

Effect of Four Weed Management Systems on Soil Quality in Junebearing Strawberry Production

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Introduction

Few herbicides are registered for use in Junebearing matted-row strawberry culture. This study was conducted to explore alternative methods of weed management that are both economically and environmentally sustainable. The experiment evaluated the effects of two conventional and two alternative weed management systems on soil quality in Junebearing matted-row strawberry production. The experiment began in 2004 and was completed after the 2007 strawberry harvest.

Materials and Methods

The experiment consisted of four weed management treatments in a randomized complete block design with four replications. The experimental plots were 30 × 30 feet (9.1 × 9.1 m). Plots contained seven rows of strawberries spaced 42 in. (1.1 m) apart, center-to-center. Dormant crowns of Jewel Junebearing strawberries were planted on June 1, 2004. Experimental treatments were, 1) living mulch of sorghum-sudangrass hybrid between matted rows, 2) compost + corn gluten meal + straw mulch between matted rows, 3) methyl bromide fumigation + herbicide, and 4) conventional herbicide.

Results and Discussion

In 2007, yield data were obtained for this experiment. In the first two years of bearing (2005 and 2006), plots with the fumigation treatment had the highest yield, followed by the herbicide treatment and compost + corn gluten meal + straw mulch treatment. Living mulch had the lowest yield (data not presented). In 2007, after three years of treatment application,

strawberry yield from all treatments were similar (Table 1). From strawberry plant data combined from 2005 and 2006, strawberry plant number and crown number were similar between the herbicide and fumigation + herbicide treatments, between the straw mulch and fumigation + herbicide treatments, and between the living mulch and straw mulch treatments (Table 2). Petiole number was highest in the herbicide and fumigation + herbicide treatment plots and was lowest in the living and straw mulch plots. Strawberry crown weight was similar between the herbicide and fumigation + herbicide treatment plots, between the herbicide and straw mulch plots, and between the living and straw mulch plots. The alternative weed management practices investigated by this research, straw mulch or living mulch, provide adequate weed control and do not reduce soil quality (data not presented). However, their negative effects on strawberry yield and plant growth indicate that more research is needed on these techniques before they can be recommended. Future research can investigate which biological properties are the most effective indicators of soil quality and strawberry plant performance.

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Table 1. Strawberry yield and plant growth measurements as affected by four weed management treatments in a Junebearing strawberry experiment, 2007.

Treatment	Yield (kg:0.31 m ⁻¹)	Berry number (no.:0.31 m ⁻¹)	Berry weight (g)
Herbicide	3.4 ^z	37.5	9.1
Fumigation + herbicide	3.4	37.4	9.0
Living mulch	3.3	35.6	9.3
Straw mulch	3.0	33.3	9.1
LSD ^y	NS	NS	NS

^zMeans of four replications.^yLeast significant difference @ P < 0.05; Means in the same row with the same letter are not different. NS=not different.**Table 2. Strawberry plant growth measurements as affected by four weed management treatments in a Junebearing strawberry experiment, 2005-2006.**

Treatment	Petiole number ^z	Strawberry plant number ^z	Strawberry crown weight ^z (g)	Strawberry crown number ^z
Herbicide	142.2 ^y a	16.2 a	40.8 ab	22.7 a
Fumigation + herbicide	136.2 a	14.8 ab	42.9 a	19.4 ab
Living mulch	107.4 b	10.9 c	30.9 c	15.3 c
Straw mulch	106.5 b	12.4 bc	33.7 bc	16.4 bc
LSD ^x	18.6	2.8	7.4	3.7

^zPetiole number, strawberry plant number, strawberry crown weight and number means were obtained from plant materials obtained from three randomly placed 0.093 m² quadrats.^yMeans of four replications.^xLeast significant difference @ P < 0.05; Means in the same row with the same letter are not different.