

2012

Influence of Multiple Layers and Polyethylene Mulch Color to Increase Day-neutral Strawberry Production

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Recommended Citation

Fontinel, Tabitha; Nonnecke, Gail R.; and Portz, Dennis Nicklas, "Influence of Multiple Layers and Polyethylene Mulch Color to Increase Day-neutral Strawberry Production" (2012). *Iowa State Research Farm Progress Reports*. 44.
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Influence of Multiple Layers and Polyethylene Mulch Color to Increase Day-neutral Strawberry Production

Abstract

Annual production systems of day-neutral strawberries bear fruit in the late summer and fall providing high value, off-season fruit in the year of planting. Newer cultivars developed in California are bred to grow in longer and cooler growing seasons. Iowa's cool springs with higher summer temperatures and the added risk of early frost in the fall can truncate strawberry production, thereby requiring production systems to achieve high yields in the field during the growing season. Soil mulches offer the potential to manipulate soil temperature and increase yields through the use of different colors and numbers of layers. The primary goal of this project was to evaluate differences in total yield of Albion day-neutral strawberry grown in three soil mulch treatments that included different colors and length of time the mulch layers remained on the planting.

Keywords

RFR A1139, Horticulture

Disciplines

Agriculture | Fruit Science | Horticulture

Influence of Multiple Layers and Polyethylene Mulch Color to Increase Day-neutral Strawberry Production

RFR-A1139

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Introduction

Annual production systems of day-neutral strawberries bear fruit in the late summer and fall providing high value, off-season fruit in the year of planting. Newer cultivars developed in California are bred to grow in longer and cooler growing seasons. Iowa's cool springs with higher summer temperatures and the added risk of early frost in the fall can truncate strawberry production, thereby requiring production systems to achieve high yields in the field during the growing season. Soil mulches offer the potential to manipulate soil temperature and increase yields through the use of different colors and numbers of layers. The primary goal of this project was to evaluate differences in total yield of Albion day-neutral strawberry grown in three soil mulch treatments that included different colors and length of time the mulch layers remained on the planting.

Materials and Methods

In May 2011, dormant crowns of Albion day-neutral strawberry were planted in three replicated plots at the ISU Horticulture Research Station, Ames, Iowa. Strawberry plants were spaced 10 in. within the row and between rows in a triple row on the three soil mulch treatments (Pliant Corporation, GA). Rows were spaced six ft apart on center. The three polyethylene soil mulch treatments included: 1) silver (metalized) on white only (one layer with silver on top) – SO; 2) olive mulch placed over a layer of silver (metalized) on white mulch placed over a layer of olive

polyethylene (three mulch layers) – OSO. The top layer (olive) was removed when soil temperatures exceeded 65°F to expose the silver over white mulch layer. The silver over white layer was removed when soil temperatures were less than 60°F in the fall to expose the olive layer; 3) black mulch placed over a layer of silver (metalized) on white mulch placed over a layer of olive mulch (three mulch layers) – BSB. The top layer (black) was removed when soil temperatures exceeded 65°F to expose the silver over white mulch layer. The silver over white layer was removed when soil temperatures were less than 60°F in the fall to expose the black mulch. In all treatments, flowers were removed for six weeks after planting. Runners were removed throughout the season. Water was provided at 1 in. per week by rainfall or through irrigation with rural water. Data variables collected included total berry yield and average berry size, and were collected from five random plants within each plot.

Results and Discussion

There were no differences among polyethylene soil mulch treatments in total number of fruit, total yield, or average berry size (Table 1 and Figure 1) for the entire growing season. Additional layers of mulch were not beneficial for increasing production in this study. However, when temperatures were slightly higher in August and early September, the additional layer of polyethylene mulch in treatments of BSB and OSO may have kept soil temperatures lower, resulting in greater yield during that time. Data suggest that additional colored layers of mulch do not improve production over the entire growing season, however they may help cool the soil during warmer periods.

Acknowledgements

We thank the Horticulture Research Station for support and maintenance of research plots.

Table 1. Total yield of Albion day-neutral strawberries grown in plots with one of three treatments of polyethylene soil mulches.

Polyethylene mulch treatment	Number of berries	Total weight of berries (kg)	Average berry size (g)
1) Silver/white polyethylene mulch only – SO	175 ^{zy}	1.6	9.0
2) Olive over silver/white over olive polyethylene – OSO	128	1.2	8.7
3) Black over silver/white over black polyethylene – BSB	156	1.4	8.9
LSD $P \leq 0.05^x$	NS	NS	NS

^zAverage of five plants over the entire growing season.

^yMeans are averages of three treatment replications.

^xLeast significant difference at $P \leq 0.05$.

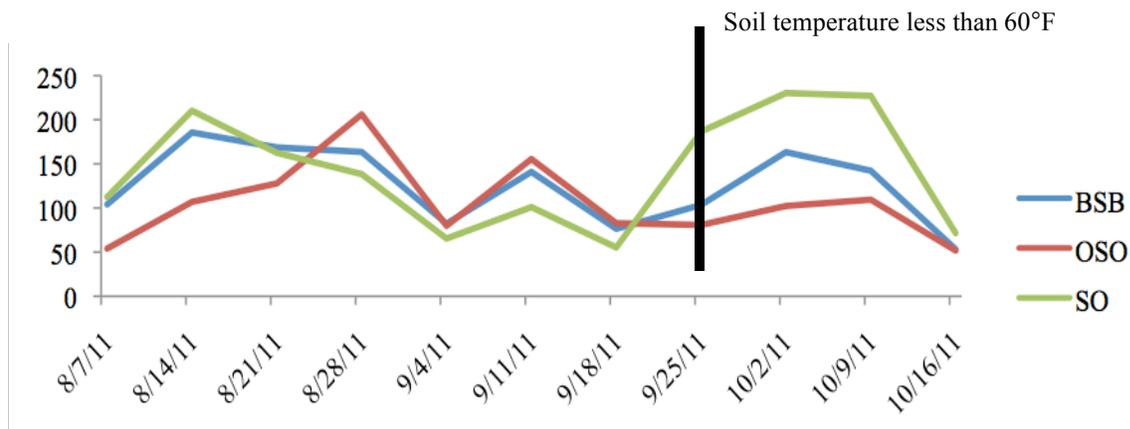


Figure 1. Total yield (g) of five plants from day-neutral strawberries grown in plots with one of three treatments of polyethylene soil mulches over the season.