

INFLUENCE OF BLACK PLASTIC MULCH, BARE GROUND, AND NO-TILL SYSTEMS ON YIELD OF SUMMER SQUASH

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ABSTRACT

The use of plastic mulches and drip irrigation for vegetable production has increased in Southern New Jersey over the past decade due to the need for earlier production, increased yields, in-row weed control, and water conservation. Vegetable farms in Southern New Jersey have adopted the use of plastic mulches for production of summer squash based on benefits of the system mentioned above. However, this system may introduce some problems: disposal of the plastic mulch and possible increase in soil borne diseases. Using plastic mulch with drip irrigation keeps soil moisture levels higher than in bare ground fields that are overhead irrigated, and thus, creates a more favorable environment for disease organisms like *Phytophthora* spp. and *Pythium* spp.

Alternative production practices of conventional bare ground and no-till/organic mulch were investigated in 1997. Squash seeds were hand planted on 28 August with two seeds per hole and hand thinned to one plant per hole on 11 September. Three treatments, Black Plastic Mulch (BPM), Bare Ground (BG), and No-till (NT) using a rye-hairy vetch killed mulch were evaluated to determine yield for late season zucchini (*Cucurbita pepo* cv. *tigress*) and yellow squash (*Cucurbita pepo* cv. *monet*). Drip irrigation was used for the BPM treatments and solid set, overhead irrigation was used on the BG and NT treatments. The experimental design consisted of three replicates, three tillage treatments (main plots) of BPM, BG, and NT, and subplots of zucchini and yellow squash. Chlorothalonil (Bravo 720) and Benomyl (Benlate 50 WP) were applied to control Powdery Mildew. Endosulfan (Thiodan 3EC) was used to control cucumber beetle. Weed control was done using Bensulide (Prefar 6E) applied pre-emergent.

A subjective evaluation of weed pressures in the NT treatments showed low levels compared to BPM and BG treatments due to suppression by the killed mulch. Although irrigated, disease pressures in all treatments were low due to insufficient rainfall and low humidity throughout the 1997 growing season. Therefore, diseases were not a concern in this trial. Because disease was not a factor, tillage systems were evaluated for yield only. Squash plants on BPM grew faster and were initially larger than plants grown under BG and NT conditions. This may be due to greater soil warming under the BPM. The data has shown no statistical difference in yield among the three treatments. We conclude that BG and NT systems have no benefit in increasing yield for zucchini and yellow squash compared to BPM when there is no disease pressure present from *Phytophthora* diseases and *Pythium* diseases.

Key Words: Zucchini, Yellow Squash, Rye-Vetch Killed Mulch

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Table 1. Yield results from zucchini and yellow squash.

ZUCCHINI SQUASH RESULTS		
TILLAGE TREATMENT	YIELD IN TONS/ACRE	YIELD IN BOXES/ACRE
Black Plastic Mulch	10.69 a *	2,138 a
Bare Ground	8.73 a	1,746 a
No-Till	8.66 a	1,732 a
YELLOW SQUASH RESULTS		
TILLAGE TREATMENT	YIELD IN TONS/ACRE	YIELD IN BOXES/ACRE
Black Plastic Mulch	6.21a	1,242 a
Bare Ground	3.99 a	798 a
No-Till	4.30 a	860 a

*Means followed by the same letter do not differ significantly according to Duncan's Multiple Range Test (P=0.05).