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Rowcovers Improve Seedless Watermelon Yields in an Intensive Vegetable Production System

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Summary. Using an intensive vegetable production system of grain-strip windbreaks, plastic-mulch-covered planting beds installed with drip irrigation tubing, and fertigation through the drip system, >67,000 lb/acre (75,000 kg·ha⁻¹) of seedless watermelons were produced. A floating row cover increased the yield by 14,000 lb/acre (16,380 kg·ha⁻¹) by increasing earliness. The row cover also improved initial transplant survival. Earliness and the additional income generated from improved production should provide economic justification to growers considering floating row covers.

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Seedless watermelons have become more popular in recent years, and projections indicate significant growth potential for this specialty melon (Karst, 1990). Because of high seed costs, poor germination under suboptimal conditions, and slow growth in cool weather with seedless watermelon, an intensive production system using transplants seemed ideally suited to this crop. Benefits of rowcovers in improving the growing environment have been shown for several crops, but some limitations, including wind abrasion to melon transplants, have been reported (Wells and Loy, 1985). Early yields of watermelon have been enhanced with rowcovers (Miller, 1989).

Seeds of 'King of Hearts' seedless watermelon and 'Mirage' seeded melon were sown on 16 Apr. 1990 in Todd styrofoam planter flats (1.5-inch cell size). Field research was conducted at the Kansas State Univ. Horticulture

Research Center, Wichita. A solidly planted cover crop of oats was tilled into areas ≈ 45 ft wide, with a 5-ft strip of rye seeded to serve as a windbreak. Fertilizer was broadcast over the planting area at the rate of 250 lb/acre (280 kg·ha⁻¹) of 13N-13P-13K. On 24 Apr., planting beds were formed, drip irrigation tubing was installed, and beds were covered with 1.25-mil-thick black embossed polyethylene mulch. Plots consisted of three replications of five rows (on 5-ft centers) of seedless melons and two rows of 'Mirage' seeded melons used as a pollinizer with 14 plants per row spaced at 20-ft intervals. Agronet (CDK Intl., Marietta, Ga.) polypropylene rowcovers 42 ft wide were applied immediately after transplanting and were removed on 4 June, 33 days after application. One week after transplanting, missing plants were replanted in the noncovered plots only. The row-covered plots were not replanted. Average vine length for covered plants was significantly longer ($P = 0.01$) for covered plants when rowcovers were removed, and averaged 27 inches compared to 22 inches for uncovered plants.

Watermelons were harvested first on 13 July, with harvest continuing until 29 Aug. July harvest consisted of melons harvested on 13 and 25 July and early August harvests on 1 and 5 Aug. More fruit by count and weight were harvested in the July and early August harvests for the covered plot, making the total harvest larger (Figs. 1 and 2). Plant survival was improved by

Fig. 1. Number of fruit per acre of 'King of Hearts' seedless watermelon, influenced by floating plastic row covers in an intensive vegetable production system.

Fig. 2. Weight per acre of 'King of Hearts' seedless watermelon, influenced by floating rowcovers in an intensive vegetable production system.

Fig. 3. Transplant survival 1 week after transplanting and when rowcovers were removed ~1 month after transplanting (final) for seedless watermelon plants as influenced by a floating rowcover. Uncovered plots were replanted to 100% stand after 1 week, while covered plots were not replanted.

rowcovers from 86% to 93% for non-covered and covered plots, respectively (Fig 3). An additional 5% of the plants in noncovered plots died after replanting the noncovered plots to a 100% stand.

The production system used water and fertilizer supplied to the plots through the drip system. Watering and fertigation were begun on 17 May and 6 June, respectively, with the drip system operated for a total of 93 h, for an

average operation of 48 min/day. Water applications were started and stopped by tensiometers at 6- and 12-inch depths, with soil water potential maintained at -0.02 bars. Total nitrogen, supplied as ammonium nitrate, during the fertigation period was 8 lb/acre (9 kg·ha⁻¹). The dense vine growth eliminated any between-row weed competition. The harvested tits were clean and of high quality, with °Brix measurements of 11.5 to 12.

The wide rowcovers were easy to apply, remained in place with no damage, and did not cause any significant plant injury from abrasion. The cost of the wide rowcover at about \$840/acre (\$944/ha) may be cause for some grower apprehension. However, the additional 14,000 lb of watermelons harvested should pay for the cost of the covers, even if melons are sold at ≈ 6¢/lb. Some yearly variation in the advantage of wide rowcovers should be expected, especially in the variable climate of the Great Plains region. Additional benefits of improved transplant survival and reducing the labor of replanting make wide rowcovers an additional advantage for use with this crop.

Literature Cited

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