Proc. Fla. State Hort. Soc. 116:138-139. 2003.

WATERMELON YIELD AND SIZE WHEN GROWN ON FOUR MULCH COLORS

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Additional index words. Citrullus lanatus, color mulch, drip irrigation, variety trial

*Abstract.***Six watermelon cultivars [*Citrullus lanatus* (Thunb.) Matsum & Nakai] were grown in a plastic mulch, drip irrigation system using four plastic mulch colors (red, blue, black, and silver). Plots were 45 ft long on 6 inch raised beds, 9 ft on center, with four replications in a randomized complete block design. Seeds were planted 19 Mar. 2002 plants transplanted to the field with 36 inch spacing on 12 Apr. Fruit were harvested 19 June. The overall average yield by cultivar ranged from 451 to 220 cwt/acre. The width ranged from 9 to 8.1 inches, length from 14.7 to 9.7 inches, and average fruit weight from 21.6 to 14.5 lb. There were no differences for the degrees Brix, but taste ranged from fair to good. Watermelon response to the four plastic colors differed by cultivar. Three cultivars had higher yields on red and black mulch, while one had highest yield on red, one on blue, and one on silver and blue. For the average yields for the six cultivars, there were no differences for red, blue, and black.**

Watermelons [*Citrullus lanatus* (Thunb.) Matsum & Nakai] are a profitable crop in Florida valued at $62.2 million in 2001-02 from 23,000 acres with an average yield of 330 cwt/acre (Fla. Agr. Stat. Serv., 2003). Plastic mulch has been used for over 15 years on high value crops such as strawberry (*Fragaria* × *ananassa* Duch.), tomato (*Lycopersicon esculentum* Mill.), pepper (*Capsicum annuum* L.), and melons (*Cucumis* and *Citrullis* spp.). Plastic mulch use has reduced loss of soil moisture, reduced weed pressure, reduced fertilizer leaching, and reduced fruit contact with the soil. Plastic mulch has been reported to increase watermelon stem growth and early and total yields (Bhella, 1988). The effects of mulch color on crop yield have been studied on several crops including tomato (Brown et al., 1992; Csizinszky et al. 1995; Decotea, et al., 1988, 1989; Diaz-Perez and Batal, 2002), calabaza (White, 2001) and pumpkin (White, 2002). Tomato responses to colored mulches have been found to be inconsistent, depending on the season, the year, the region (Csizinszky et al., 1995), and light reflecting properties (Decotean et al., 1989; Diaz-Perez and Batal, 2002). Due to different optical properties for the same color mulch, the general term of mulch color has been suggested to be inadequate (Diaz-Perez and Batal, 2002). The objectives of this study were to evaluate six watermelon cultivars' response to four plastic mulch colors in a spring production system in central Florida.

This research was supported by the Florida Agricultural Experiment Station, and approved for publication as Journal Series No. N-02383.

Materials and Methods

Watermelon cultivars: 'Tendersweet', 'Pinata', 'Desert King', 'Montreal', 'Yellow Rose', and 'Tastigold' were grown on four plastic mulches: red, blue, black, and silver. The silver mulch was a non-reflective mulch. Ampacet Corp., Tarrytown, N.Y., supplied the plastic mulch film. Before the plastic mulch was laid on 12 Mar. 2002 and transplanted to watermelons, 500 lb/acre of a 13-4-13 fertilizer was broadcast and incorporated into a Tavares-Millhopper fine sand. Six-inch raised beds were formed and the mulch laid with a 32 inch top. Beds were 9 ft on center, plants 3 ft apart, plots 45 ft long and replicated four times in a randomized complete block (RCB) design. Seeds were started in a greenhouse 19 Mar. 2002 and transplanted to the field on 12 Apr. 2002. Irrigation and additional fertilizer were supplied through drip tape. A 7-0-7-0.5 N-P-K-Mg liquid fertilizer was applied daily as scheduled in the Vegetable Production Guide for Florida 2001-2002 (Maynard and Olsen, 2002). Vine growth was noted at 4 and 8 weeks after transplanting. Harvest was 19 Jun. 2002. Individual marketable fruit weight, diameter, length, and a random sample of one fruit per replication was sampled for degrees Brix and taste. Data were analyzed by analysis of variance and means compared using Duncan's Multiple Range Test, 0.05 level (SAS Institute, 1999).

Results and Discussion

Early plant growth for watermelons grown on red, blue, black, and non-reflective silver plastic mulches measured at 4 and 8 weeks after transplanting was not affected (data not shown). Replication variability was too great to measure a difference at 4 weeks and there were no differences at 8 weeks after transplanting.

Yield by cultivar (Table 1) ranged from 220 to 451 cwt/acre, with 'Tendersweet' having a larger yield than 'Yellow Rose' and 'Tastigold'. 'Tendersweet' had the highest average

Table 1. Yield and size for six watermelon cultivars grown on plastic mulch, Apopka, Fla., 2002.

		Average fruit size		
Cultivar	Yield (cwt/acre)	Width (inches)	Length (inches)	Weight (lb)
Tendersweet	451 a[z]	9.0 a	14.7 a	21.6 a
Pinata	304 bc	8.3 b	14.4 a	19.3 ab
Desert King	285 bc	9.0 a	10.5 b	16.2 c
Montreal	271 bc	8.3 b	13.5 a	18.7 b
Yellow Rose	249 c	8.1 b	13.0 ab	16.5 bc
Tastigold	220 c	8.8 a	9.7 b	14.5 c

[z]Mean separation within columns by Duncan's Multiple Range Test, 0.05 level.

Table 2. Rind thickness, Brix, and taste for six watermelon cultivars grown on plastic mulch, Apopka, Fla., 2002.

Cultivar	Rind thickness (inches)	Brix (degrees)	Taste[y]
Tendersweet	0.70 bc[z]	8.7 a	good-fair
Pinata	0.85 ab	9.7 a	fair-good
Desert King	0.70 bc	7.7 a	fair
Montreal	0.74 a-c	9.8 a	good
Yellow Rose	0.66 bc	9.3 a	fair
Tastigold	0.80 ab	8.9 a	good

[z]Mean separation within columns by Duncan's Multiple Range Test, 0.05 level.
[y]One fruit from each replication was sampled by one person.

Table 3. Yield for six watermelon cultivars grown on four plastic mulch colors, Apopka, Fla., 2002.

	Yield (cwt/acre)						
Mulch color	Tastigold	Desert King	Pinata	Tendersweet	Montreal	Yellow Rose	Average
Red	314 a[z]	273 ab	480 a	350 b	335 a	220 ab	329 a
Blue	217 b	261 b	326 bc	617 a	202 b	256 a	313 a
Black	243 ab	343 a	310 bc	345 b	377 a	198 b	303 a
Silver	200 b	251 b	277 c	390 b	234 b	293 a	274 b

[z]Means separation within columns by Duncan's Multiple Range Test, 0.05 level.

weight (21.6 lb) and was greater than all except 'Pinata'. 'Tastigold' and 'Desert King' had the lowest average weight (14.5 and 16.2 lb, respectively). 'Tendersweet', 'Pinata', and 'Tastigold' were the melons with the largest width and 'Tastigold' and 'Desert King were the shortest, being almost round. Rind thickness (Table 2) ranged from 0.66 to 0.85 inches ('Yellow Rose' and 'Pinata', respectively). There were no differences in degrees Brix, but it ranged from 9.8 to 7.7. A taste test was made for each cultivar by replication (Table 2) and differences in taste were noted which followed but were not correlated with the Brix percent. There was a difference within the cultivar but the sample of one fruit per replication did not detect a difference. The taste scores ranged from fair to good.

The six watermelon cultivars in this study were affected differently by the four mulch colors when measured by marketable yield (Table 3). 'Tastigold', 'Desert King', and 'Montreal' had the highest yields when grown on red and black mulch. 'Pinata' had the highest yield on red mulch and the lowest yield on non-reflective silver mulch. 'Tendersweet' had the highest yield on blue mulch. 'Yellow Rose' had the highest yield when grown on non-reflective silver mulch, blue mulch, and red mulch.

The average yield for all cultivars by the four mulch colors was lower for only the non-reflective silver mulch (Table 3). Red, blue, and black plastic mulch colors did not affect the yields for the average of the six watermelon cultivars, but there were significant yield differences by color for individual cultivars. More work is needed to look at the responses to different color mulches by cultivars.

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