

Vine Length of A Diverse Set of Watermelon Cultivars

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Introduction. Breeding trials are carried out with the intent of maximizing the amount of information obtained while minimizing costs associated with trialing. Plots vary in the number of replications, years, and locations depending on whether yield and/or quality data is to be recorded (5). The size of a plot depends on the amount of seed available, equipment, labor, land, and the susceptibility of a crop to competition effects from neighboring plots. Smaller plot sizes allow greater numbers of lines to be evaluated with increased replication. However, they can be more susceptible to the effects of border competition if steps are not taken to group plots according to competing ability (1). Experiments and trials are suggested to have border rows around the plot and to harvest the center rows (net plots) unless border effects are not present (3, 6). Border rows can significantly increase the size and therefore costs of experiments or trials.

The need for border rows is crop specific and depends on competing ability differences of cultivars in adjacent plots. For watermelon, we were interested in vine length differences in relation to border competition effects. Studies on other cucurbits have noted main stem lengths to be positively correlated with yield per plant and have mostly additive genetic variance as did multiple lateral branching (2, 4). Long vined cultivars of cucumber have shown a tendency to reduce yields of adjacent cultivars (7). One study conducted on watermelon found only slight border competition effects due to differences in vine length. From their initial survey of breeders for extremes of vine length, the cultivars Sugar Baby and Petite Sweet were suggested as the shortest vined, Crimson Sweet as mid-vine length, and Charleston Gray, Jubilee, and Allsweet the longest vined. This same study found vine lengths for Charleston Gray to be 3.1 m (longest), 2.8 m for Crimson Sweet (intermediate), and 2.6 m for Sugar Baby (shortest) (8).

The objective of this study was to measure the vine length of a diverse set of watermelon cultivars that included bush type cultivars and varying flesh colors.

Methods. The experiment was conducted during the summer season of 2000 at the Horticultural Crops Research Station in Clinton, North Carolina.

The experiment had one replication, one measurement of vine length, one location and nineteen cultivars planted in single-row plots. Watermelon cultivars were either direct seeded into black plastic mulch and irrigated with plastic drip tape or into raised bare soil beds. Plots covered with plastic mulch were 3.7 m long, on 3.1 m centers with 0.6 m hills, and 2.4 m alleys at each end of the plot. Plots in bare soil were 6.1 m long, on 3.1 m centers with 1.5 m hills and 4.6 m alleys.

Nineteen cultivars were evaluated representing a range of vine lengths. Cultivars planted into plastic mulch included Garrisonian, Golden Honey, Klondike Striped 11, Mountain Hoosier, New Winter, and Stone Mountain. Cultivars on bare soil included Black Boy, Bush Charleston Gray, Bush Sugar Baby, Charlee, Fairfax, Klondike WR3, Picnic, Sugar Baby, Sugar Lee, Sweetheart, Tom Watson, Yellow Baby, and Yellow Crimson.

Cultivars were seeded on 1 May 2000 into plastic mulch and 25 May 2000 into bare soil. Three seeds of each cultivar were initially planted and were later thinned to one plant per hill. The experiment was conducted using recommended horticultural practices (Sanders, 1999). Plots were on raised beds of either bare soil or beds covered by black plastic mulch.

One measurement of vine length (in mm) was taken on 11 August 2000 for the cultivars on plastic and 17 August for bare soil, coinciding with fruit harvest stage. Vine length was measured from the base of each plant to the growing point of a main vine using a flexible metric tape. A main vine was chosen from those beginning close to the base of the plant and extending farthest from the base.

Results. Based on a replicated study in a field nearby, differences in vine length of less than 1 m probably are not significant between cultivars. When combined over both production methods (plastic

Table 1. Vine length of watermelon cultivars measured at Clinton, NC.

| Mulch/Cultivar | Flesh color | Vine type | Length (m) |
|--|---------------|-----------|------------|
| Black plastic | | | |
| Garrisonian | Red | Standard | 4.8 |
| Golden Honey | Salmon yellow | Standard | 6.8 |
| Klondike Striped 11 | Red | Standard | 7.4 |
| Mountain Hoosier | Red | Standard | 4.3 |
| New Winter | Red | Standard | 6.1 |
| Stone Mountain | Red | Standard | 5.7 |
| <i>Mean (black plastic)</i> | | | 5.9 |
| Bare soil | | | |
| Black Boy | Red | Standard | 2.8 |
| Bush Charleston Gray | Red | Bush | 2.7 |
| Bush Sugar Baby | Red | Bush | 1.2 |
| Charlee | Red | Standard | 5.6 |
| Fairfax | Red | Standard | 5.6 |
| Klondike WR3 | Red | Standard | 4.4 |
| Picnic | Red | Standard | 5.6 |
| Sugar Baby | Red | Standard | 3.8 |
| Sugar Lee | Red | Standard | 2.9 |
| Sweetheart | Red | Standard | 2.8 |
| Tom Watson | Red | Standard | 4.4 |
| Yellow Baby | Canary yellow | Standard | 3.7 |
| Yellow Crimson | Salmon yellow | Standard | 3.5 |
| <i>Mean (bare soil, bush types)</i> | | | 2.0 |
| <i>Mean (bare soil, no bush types)</i> | | | 3.8 |

^z Data are main vine length from 1 replication and 1 harvest date.

mulch and bare soil), the cultivar Klondike Striped 11 had the longest vines with a length of 7.4 m (Table 1). 'Bush Sugar Baby' was the shortest vined cultivar at 1.2 m. Although 'Bush Sugar Baby' had a shorter vine compared to cultivars having a standard vine length, the same could not be said for 'Bush Charleston Gray'. 'Bush Charleston Gray' (2.7 m) had a similar vine length compared to the standard vined cultivars Black Boy (2.8 m), Sugar Lee (2.8 m), and Sweetheart (2.8 m). Mean vine length was 5.9 m for cultivars on plastic mulch and 3.8 m for cultivars on bare soil.

Among cultivars planted into black plastic mulch, again 'Klondike Striped 11' had the longest vine length of 7.4 m while 'Mountain Hoosier' had the shortest (4.3 m). No bush type watermelon were planted in plastic mulch. Additionally no clear trend could be seen when comparing vine lengths based on cultivars differing in flesh color. The only salmon yellow cultivar planted to plastic mulch, 'Golden Honey', had a vine length of 6.8 m.

On bare soil, the cultivars Charlee, Fairfax, and Picnic all had the longest vine lengths with 5.6 m each. 'Bush Sugar Baby' had the shortest vine length of 1.2 m within all bare soil cultivars. Among non bush-type cultivars, 'Black Boy' and 'Sweetheart' were the shortest with 2.8 m each while 'Sugar Lee' had a similar vine length of 2.9 m. Cultivars with salmon yellow flesh had vine lengths close to the middle of the range in vine lengths for non-bush cultivars. Vine lengths for 'Yellow Baby' and 'Yellow Crimson' were 3.7 m and 3.5 m, respectively.

Conclusions. This survey of vine lengths showed a trend for higher vine lengths when cultivars were grown on plastic mulch than when grown on bare soil. Although some cultivars evaluated had a bush-type growth habit, they were not necessarily different in vine length than standard vine types. A large range in vine length was found for standard-vined cultivars (2.8 to 7.4 m) regardless of the growing environment. Even though slight border competition

effects have been found for watermelon, caution should be undertaken when choosing cultivars to be included in each trial, especially the bush-type cultivars.

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