
The Effect of Fumigant and Mulch Type on Watermelon Yield and Fruit Size 97-18

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Introduction

Watermelon is a major Florida vegetable crop with 40,000 to 50,000 acres planted annually (Anon., 1997). Plasticulture has been widely adopted in watermelon production due primarily to higher early yields (Fletcher and Hochmuth, 1994; Hochmuth, 1989; Hochmuth, 1993; Olson et al., 1994). Florida growers have been able to fumigate under plastic mulch with methyl bromide and chloropicrin mixtures as allowed via section 18 of FIFRA. The use of methyl bromide has been essential for the control of both purple and yellow nutsedge in plastic mulch. Methyl bromide is scheduled to be phased out by the year 2005 due to implications of ozone depletion. Uncontrolled, nutsedge plants are able to pierce through the plastic and compete with the watermelon crop for water, nutrients, and light.

Paper mulches have been tested at the North Florida Research and Education Center - Suwannee Valley (Hochmuth and Hochmuth, 1994f). One benefit of paper mulch utilization has been the control of nutsedge. The paper resists the puncture of the nutsedge blade tips. As a result, the nutsedge is suppressed for as long as the paper lasts. Nutsedge is only able to emerge through the plant holes.

This trial was conducted to evaluate alternative mulching and fumigation programs for the production of watermelon.

Materials and Methods

Plots were established in a Lakeland fine sand at the North Florida Research and Education Center - Suwannee Valley near Live Oak, Florida. Pre-plant soil tests (Mechlich-1 extract) showed 46 ppm P, 28 ppm K, 29 ppm Mg, and 375 ppm Ca. Soil pH was 6.5 using a 1:2 (soil:water) solution. The soil was fertilized prior to planting with 500 lbs/A of 13-4-13 (N-P₂O₅-K₂O) on 6 March 1997. The crop also received an additional 90 lbs/A of N and K₂O via weekly fertigations April 14 to June 2. Beds were formed on 7.5 ft centers. The beds received one of three fumigation treatments on 10

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March: no fumigation, chloropicrin at a broadcast rate of 150 lbs/A, or a mixture of 98% methyl bromide: 2% chloropicrin at a broadcast rate of 400 lbs/A. Drip irrigation tape was laid in a one-inch deep open groove in the center of the bed. Half of the plots had polyethylene mulch applied and the other half paper mulch. Edison 1.5 mil black polyethylene mulch was used in the plastic mulch treatments. Appleton black paper mulch was used in the paper mulch treatments. Final beds were 24 inches wide and 6 inches high.

Plots 45 ft were established on the beds. Treatments were arranged in a randomized complete-block design with four replications. Transplants of the cultivar 'Carnival' were planted on 28 March 1997 in one row per bed spaced 36 inches apart.

Plots were irrigated by drip irrigation using a tensiometer as a scheduling aid. Water was applied to maintain a soil moisture tension of -8 to -12 centibars at 12 inch soil depth. Insects and diseases were managed in accordance with a recommended spray program.

Mature fruit were harvest on four dates: June 6, 9, 16, and 26. The weight of each marketable fruit was recorded. Data were analyzed using analysis of variance.

Results and Discussion

Watermelon yields in paper and plastic mulch treatments were similar at approximately 450 cwt/A (Table 1). No significant difference was found between paper and plastic mulch treatments for number of fruit per acre, total yield, or average fruit weight.

Fumigant treatments, likewise, had no effect on yield or average fruit weight. Nutsedge was able to grow in plastic mulch plots where no fumigation or chloropicrin was used. No nutsedge grew in paper or plastic mulch plots where methyl bromide was used. All paper mulch plots alone prevented nutsedge from piercing through the paper mulch.

These trial results indicate further work should be continued to evaluate paper mulch and alternative fumigants in watermelon production. Alternative methods of controlling nematodes and nutsedge are going to be important in watermelons grown in plasticulture without methyl bromide.

Literature Cited

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Trial Cooperators

Hendrix and Dail - Fumigant
7610 US Hwy 41 N, Palmetto, FL 34221

Roberts Irrigation Products, Inc. - Drip Tape
700 Rancheros Drive, San Marcos, CA 92069-3093

IMC Rainbow - Fertilizer
PO Box M, Tifton, GA 31793

Table 1. The effect of fumigant and mulch type on watermelon yield and fruit size at Live Oak, FL during spring 1997.

Fumigant	Mulch Type	Total Yield		Avg. Fruit Weight (lbs)
		No. Fruit/A	Cwt/A	
	Paper	2850	466	14.7
	Plastic	2678	435	16.1
	Significance (p=0.05) ^z	NS	NS	NS
<hr style="border-top: 1px dashed black;"/>				
No Fumigant		2614	416	13.8
Chloropicrin		2823	469	16.3
Methyl bromide: Chloropicrin (98:2)		2856	467	16.0
Significance (p=0.05) ^z		NS	NS	NS

Z Treatment effects were not significant (NS) at the 5% level.