

Optimum Planting Dates for Intercropped Cucumber, Squash, and Muskmelon with Strawberry¹

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Introduction

Florida is the second largest strawberry-producing state in the U.S. The growing season takes place between October and March with a planted area of approximately 7400 acres and a gross sales value of \$239 million (U.S. Department of Agriculture, 2007). Although market prices usually determine the length of the strawberry season, most growers agree that early yields provide the highest profits per unit, with prices generally declining at the end of February.

The majority of strawberry growers in Florida plant a second crop between 4 and 6 weeks before the end of the season to take advantage of the existing mulch beds, residual fertilizer, drip irrigation lines, and low pest pressure. Among the most frequently intercropped species are cucumber, summer squash, and muskmelon, all of which are directly seeded between double rows of strawberries. Intercropping allows growers to have earlier access to cucurbit markets than they would if they planted each crop separately (Duval, 2005). Previous research showed that when cucumber, summer squash, and muskmelon are planted during the last week in

February (31 days before the end of the strawberry season) there is no significant reduction of strawberry yields (Duval, 2005). However, the effect of different planting dates on the yield of the second crops was not addressed.

Another important issue is the weather during January and February in Florida, when freezing temperatures regularly occur. There is a current tendency among growers to intercrop earlier than the last week in February. However, no research has been conducted to address the possible benefits or drawbacks that may be associated with this practice. Early cucurbit planting could expose young seedlings to unfavorable growing conditions. The objective of this study was to determine the most appropriate planting dates for cucumber, summer squash, and muskmelon intercropped with strawberry, and the effect of intercropping on strawberry yields.

Intercropping Planting Dates

Two field studies were conducted at the Gulf Coast Research and Education Center of the University of Florida on a Myakka fine sandy soil with 1.5% organic matter and pH 7.3. Fields were

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planted on 6 October 2005, and 4 October 2006 with bare-root transplants of 'Strawberry Festival'. Planting beds were 32 inches wide at the base, 28 inches wide at the top, 8 inches high, and spaced 4 ft apart on centers. Pressed beds were fumigated with methyl bromide plus chloropicrin (67:33 v/v) at a rate of 350 lb/acre, fertilized with 50 lb/acre of a 15N-0P-25K granular formula, and covered with black, high-density polyethylene mulch. A single-drip irrigation line was buried 1 inch deep on the bed center. Plant nutrients were supplied to the crop through the drip lines following statewide recommendations (Peres et al., 2006). Overhead sprinkler irrigation was used for freeze protection. During 2006, there were two freezing events on 13 and 14 February, and the following season freezing temperatures occurred on 17 February. Average monthly temperatures surpassed 60°F after March in 2006 and 2007, steadily increasing over time and reaching a maximum of 95°F in June during both seasons.

Seeds of 'Straight Eight' cucumber, 'Crookneck' summer squash, and 'Athena' muskmelon were planted 15 days apart on 25 January, 9 February, 23 February, 9 March, and 23 March. Each species was planted in separate experiments. Cucumber seeds were planted 1 ft apart, while summer squash and muskmelon were established 2 ft apart. To determine the effect of the intercropped species on strawberry, strawberry marketable yields were collected on each plot beginning on 25 January (16 harvests), regardless of the planting dates. Marketable fruits of cucumber and summer squash were collected six times, whereas muskmelon plots were harvested four times.

The results showed that none of the three intercropped species affected strawberry yield up to 60 days before the end of the season on 25 March (data not shown). This confirms and expands previous results, indicating that the competition of these cucurbits against strawberry is negligible when the plants are at least 12 weeks old (Duval, 2005). Planting dates significantly affected cucumber, summer squash, and muskmelon yield. Cucumber yield increased rapidly from 25 January to 23 February (approximately 67%), reached the

maximum yield between 23 February and 9 March, and declined with later plantings (Figure 1).

Warmer temperatures seemed to favor summer squash yield, which performed better at or after 23 February (Figure 2). Planting the crop as early as 25 January reduced yields by 36%, in comparison with yields obtained from plots planted on 23 February. There were no significant yield differences among the 23 February, and 9 and 23 March planting dates. The opposite tendency was observed with muskmelon, whose yield reduced as temperatures increased (Figure 3). The largest production was measured when the crop was planted either on 25 January and 9 February. Yields from these crops were 27% higher than the predicted yield for the 23 February planting date.

In summary, planting dates caused very distinctive responses of the three cucurbit species tested in this study. Cucumber and summer squash seemed to benefit from planting under the later warmer temperatures, whereas muskmelon thrived under earlier plantings during cooler weather. It is worth noting that the muskmelon growing season is at least 20 days longer than those for cucumber and summer squash, which exposes reproductive vines to excessively high temperatures (>90°F) in May and June, potentially causing flower abortion and low pollination. Thus, growers would benefit by planting muskmelon early.

Literature Cited

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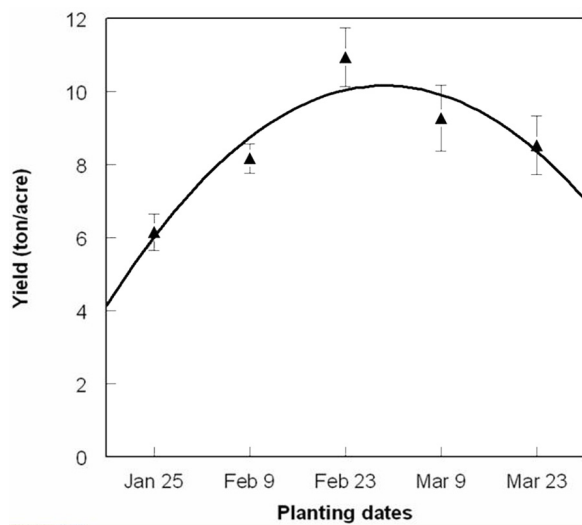


Figure 1. Effects of planting dates on the yield of intercropped cucumber with strawberry.

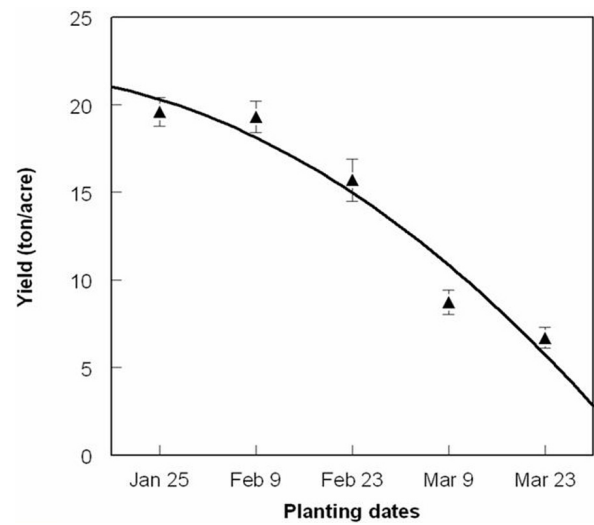


Figure 3. Effects of planting dates on the yield of intercropped muskmelon with strawberry.

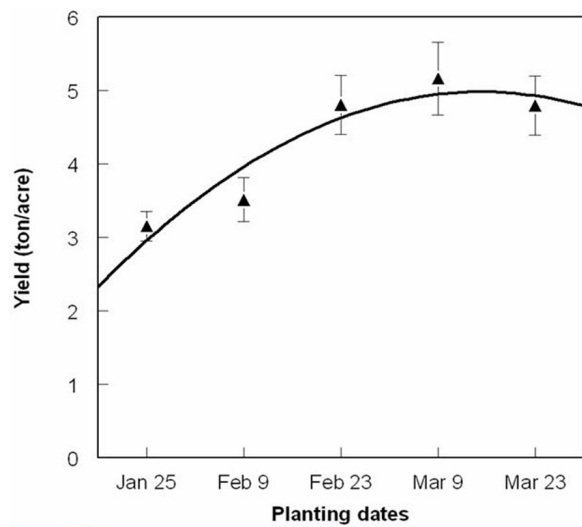


Figure 2. Effects of planting dates on the yield of intercropped summer squash with strawberry.