone if rapped with your knuckle compared to a high pitched tone in immature fruit. Another indicator of maturity includes increased "waxiness" of the rind. Overripe fruit may split when subjected to rapid changes in soil moisture following rains. If heavy rain is forecast, ripe fruits should be picked to prevent cracking.

Days to maturity were calculated from the transplanting date to the date of first significant harvest. The average maturity of all the cultivars was 87 days compared to the average maturity listed in the seed catalogs (83 days).

CONCLUSIONS

Personal-sized seedless watermelons can be grown successfully in Connecticut with little special treatment. All cultivars evaluated produced excellent quality fruit and yields at both sites. Black plastic mulch increased yields by increasing the number of fruit per plant. Informed choices of seedless cultivars and pollinator cultivars can make harvesting easier. For the homeowner, personal-sized watermelons provide a sweet healthy dessert without sacrificing valuable space in the refrigerator. For the commercial grower, personal-sized watermelons offer special market opportunities, especially for those who grow for roadside stands and farmers' markets.

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Table 1. Fruit characteristics of cultivars in 2004-2007 personal-sized watermelon trials

Cultivar	Year Planted	Rind Characteristics
Bobby	2005	Medium green, narrow dark stripes
Extazy	2005	Dark green, mottled striping
Miniput	2006	Dark green, no stripes
Petite Treat	2006	Light green, dark stripes
Poquito	2006	Light green, medium dark stripes
Solitaire	2006	Dark green, mottled striping
Valdoria	2006	Dark green, no stripes, some seeds
Vanessa	2005-07	Very dark green, no stripes
Exp 5130	2005	Light green, medium dark stripes
Exp 5133	2005	Light green, medium dark stripes
Exp 6008	2005	Dark green, mottled striping
Jenny (pollinator)	2005-2006	Light green, narrow dark stripes
Sidekick (pollinator)	2007	Light green, wide dark stripes

Table 2. Size Distribution of watermelons at Windsor (%)

Cultivar	<3 lbs	Personal-sized (3-7 lbs)	>7 lbs
2005			
Plastic			
Bobby	16	71	13
Extazy	23	71	5
Vanessa	11	86	2
Exp 5130	16	84	0
Exp 5133	17	83	0
Exp 6008	9	75	16
No Plastic			
Bobby	15	63	22
Extazy	5	86	8
Vanessa	33	65	2
Exp 5130	27	73	0
Exp 5133	19	76	8
Exp 6008	21	68	11
2006			
Plastic			
Miniput	-	29	70
Petite Treat	-	50	50
Poquito	8	34	58
Solitaire	8	54	38
Valdoria	4	54	42
Vanessa	24	52	24
No Plastic			
Miniput	3	45	52
Petite Treat	9	45	45
Poquito	-	20	80
Solitaire	9	45	45
Valdoria	13	53	33
Vanessa	4	90	7
2007			
Vanessa (plastic)	8	78	14
Vanessa (no plastic)	13	79	8

Table 3. Size Distribution of watermelons at Mt. Carmel (%)

Cultivar	<3 lbs	Personal-sized (3-7 lbs)	>7 lbs
2005			
Plastic			
Extazy	10	64	23
Vanessa	6	90	3
Exp 5130	2	97	0
Exp 5133	19	81	0
Exp 6008	3	61	35
No Plastic			
Extazy	20	72	8
Vanessa	20	77	3
Exp 5130	16	84	0
Exp 5133	23	75	3
Exp 6008	3	83	13
2006			
Plastic			
Miniput	7	74	19
Petite Treat	-	71	29
Poquito	-	22	78
Solitaire	5	50	45
Valdoria	-	41	59
Vanessa	8	76	16
No Plastic			
Miniput	-	44	56
Petite Treat	17	50	33
Poquito	6	18	76
Solitaire	5	58	37
Valdoria	4	60	36
Vanessa	18	50	32
2007			
Vanessa (plastic)	14	70	17
Vanessa (no plastic)	10	75	15

Table 4. Yields of watermelons in 2005

Cultivar	Avg Fruit/plant no.	% pers.sized 3-7 lbs	est. yield no./A*	% oversized >7 lbs	est yield no./A*
Windsor					
Plastic					
Bobby	3.2	71	9,897	13	1,812
Extazy	4.6	71	14,227	5	1,336
Vanessa	4.4	86	16,483	2	383
Exp 5130	4.8	84	17,563	0	-
Exp 5133	5.0	83	18,077	0	-
Exp 6008	4.6	75	15,028	16	4,275
No Plastic					
Bobby	2.2	63	6,037	22	2,108
Extazy	3.1	86	11,613	8	1,440
Vanessa	3.3	65	9,344	2	287
Exp 5130	4.1	73	13,038	0	-
Exp 5133	6.2	76	20,525	8	2,881
Exp 6008	4.7	68	13,922	11	3,003
Mt. Carmel					
Plastic					
Extazy	2.6	64	7,248	23	3,473
Vanessa	2.6	90	10,193	3	340
Exp 5130	3.5	97	14,789	0	-
Exp 5133	4.0	81	14,113	0	-
Exp 6008	2.6	61	6,909	35	5,285
No Plastic					
Extazy	2.1	72	6,586	8	732
Vanessa	2.9	77	9,727	3	379
Exp 5130	3.7	84	13,538	0	-
Exp 5133	3.2	75	10,454	3	418
Exp 6008	2.6	83	9,400	13	1,472

*#fruit/plant x #plants/A x % in size classification (60” x 24” spacing = 4356 plants/A)

Table 5. Yields of watermelons in 2006

Cultivar	Avg Fruit/plant no.	% pers.sized 3-7 lbs	est. yield no./A*	% oversized >7 lbs	est yield no./A*
Windsor					
Plastic					
Miniput	3.1	29	3,916	70	9,453
Petite Treat	1.8	50	3,920	50	3,920
Poquito	2.2	34	3,258	58	5,558
Solitaire	2.2	54	5,175	38	3,642
Valdoria	2.0	54	4,704	42	3,659
Vanessa	2.4	52	5,436	24	2,509
No Plastic					
Miniput	2.4	45	4,704	52	5,436
Petite Treat	0.9	45	1,764	45	1,764
Poquito	0.8	20	697	80	2,788
Solitaire	0.9	45	1,764	45	1,764
Valdoria	1.2	53	2,770	33	1,725
Vanessa	2.3	90	9,017	7	701
Mt. Carmel					
Plastic					
Miniput	2.2	74	7,092	19	1,821
Petite Treat	1.4	71	4,330	29	1,769
Poquito	1.5	22	1,437	78	5,097
Solitaire	1.8	50	3,920	45	3,528
Valdoria	1.8	41	3,215	59	4,626
Vanessa	2.1	76	6,952	16	1,464
No Plastic					
Miniput	1.3	44	2,492	56	3,171
Petite Treat	1.0	50	2,178	33	1,437
Poquito	1.4	18	1,098	76	4,635
Solitaire	1.6	58	4,042	37	2,579
Valdoria	2.1	60	5,489	36	3,293
Vanessa	1.8	50	3,920	32	2,509

*#fruit/plant x #plants/A x % in size classification (60” x 24” spacing = 4356 plants/A)

Table 6. Yields of Vanessa watermelons in 2005-2007

	Avg Fruit/plant No.	% pers.sized 3-7 lbs	est. yield no./A*	% oversized >7 lbs	est yield no./A*
Windsor					
2005					
Plastic	4.4	86	16,483	2	383
No Plastic	3.3	65	9,344	2	287
2006					
Plastic	2.4	52	5,436	24	2,509
No Plastic	2.3	90	9,017	7	701
2007					
Plastic	4.2	78	14,270	14	2,561
No Plastic	3.8	79	13,077	8	1,324
Mt. Carmel					
2005					
Plastic	2.6	90	10,193	3	340
No plastic	2.9	77	9,727	3	379
2006					
Plastic	2.1	76	6,952	16	1,464
No plastic	1.8	50	3,920	32	2,509
2007					
Plastic	4.3	70	13,112	17	3,184
No plastic	3.0	75	9,801	15	1,960

*#fruit/plant x #plants/A x % in size classification (60” x 24” spacing = 4356 plants/A)

Table 7. Rind thicknesses and Brix

Cultivar	Rind thickness (inches)	Brix (%)
Bobby	0.464cd	13.50a
Exp 5130	0.479cd	11.51bd
Exp 5133	0.519bc	11.38cd
Exp 6008	0.545abc	11.19d
Extazy	0.496bcd	11.88bc
Miniput	0.644a	11.67bd
Petite Treat	0.475cd	12.23b
Poquito	0.513bc	11.49cd
Solitaire	0.586ab	11.33cd
Valdoria	0.421d	11.15d
Vanessa	0.434d	11.26d

Means followed by the same letter within each column are not significantly different by Tukey's multiple range test at the five percent level.

Table 8. Lycopene content (average of both sites) and seediness of watermelon varieties

Cultivar	lycopene content (ug/g)*	presence of seeds
Bobby	66.2	-
Exp 5130	72.5	-
Exp 5133	76.4	-
Exp 6008	92.5	-
Extazy	97.0	-
Miniput	73.5	-
Petite Treat	78.2	-
Poquito	75.0	-
Solitaire	69.7	-
Valdoria	70.3	+
Vanessa	71.6	-

* Data provided by Dr. Perkins, USDA ARS, Oklahoma

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