

Optimizing Day Neutral Strawberry Growth

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Production of strawberries using new varieties of day-neutral strawberry varieties has provided an opportunity for growers to market a fresh local product at a high retail value. These varieties have potential to perform well in an annual plasticulture system, but until recently little research has been conducted on managing annual day neutral plants.

Beginning in 2006, growers in Garrett County, Maryland began using cultivars such as 'Seascape', 'Evie 2', 'Evie 3' and 'Everest' to produce summer fruit. They are using an annual system starting with a large plug plants that are planted ideally by the end of April. The plants are set in a typical double row raised bed plasticulture system. The plants are planted 12 inches apart in the row and the rows are 12' apart. Fruit production in these systems has been as high as 27,000 pounds per acre (1.8 pounds per plant). Fruit production generally begins the first part of July and will continue until the ended by frost. In our high elevation (2600') cool summers provide ideal growing conditions and we do not experience the summer shut down often associated with trying to produce day neutral strawberries elsewhere.

Since producing annual planted day neutral strawberries from plug plants is a relatively new production method in the US, many of the production practices recommended to growers were based on methods that have worked well in other locations or systems. One practice often recommended to producers is to remove blossom trusses after planting for a period of time, as is done in Europe. Theoretically, this practice would be to allow the plant to establish well before fruit production begins. In 2007, we established two research plots to determine if flower blossom removal after planting had any affect on total fruit production and fruit size. The variety 'Seascape' was used for this research. The plants were planted on May 14th. After planting, three groups of 20 plants were randomly selected from each of three rows. Blossoms were removed up to three different dates after planting.

Fruit production for the various treatments began on:

Treatment #1= remove blossoms until June 1st – first fruit ripe July 2nd,

Treatment #2= remove blossoms until June 14th – first fruit ripe July 10th,

Treatment #3= remove blossoms until July 2nd – first fruit ripe July 17th.

While the treatments did have an affect on when plants started to fruit (above); treatments had no effect on total annual fruit production (weight/plant)(Table 1). The only significant difference found was that of mean berry weight at site 101. At this site, the mean berry weight was significantly lower for treatment #3.

Table 1 - Blossom Removal Experiments

	Site 101		Site 102		Combined*	
	Wt per plant (g)	Mean Berry Wt. (g)	Wt per plant (g)	Mean Berry Wt. (g)	Wt per plant (g)	Mean Berry Wt. (g)
#1 Removed until June 1	835	9.0a	413	10.5	624	9.8
#2 Removed until June 14	845	8.7a	440	9.7	642	9.2
#3 Removed until July 2	815	8.3b	481	11.1	648	9.7
p(F)	0.79	0.0162	0.29	0.28	0.68	0.33
Site 101					832a	10.4a
Site 102					445b	8.7b
p(F)					<0.0001	0.0439

- Site by blossom removal treatment interaction not significant, so sites can be combined (interaction sig. at p(F) = 0.32 for wt per plant, and 0.089 for mean berry wt, respectively).

Summary: producers need not remove flowers after the plug plants are planted in Spring. This will represent a savings in the labor required to establish spring planted day neutral strawberry plants. The only advantage to flower removal would be to delay fruit production to target a certain market. This research demonstrates that removing the flowers neither hurts or helps overall production; however, it should be noted that flowers were removed when plants were in the plugs at the nursery. We continue to recommend flower removal at the nursery.

Another untested production practice that has been recommended for summer strawberry production is that of using aluminized plastic. Black plastic mulches have been shown to increase soil temperatures around 5⁰F. Black plastic mulches would be favorable for plant establishment during cool spring weather but may reduce production during hot summer weather. Aluminized reflective mulch has been shown to decrease soil temperatures by 2-4⁰F at 2-3 inch deep soil levels. During hot summer days, the cooler soil temperatures would be desirable for strawberry production. In Garrett County where the springs are often very cool and the summer temperatures are milder than most other strawberry production areas, it is questionable if strawberries produced on aluminized plastic will out yield strawberries grown on black plastic. Aluminized plastic has a higher cost to the producer of about \$400.00 per acre.

We established two research plots to compare fruit production of annual plug planted day neutral strawberries on three different colors of plastic mulch, black, reflective aluminized, and white. The plants are planted in a typical 12 inch double row raised bed plasticulture system. Three twenty plant blocks were randomly selected in each of the different plastic color rows. Soil temperatures were taken with a probe at 3" deep during each harvest time. The variety for the research was 'Evie 2' and the planting date was May 14th.

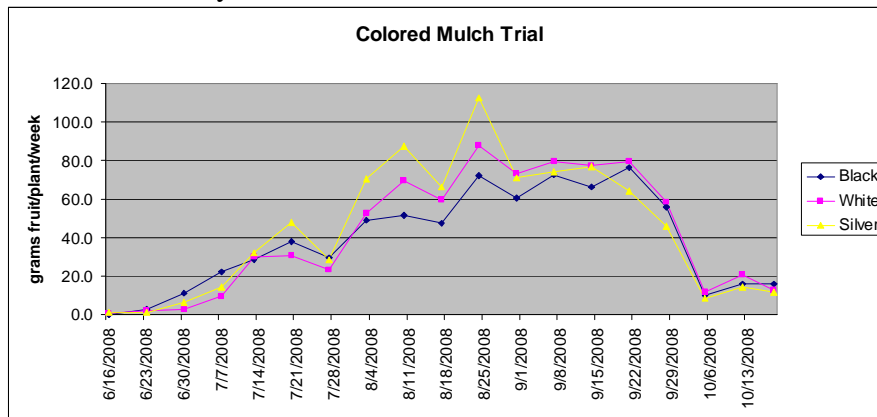
Data collection from one of the sites was interrupted during the summer, therefore the data is only being presented from one site which did not allow for statically analysis of the research. At the remaining site, however, increased production was observed on the aluminized plastic. The production per plant on aluminized plastic was 792 grams with an average berry size of 13.7 grams. The average production per plant is given in table 2 below. Soil temperatures under the black plastic were lower than expected. This might be explained by the fact that the plastic was not tight to the bed due to rocky soil conditions.

Table 2

	Grams/plant	Average Berry Size	Soil Temp. °F
Black	689g	13.2g	71.5
White	743g	13.3g	73.3
Aluminized	792g	13.7g	69.7

Early fruit production was slightly higher on black plastic during the later part of June and early July, however in mid summer, production on the aluminized plastic was greater. Table 3 shows the weekly production of the various colors. The important question would be if the additional cost of the aluminized plastic would be economical over black plastic. At a plant population of 15,000 plants per acre, an average marketability of 70%, and a value of \$3.00 per pound, the value of an acre of strawberries planted on aluminized plastic would be \$7,119.00 higher than that produced on black plastic and \$3,385.00 higher than that produced on white plastic. From our observations the extra cost per acre of aluminized plastic (\$400.00 per acre) would be a profitable investment. The disadvantage to growers of small plots is that they would have a higher initial investment in a roll of aluminized plastic that may be used for several years and that the aluminized plastic may not be available from local suppliers.

Table 3 – Weekly Production on Various Colors of Plastic Mulch



Willie Lantz has served as the Agriculture and Natural Resources Extension Educator for the Garrett County office of Maryland Cooperative Extension located in Oakland, MD for the past four years. Willie is a native of nearby Preston County, WV where he grew up on a dairy farm. Willie has a BS and MS in Agriculture Education from West Virginia University. Willie worked for 11 year as the Agriculture Management Instructor

for the University of Maryland's Institute of Agriculture teaching courses at Garrett College. While at Garrett College, Willie started the Alternative Agriculture Center which operated demonstrational enterprises in the area of alternative agriculture. Willie's main emphasis in his Extension work has been on sustainable agriculture enterprises. The research presented here is part of a three year grant entitled "An Integrated Approach to Developing a Day-Neutral Strawberry Production Industry" which was funded by Northeast SARE. The other investigators in the grant are Kathy Demchak, Penn State and Dr. Harry Swartz, University of Maryland.