Strawberry Field Research Studies 2015

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Plasticulture strawberry production is becoming more popular as a way for Ohio growers to extend the strawberry harvest and marketing season, thus capturing a great profit from the demand for local strawberry production. One of the main advantages of the system is a potential earlier harvest providing a competitive edge in the market place relative to conventional matted row production systems. Other potential advantages include potentially higher yield and reduced environmental impact from a simpler pest management system; enhanced food safety and fruit quality issues and reduced harvest labor costs due to increased harvesting efficiency. Challenges include: lack of experience with the system among growers, Extension personnel and researchers, production costs, winter protection techniques, soil fumigation methods and adaptability of suitable varieties to Ohio's climate.

Objectives of research study:
These 2015 field research trials investigated potential season extension and production improvements in Ohio plasticulture strawberry production. Previous research has identified a functional and profitable system, but new variety testing, new season extension techniques and winter row cover management still need to be explored and optimized to maximize grower financial returns.

Scope of Research:
Field trials were established and located in southern Ohio at the Piketon Research & Extension Center at Piketon, Ohio (latitude 39.05° N, longitude 83.00° W, elevation 578 ft.). The field soil is designated as a Doles (DoA)-Omulga (OmA) silt loam soil with 0–3% slope. At each harvest yield data and fruit quality attributes were observed and recorded. Plant growth characteristics, fruit quality attributes, insect and disease susceptibility and tolerance and winter injury percentages were monitored and recorded.

Methods:
Fall 2014 planting
Strawberry tips were stuck on August 5, 2014 into 50 cell plug trays containing Metro Mix 360 soilless media and placed on weed mat fabric under mini wobblers during the month of August. Planting media was kept moist using an electronically timed misting schedule to promote root development. The resulting plugs were transplanted to the field on September 15, 2014 by waterwheel transplanter and watered in with 20-20-20 water soluble starter fertilizer. Strawberry plants were planted in double rows with 12 inches between rows and plants. Field preparation included application of 90 pounds per acre of nitrogen, phosphorus, and potassium pre-planting, and pre-formation of raised beds. Chateau herbicide was applied prior to the bed being covered with black plastic mulch. Trickle irrigation was applied under the mulch at this same time. Beds were formed with a commercial bed shaper. Three fumigation treatments were applied on the 8th of August. All Biofence applications were made prior to the plastic being applied to the raised

bed. The Dazitol treatments were applied on September 10th and 12th via the drip irrigation system. The first of the floating row cover treatments was applied when average heat units reached 50 degrees Fahrenheit and were applied on November 3rd. The second floating row cover treatments were applied on January 6th. Plant growth was monitored and recorded throughout the winter. To control disease, a standard commercial fungicide program was followed. Calcium nitrate was injected through the drip tape beginning in early April and continued through harvest in an attempt to maintain optimum plant growth and berry fruit quality.

Outcomes & significance of outcomes:

The cultivar evaluation study evaluated seven strawberry cultivars. Total marketable pounds ranged from 4,916 lbs. (Sweet Ann) to 11,440 lbs. (Benicia). Marketable fruit per plant ranged from 8.30 fruit (Albion) to 20.28 fruit (Chandler). Average fruit weight ranged from .48 oz. (Camarosa) to .69 oz. (Camino Real).

The winter protection study evaluated six different floating row cover treatments to protect the crop during the winter months. Total marketable pounds ranged from 8,213 lbs. (1.2 oz./sq. yard alone) to 11,127 lbs. (1.0 oz./sq. yard plus .6 oz./sq. yard). Marketable fruit per plant ranged from 19.93 fruit (1.2 oz./sq. yard plus .6 oz./sq. yard) to 26.22 fruit (1.0 oz./sq. yard plus .6 oz./sq. yard). Average fruit weight ranged from .44 oz. (1.2 oz./sq. yard alone) to .49 oz. (.6 oz./sq. yard plus .6 oz./sq. yard).

The fumigation study looked at six different fumigation treatments. Total marketable pounds ranged from 5,858 lbs. (Biofence @ 500 lb.) to 9,137 lbs. (Biofence @750 lb.). Marketable fruit per plant ranged from 14.22 fruit (Biofence @ 500 lb.) to 21.39 fruit (Control). Average fruit weight ranged from .38 oz. (Dazitol 5 day) to .57 oz. (Biofence @100 lb.).

The matted row cultivar evaluation study looked at seven cultivars. Total marketable pounds ranged from 6,611 lbs. (Galletta) to 21,308 lbs. (Sonata). Marketable fruit per acre ranged from 216,666 fruit (Galletta) to 874,166 fruit (Sonata). Average fruit weight ranged from ..30 oz. (Earliglow) to .47 oz. (Galletta).

A plasticulture strawberry twilight meeting and field day was conducted on May 21, 2015 to showcase the field research trials, to share preliminary research results with growers and industry and to educate interested growers and Extension faculty and staff on plasticulture strawberry production techniques.

Table 1. Cultivar Evaluation Results

Cultivar	lbs. per Acre	Fruit per Plant	lbs. per Plant	Average Fruit Weight (oz.)	Percent Soluble Solids
Benecia	11440 A	20.229 A	0.78786 A	0.63524 A	9.35 C
Chandler	7991 B	20.281 A	0.55037 B	0.43558 B	10.9 ABC
Camarosa	7206 BC	16.325 A	0.49626 BC	0.48228 B	10.15 BC
Camino Real	6789 BC	10.919 B	0.46758 BC	0.6912 A	11.5 AB
San Andreas	5414 BC	8.744 B	0.37286 BC	0.68101 A	10.5 BC
Albion	5062 BC	8.45 B	0.34863 BC	0.66362 A	12.45 A
Sweet Ann	4916 C	8.303 B	0.33855 C	0.63644 A	10.35 BC
LSD	2984.3	4.1004	0.2055	0.1312	1.8638

***Treatments with the same letter are not statistically significantly different.**

Table 2. Winter Protection Results

Treatment	Marketable lbs. per Acre	Marketable Fruit per Plant	Marketable lbs. per Plant	Average Fruit Weight (oz.)
5	11127 A	26.228 A	0.7663 A	0.46663 A
4	10175 A	22.93 A	0.7008 A	0.49269 A
3	9013 A	22.208 A	0.6208 A	0.44358 A
1	8431 A	20.114 A	0.5807 A	0.45501 A
6	8255 A	19.936 A	0.5685 A	0.4434 A
2	8214 A	20.633 A	0.5657 A	0.44505 A
LSD	4768.5	11.511	0.3284	0.0503

***Treatments with the same letter are not statistically significantly different.**

Table 3. Winter Protection Row Cover Treatments

Treatment Number	Row Cover Treatment applied
1	1.0 oz./sq. yard applied November
2	1.2 oz./sq. yard applied November
3	1.2 oz./sq. yard applied November plus 1.0 oz./sq. yard applied January
4	.6 oz./sq. yard applied November plus .6 oz./sq. yard applied January
5	1.0 oz./sq. yard applied November plus .6 oz./sq. yard applied January
6	1.2 oz./sq. yard applied November plus .6 oz./sq. yard applied January

Table 4. Fumigation Study Results

Treatment	Marketable lbs. per Acre	Marketable Fruit per Plant	Marketable lbs. per Plant	Average Fruit Weight (oz.)
2	9138 A	18.775 AB	0.62932 A	0.54251 A
1	8690 A	16.7 AB	0.59846 A	0.57507 A
6	8447 A	21.397 A	0.58178 A	0.43516 C
5	7826 AB	17.406 AB	0.53896 AB	0.49154 B
4	5912 B	16.499 AB	0.40719 B	0.38912 D
3	5859 B	14.225 B	0.4035 B	0.4577 BC
LSD	2353.2	5.812	0.1621	0.0445

***Treatments with the same letter are not statistically significantly different.**

Table 5. Fumigation Treatments

Treatment Number	Fumigation Treatment
1	**Biofence banded @ 1000 lb. per acre**
2	**Biofence banded @ 750 lb. per acre**
3	**Biofence banded @ 500 lb. per acre**
4	**Dazitol 5 days prior to planting**
5	**Dazitol 3 days prior to planting**
6	**Control**

Table 6. Matted Row Cultivar Evaluation

Cultivar	Marketable lbs. per acre	Marketable Fruit per Acre	Average Fruit Weight (oz.)	Percent Soluble Solids
5	21757 A	909167 A	0.38433 B	8.4667 AB
7	18961 A	715000 AB	0.4303 AB	7.7333 B
1	18677 A	773333 AB	0.38123 B	9.1333 AB
6	18289 A	660000 B	0.44491 AB	8.2667 AB
4	10973 B	575833 B	0.3042 C	9.2 AB
3	9145 B	359167 C	0.40691 B	9.3333 A
2	6612 B	216667 C	0.47991 A	7.6667 B
LSD	5796.3	199868	0.0678	1.5864

***Treatments with the same letter are not statistically significantly different.**