

Organic Strawberry Plasticulture vs. Matted Row and Variety Trial.

2018-19 SARE Farmer
Grant Project at Red
Fire Farm



2018 SARE Farmer Grant title:

**“System Modifications and
Varieties for Extending the
Organic Strawberry
Plasticulture Ripening Season
in Massachusetts”**



The goals of this project:

- **Try modifications to our plasticulture system to see if we could delay ripening.**
- **Try different varieties to see if they grow well and ripen later when grown with the plasticulture system**



Weeds are one of the top worries when it comes to growing organic strawberries.

Strawberries are low growing thus easily outcompeted by weeds.

Even with many hours of cultivating, hoeing and hand weeding by harvest time weeds are often on the verge of overtaking the crop.

Our Plasticulture Strawberry Growing System:

We grow our strawberry plugs by purchasing disease-free tips from specialized Canadian growers and rooting them under a mist system in our greenhouse.

Optimal timing for transplanting plugs into plastic beds is the last week of August or first week in Sept. It can be hard to get tips in time and get the plugs fully grown for this schedule.



Misting Schedule:

Stick tips into 50's about 5-6 weeks prior to transplant.

Mist for 10 seconds every 5 minutes for first 4 days.

Mist for 30 seconds every 12 minutes for days 5-15.

After this, decrease mist duration but still every 12 minutes.

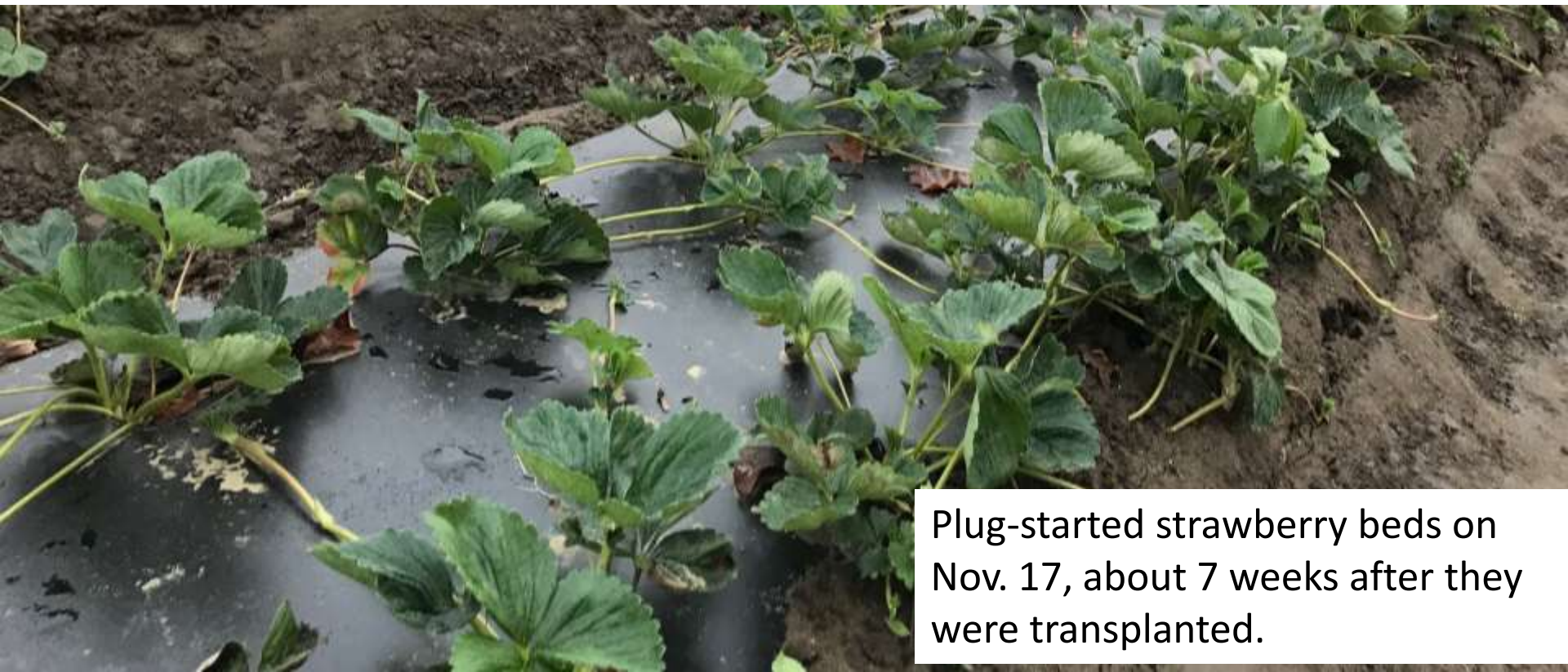
Discontinue all mist after about 3-4 weeks and let plants harden.



Plugs are planted in 2 rows per bed with 12" in-row. This is twice the plant density compared to matted row.

Goal is to grow the mother plants into large crowned plants, but not to allow runners to peg down. Runners are cut or cultivated off before they root.

Varieties need to have lots of yield potential per plant, since success depends on lots of berries or weight per plant vs. matted row where good yields can be achieved with modest per-plant yields and a high population density of daughter plants.



Plug-started strawberry beds on Nov. 17, about 7 weeks after they were transplanted.



We cover plasticulture strawberry beds with floating row cover starting in mid- or late Sept. once outdoor temps begin to cool.

Goal is to provide extra warmth for the plants later into the fall, as this is the time when buds are being initiated, and they will set more and larger berries with a longer amount of fall warmth.

Row covers stay on all winter, usually until plants are about to flower in the spring.



The same plasticulture strawberry during a midwinter thaw.

Weeds must be controlled. Usually the holes need little weeding. Plastics edges and aisles are cultivated in the fall after planting, then straw, hay, or landscape fabric mulch is put in place to assure that berries don't ripen onto dirt or suffer soil splash.



Weed mat seems to provide the most reliable weed suppression, but costs a lot to install and remove. Also, puddles can form in aisles as weed mat slows water drainage slightly, and weed mat prevents using cultivators to cut off runners.



One question we had was whether our organic-seeking PYO customers would be turned off by a field full of plastic mulch. We found that customers did not seem to mind the plastic one bit.

Basically, if customers are turned into a field with an abundance of berries that taste good and pick quickly, then they will be happy! This tour of politicians also was happy to see this field of easy to pick tasty berries!





One variation is to establish plants on plastic beds using bare root plants instead of plugs. Timing for planting bare root plants onto plastic is early to mid-July. At this time of year with hot weather the bare root plants may easily die if not watered enough immediately after transplanting.

Using bare root plants with this timing can result in large crowns, and bare root plants are less expensive than plugs, but plants also try to make lots and lots of runners that must be cut off.

The bed at left was established using bare root plants that were kept in storage at the nursery until July 10.

(per acre) matted row, all year 1 steps now verified and adjusted based on 2018 hours actuals

[illegible]

We kept careful data on establishment costs comparing matted row vs. plasticulture in 2018. Adjusted to a per acre basis, these enterprise budgets show the costs and returns of each system.

Materials Cost:	amt per a/unit	cost each	cost per acre	
transplants	7106 plants	0.15	1065.9	(assume \$12 per tray, so 36's = .37, 50's = .27, 72's = .18, 108's = .11)
seed cost per acre			0	see tp cost
fertilizer materials (LB)	2000 LB	0.5	1000	
plastic mulch	0 bed ft	0.03	0	(cost per foot)
straw mulch	250 bale	5.5	1375	250 bales per acre @ \$5.5 bale
entrust	oz	37.5	0	
pyganic	12 oz	4	48	
organic fungicides	12 oz	4	48	
packaging materials / bins	438 quart flats	1.5	657	
labeling	3504 quart pulps	0.2	700.8	
cover crop seeds	150 LB	1	150	
row cover	0 bed ft	0.12	0	
other supplies			0	
			5044.7	
	# hours	\$ per hr	cost per acre	
Marketing sales labor per acre	20	15	300	
	# miles	\$ per mile	cost per acre	
transportation	840	1	840	(assumes driving labor is part of per mile transportation cost)
fm display materials				
advertising cost				
Total Estimated Variable Costs Per Acre			14749.95	
Fixed Overhead Costs:				
land				
buildings				
insurance				
office expense				
property taxes				
utilities				
fees & permits				
other				
		assume harvest vehicle is \$333 per acre per year, so this added into overhead.		Also added a buffer of 10%
other spread sheet says overhead is about 135,000 per year for above items, so assuming 100 planted acres = \$1350 per planted acre.				
Total Estimated Fixed Costs Per Acre			2000	
		price sold		
Yield Per Acre	7,000 LB	4.5	Total Sales per Acre	31500
(assume 1.5 lb per qt, sales price of \$7 per quart)			Total Production Cost Per Acre	16749.95
			Net Per Acre	\$ 14.750

Matted row establishment cost \$13,910 per acre in year 1 (even with all the weeding and cultivating passes.)

Plasticulture beds established using July-planted bare root plants cost \$17,240 per acre to establish.

Plasticulture establishment with late-Aug transplanted plugs cost \$20,057 per acre to establish. This is when weed mat was used to mulch between the beds.

We wanted to figure out if there were viable ways to manipulate the plasticulture system to get some berries to ripen in late June and into July.

We assumed that using plugs planted in Late August would require less cultivating for weeds, and thus a be less expensive.

Problem was that Chandler planted on plastic in this system usually ripened starting in late May (up to 3 weeks sooner than early matted row varieties) and finished ripening by mid June.

The early berries are great, but our PYO and other customers expect the season to continue until at least the 4th of July.



We set up a trial to compare all these treatments to a matted row planting:

White or silver plastic (instead of black) to keep soil cooler.

Remove row cover sooner in spring, to delay early spring growth.

Use different varieties that ripen later than Chandler.

Delay spring growth by mulching over the plants with straw and removing in late April.

Try bare root (vs. plugs) in beds to see if there is a difference in ripening dates.

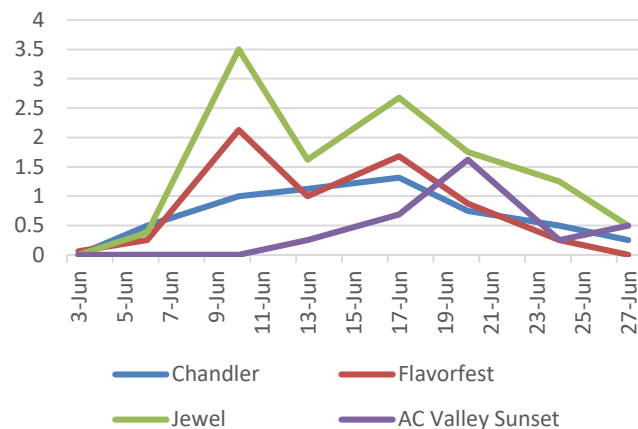


Our trial had 29 different treatments.

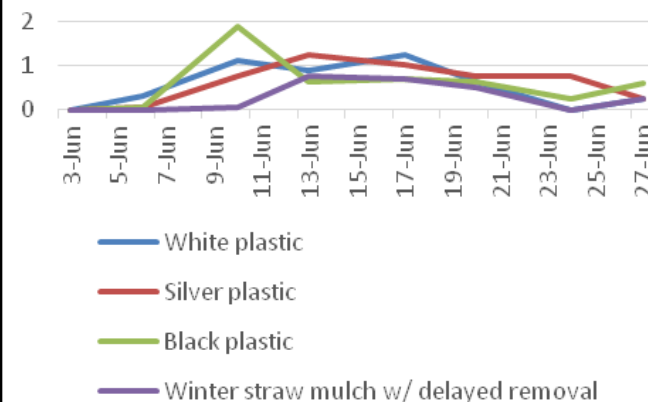
A 10 bed-foot section of each treatment was identified and flagged.

These sections were harvested separately, and the berry weight was recorded.

Yield in lbs/10 bed feet
Bare Root, July Planted, No Row
Cover

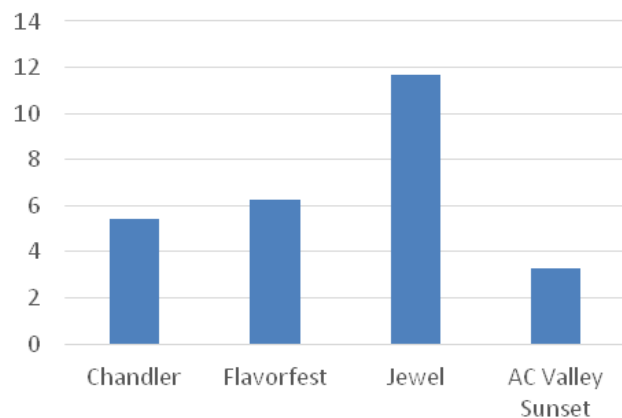


Yield in lbs/10 bed feet
Chandler - from plugs, no row
cover

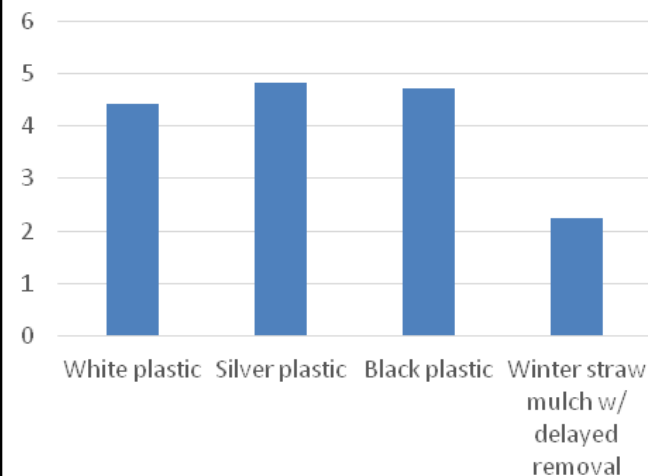


We collected a lot of data! See our full report on the SARE project web site

Total Yield in lbs/10 bed feet
Bare Root, July Planted, No Row
Cover



Yield in lbs/10 bed feet
Chandler - from plugs, no row cover



Take the yield data from this study with a grain of salt!

- 1) The field suffered fall deer browse damage when they ripped through the row cover and ate surprising amounts of leaves before I realized what was happening. Yield plots were selected in spring in areas with minimal damage.
- 2) Harvest crews may have made some mistakes and did miss some plots on some harvest days.
- 3) This was not a replicated trial.





As part of the SARE study we tried new varieties (for us) :

Ruby June

Fronteras

Camino Real

Cleary Civ

Also of course:

Chandler

These were compared to many of our standard matted row varieties such as :

Cavendish

AC Wendy

Jewel

Mayflower

Earliglow

Sparkle

Flavorfest

Yambu

-



Each year we cut up all the varieties at our annual Strawberry Soiree event, and we ask people to taste them all and rate their favorites.



2019 results were the first year ever that Jewel rated as a major flavor winner.

All other recent years Chandler was by far the taste favorite.



The Strawberry Soiree

GREAT STRAWBERRY ELECTION

with a little check mark for your top 2 strawberry varieties. (2 votes per person, because it can be hard to choose :))

VARIETY	VOTE
CAVENDISH	
CLANCY	
EARLIGLOW	
YAMBU	
SPARKLE	
MAYFLOWER	
BENDY	
FOREST	
FRONTERAS	
CLEARY	
JEWEL	
RUBY JUNE	
CAMINO	
CHANDLER	

Totals will be tallied and winners will be announced at dinner and in the farm email :)

Take home messages from this study:

Don't give up on matted row, as there does not seem to be a good way to get lots of ripe berries in later June using the plasticulture system, despite using different varieties and manipulations.

Besides, matted row per acre establishment is not as expensive, despite the weeding!

Grow more Cleary CIV. This was by far the earliest to ripen variety, and in my opinion consistently one of the very best flavored.

Also grow even more Jewel! In both plasticulture and matted row, this appears to be a top yielding variety, and in 2019 it even tasted amazing!



When it comes to plasticulture:

Don't bother with any color of plastic other than black.

Try to figure out less expensive aisle weed management than weed mat. We went back to cultivating and applying hay in early spring.

Does not seem like July-planted bare root into plastic is worthwhile. Too busy then, plants die easily from dryness, and yields not amazing.





**Thank You To Northeast SARE for Providing
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