Strawberry Season Extension Using Low Tunnels

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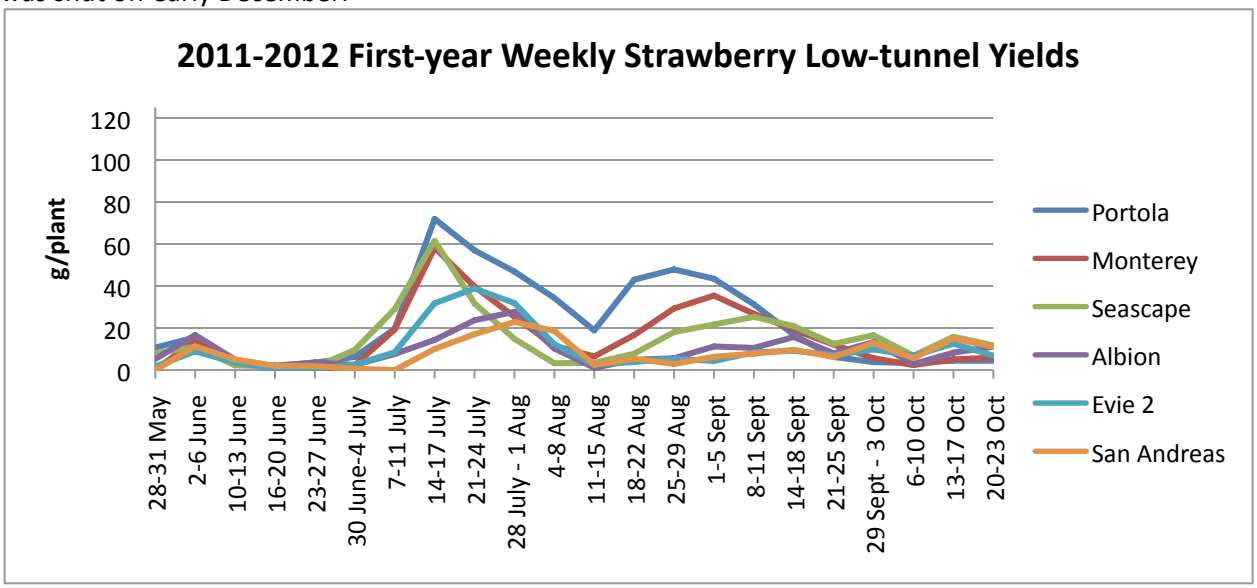
For over 100 years, the USDA-ARS strawberry breeding program in Beltsville, MD, has made major contributions to the development of the strawberry as a crop. Recently, the program has made new inroads in day-neutral strawberry breeding. We have developed and continue to develop a selection environment that allows us to identify day-neutral strawberry breeding material. In the process, we have developed a production method that may allow Mid-Atlantic growers to significantly extend their strawberry production season. The production system uses low tunnels as rain and light shields in the summer and as mini-greenhouses in the cooler months. Late-winter planting allows the use of dormant bare-root plants, partial mechanization, and many cultivar choices.

In 2011, we tested five day-neutral cultivars from California and obtained surprisingly good yields and fruit quality for the entire month of July. The same planting gave tremendous yields from mid-April through the end of May in 2012. A new planting started fruiting continuously in July 2012. Besides the extended season, other advantages of this low tunnel production system were: reduced problems with deer, reduced runnering, fewer weeds, reduced water usage for frost production, no Botrytis fruit rot, improved post-harvest storage life, and, in 2012, reduced anthracnose fruit rot. Challenges in 2011 included an historic heat wave, hurricanes, and anthacnose fruit rot. Challenges in 2012 included fruit rot from Mucor. Cultivar development will include disease resistance as always.

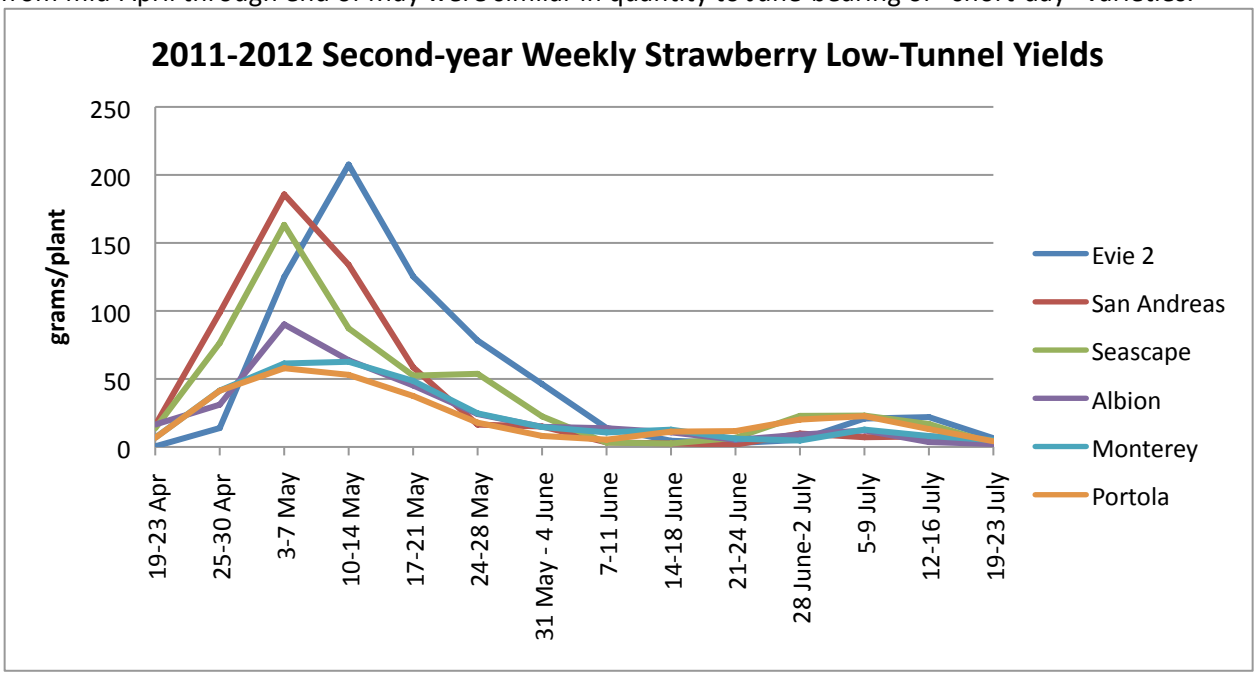
Strawberry yields from under two sets of low tunnels at USDA-ARS in Beltsville, Maryland, 2011 and 2012. The first set, "2011-2012" was established April 2011 and harvested in 2011 and 2012. The second set, "2012-2013" was established March 2012(yields as of 20 Sept).

	2011-2012 tunnel yields (lbs/A)			2012-2013 tunnel yields (lbs/A.)		
Genotype	2011	2012	Total	2012	not-rotted	% not-rotted
Evie2	9,515	**25,204**	34,720	.	.	.
Seascape	**13,748**	**20,501**	34,249	**15,816**	**12,813**	81
Portola	**19,669**	11,645	31,315	**25,444**	**20,980**	82
San Andreas	8,885	**21,032**	29,917	12,303	8,766	71
Monterey	**14,788**	12,000	26,789	**18,044**	**14,719**	82
Albion	9,841	12,825	22,666	12,451	9,774	79
Diamante	.	.	.	10,758	7,851	73

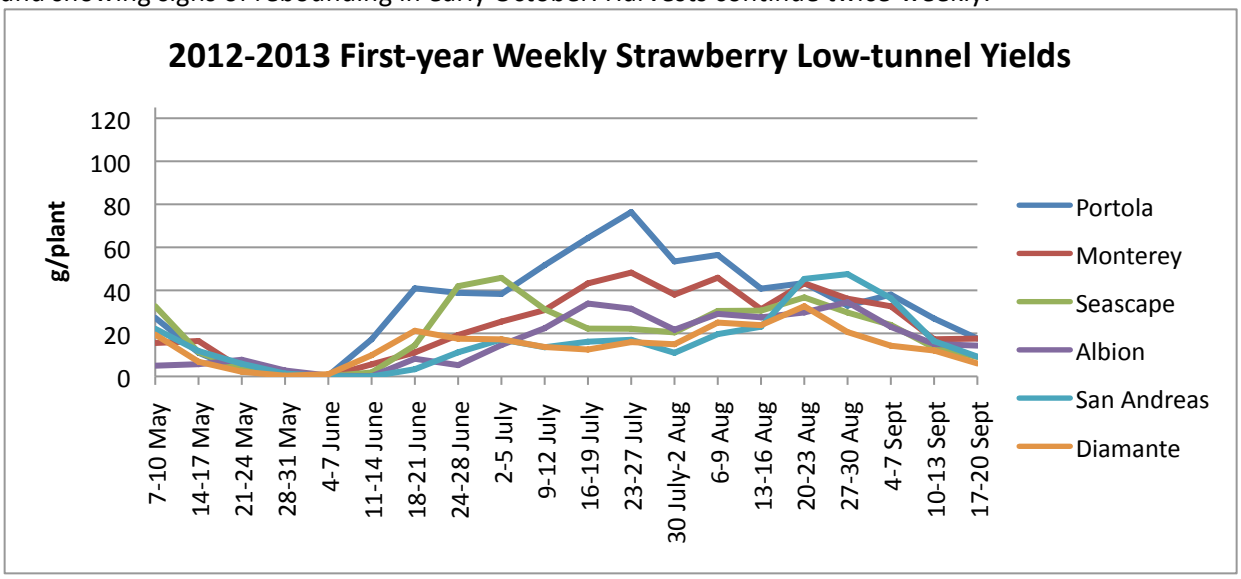
2011-2012 low-tunnels were planted with dormant bare-root plants 11 April 2011. Some fruit appeared in early June from buds set in the California nursery. Tunnels were erected mid-June. Fruit from buds formed in Maryland appeared end-of June through the month of July. A record heat wave and an anthracnose outbreak depressed yield in early August; other unknown factors may also have contributed. Some cultivars started producing again from mid-August through mid-September. Water was shut off early December.



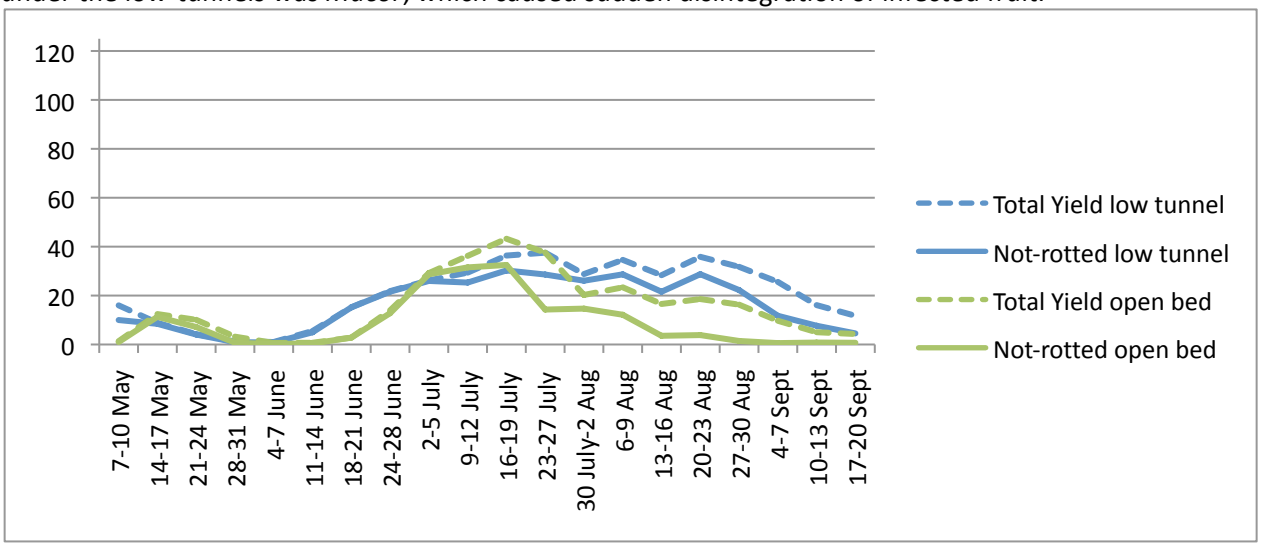
The winter was very mild. Tunnels were raised and beds were watered 23 February 2012. Frost protection was provided by misters under the tunnels. The first fruit appeared on Albion 16 April. Yields from mid-April through end of May were similar in quantity to June-bearing or “short-day” varieties.



2012-2013 low-tunnels were planted with dormant bare-root plants 8 March 2012, a month earlier than the previous year. Tunnels were erected a few days later. Frost protection was provided by misters under the tunnels. Some fruit appeared in early May from buds set in the California nursery. Fruit from buds formed in Maryland appeared early-mid June, peaking in July, tapering off through mid-September, and showing signs of rebounding in early October. Harvests continue twice-weekly.



Alternating with the low-tunnels in the 2012-2013 planting are open beds for comparison. Fruiting started later, and yield generally was lower than yield from the tunnels. More important, the proportion of rotted fruit was much lower from the low-tunnels, especially as the summer progressed. The primary disease of fruit from open beds was anthracnose fruit and crown rot. The primary disease of fruit from under the low-tunnels was *Mucor*, which caused sudden disintegration of infected fruit.



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