

## 2014 Empire Producers EXPO Berry Session Presentation Summaries

**Day-Neutral Strawberry Variety Performance and Planting Date Affects in Plasticulture** - Dr. Courtney Weber, Small Fruits Breeder, Department of Horticulture, Cornell University, NYAES, Geneva, NY 14456 [caw34@cornell.edu](mailto:caw34@cornell.edu)

Day-neutral and short day (June-bearing) strawberry variety performance was evaluated over a 3-year period in an annual plasticulture system modified for multiple harvest periods and overwintering. The trials were established at 6 different planting dates over 2 years using either dormant-bare root crowns or green plug plants grown from dormant crowns for spring and summer plantings. Observations from the first trial planted in 2011 and harvested in 2011-12 led to the conclusion that early planting in both the spring and summer was critical to strong plant development and higher yields. It also demonstrated the potential to utilize the plasticulture system in NY to produce fruit outside the traditional June harvest period.

A second trial was planted in 2012 to compare planting dates (April 27, May 23, July 16 and August 14) as well as varieties in this modified plasticulture system. This trial was harvested in 2012-2013. This trial was established using the most appropriate plant type for the planting date, dormant bare-root crowns in the spring and green plugs in the summer. In order to plant in early spring, beds were formed and covered with plastic in October 2012 (the previous fall) and left overwinter so that planting could be done in April and May. For the summer planting dates, the plugs were produced in-house using bare-root crowns from the same batch of dormant plants as the spring plantings. The crown roots were trimmed to approximately 2 inches and placed in 2"x2"x2 3/4", 50-well plug trays filled with soilless Cornell mix. The plants were grown in open cold frames with overhead irrigation for 6 weeks prior to planting in the field.

The day neutral varieties harvested in 2013 included Albion, Evie 2, Monterey, Portola, San Andreas, Seascape and Tribute. The short day varieties included Jewel, Chandler, Clancy, Ovation, Seneca and Ventana. The summer/fall harvest of the April and May 2012 planted plants began on July 18, 2012, 82 days post planting, and lasted until October 1. The spring 2013 harvest of all 4 planting date trials began on June 4 and lasted through July 9. The summer/fall 2013 harvest for the day-neutral varieties planted in 2012 began on July 22 and continued until October 11. Four, ten-plant plots were harvested from each variety. The fruit was weighed and counted for total yield and mean fruit size calculations. The timing, intensity and uniformity of flowering among varieties, plots and in some cases within varieties and plots varied greatly. These trials will be overwintered for observation and possible harvest in 2014 as well to determine the potential longevity of plantings using the plasticulture system.

Of the short day plants, Jewel and Seneca were the most productive over all 4 dates and Clancy and Chandler were the least productive. The highest yields were produced from July planting date using plugs followed by the August planting date. The spring planting dates produced similar yields with a maximum of 8,400 lb/ac for Jewel. The summer plantings with plugs were much more productive with a maximum yield for the July planting of 14,100 lb/ac for Ventana and greater than 10,000 lb/ac for all varieties except Clancy at 9,500 lb/ac. The August planting was much more variable but was uniformly lower for all varieties by 10-40% but was still higher than the spring plantings in all cases except Chandler.

Yield in the day-neutral varieties was greatly variable by planting date. The highest yields overall were again produced from the July planting of plugs with similar but consistently less production from the August plantings. This was true even though there were only 2 harvest periods on these plantings, spring/summer 2013 and summer/fall 2013. Yield averaged 18,200 lb/ac across all varieties for the July planting with a high yield of 23,000 lb/ac for Evie 2 and 22,800 lb/ac for Seascape. The lowest yield for the July planting was for Portola at 12,800 lb/ac.

The spring plantings of day-neutral varieties produced significantly less fruit over 3 harvest periods (summer/fall 2012-spring/summer 2013-summer/fall 2013) compared to the summer planted plots with only 2 harvests. Yield was 39% less for the April bare root planting compared to the July plug planting. The May planting was less productive than the April planting producing 36% less fruit.

However, it should be noted that the reduction in yield between the April planting and the July planting was due to the differences between the first spring/summer crop of each planting. The first summer/fall crop for the April planting was in 2012 starting less than 3 months post planting and produced a viable crop in the planting year. The second crop in this case was the spring/summer 2013 harvest. The first summer/fall crop for the July planting occurred 12 months after planting following the first spring/summer crop in 2013. While the order of variety productivity was not identical, the average yields for the first summer/fall crop was similar, whether in the planting year or in the following year.

From the first trials, it appears that day neutral varieties can be used in plasticulture with an early April planting to produce high yields during a long harvest season from late May to October with only a small window in June-July when fruit is not available. Day

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neutral varieties with the most potential include San Andreas, Seascape and Evie 2. Overall, Seascape had the best combination of high yield and good eating quality.

The varieties Aromas, Diamante, Tribute, Portola and Monterey were less productive and/or had poor fruit quality. The short day varieties were not as productive and generally runner excessively so that much pruning is required. The varieties typically planted in the fall/winter in the SE U.S. (Chandler, Festival, Palomar, Radiance, Camino Real, Ventana) were not productive and do not seem adaptable to the NY climate. The Cornell varieties Jewel and Seneca were the most productive and adapted to this system in NY. Based on the observations made and data collected over the 3-year project, production using plasticulture systems may be a viable option for growers in NY and other regions of similar climate, especially for day-neutral varieties. Cumulative yield exceeded 23,000 lb/ac in one growing season (2 harvest periods) for the most productive varieties when summer planted plug plants were established in late July. Based on the data from the late August planting that saw a small reduction of yield, a likely planting window of July 15 to August 15 is optimal for maximum yields in the following year.

So depending on the goals of the grower, the optimal planting date may vary. If the goal is to produce fruit quickly in the traditional off-season in NY in the planting year only, then the most appropriate approach would be to plant as early in the spring as possible, preferably in April or sooner when the ground is still cold and moist. This allows the plants to come out of dormancy slowly and naturally and avoids much of the potential heat stress observed with planting bare root plants in black plastic later in the year. This produces the largest, healthiest plants, which can begin production 10-12 weeks post planting. For this system, it is recommended that the first flowers be removed from the emerging crowns to allow greater crown development prior to the development of new flowers for summer and beyond. Overwintering of the plantings utilizing this system was not productive in open field production, presumably due to the high stress level from producing fruit up until frost in the fall, which does not allow the plant to adequately prepare for winter dormancy and growth the following spring. Utilizing additional technology such as high or low tunnels may mitigate some of this and produce stronger plants going into winter making the overwintering of these plants more viable.

If the goal of the grower is to maximize yields across both the traditional June production season as well as the following off-season from July to October, then a summer planting between July 15 and August 15 is most suitable. Plug plants would need to be produced either on farm or with collaboration with a nursery in order to obtain the appropriate plants at the appropriate time. Currently, plug plants are not available from commercial nurseries in this time frame so special arrangements are necessary.

A similar benefit to planting short-day (June-bearing) varieties in the plasticulture system was observed for the July planted plug plants and less so for the August planted plants. The yield and fruit size was superior to most trials conducted in matted row system and comes with much more manageable weed control options using hooded sprayers between the rows and the plastic to control within the row. There are higher costs associated with the system due to the added cost of plastic and machinery to apply it as well as at least 100% increase in plant costs due to higher planting density and the cost of producing or buying plugs. The grower will need to carefully analyze the cost benefits to less weed control and higher quality and possibly yield of fruit to determine if this system is a viable option for them. The most promising varieties for this system based on yield were Jewel and Seneca with Jewel displaying the highest fruit quality for retail and wholesale sales.