

Organic Raspberry Production
NMSU Sustainable Agriculture Science Center, Alcalde, N.M.

Ron Walser (1) and Steve Guldan (2)

Dormant bare root plants of the primocane bearing red raspberry varieties Caroline, Polana, Autumn Britten, and Heritage and the yellow raspberries Kiwigold and Anne were planted into the field at the New Mexico State University Sustainable Agriculture Science Center, Alcalde, New Mexico, in March 2002. Five plants of each variety were planted into 10-ft-long plots, with 4 replications of each plot. Rows were 10 ft apart. One drip irrigation line (1 ft distance between emitters) was installed down each row. Water was applied as needed but generally was applied two times/week from 6 to 8 hours each period. Pruning consisted of cutting off the plants at ground level each winter. This trial was part of a certified organic production research project at the Alcalde Science Center, thus plants were grown using organic production procedures. The fertility program consisted of the application of 2–3 inches of compost made from 25% horse manure and 75% green chop alfalfa applied to the plots following pruning each winter. The only pest problems encountered during the four harvest years were mites and grasshoppers. Mites were controlled with applications of 1% summer oil. It appeared that the Polana variety was the most susceptible to mite damage. Control procedures were not applied to grasshoppers, which only caused significant damage in 2005. However, the damage only delayed harvest and did not cause a significant decrease in yield except in the case of Polana (Table 1). The grasshoppers cut off many of the terminals just before blossoms began appearing, which delayed fruit ripening but caused more lower laterals to develop fruit. Also, the fact that in 2005 the first killing freeze did not occur until the first part of November increased total yield of most varieties in that year by extending the harvest period beyond other years. Birds did not bother the raspberries, even though they did considerable damage to grapes and blackberries that were close by. Berries were harvested on Tuesdays and Fridays, after which yield and size data was recorded.

Caroline and Kiwigold had the highest average yield, while Anne, followed closely by Caroline and Autumn Britten, had the largest berries. All of the berries with the exception of Anne were firm and could withstand shipping. Consumers liked the flavor of Anne best, followed closely by Caroline.

Thus, based on the results of this research, we are recommending that growers in New Mexico located in colder locations (above 7,000 ft) plant Polana (due to the early harvest time), and others plant Caroline. Back-yard gardeners are planting a few Anne, but we are recommending commercial growers not use Anne because of the softness of the berry.

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Table 1. Raspberry yield data

Raspberry Trials - NMSU Sustainable Agriculture Science Center at Alcalde

Variety	4-Yr Average ¹	Average Yield in lbs/acre			
		2003	2004	2005	2006
Caroline	14,788 a	11,761 *	15,740 *	17,826 *	13,826 *
Kiwigold	12,414 ab	8,276	14,423	15,609	11,348
Polana	10,591 bc	10,454	15,215	7,870	8,826
Heritage	10,120 bc	6,970	11,423	10,957	11,130
Autumn Britten	9,121 c	9,148	11,162	9,261	6,913
Anne	7,927 c	8,376	9,505	7,565	6,261
Trial Mean	10,827				
LSD (0.05)	3,008				
CV %	18.44				
F Test	0.0030				

Variety	4-Yr Average ¹	Average Berry Size in grams/berry			
		2003	2004	2005	2006
Anne	3.1 a	2.9 **	3.0 **	3.2 **	3.1 **
Caroline	2.7 b	2.8	2.7	2.7	2.6
Autumn Britten	2.7 b	2.6	2.9	2.5	2.6
Heritage	2.1 c	2.1	2.1	2.1	2.1
Polana	2.1 c	2.2	2.3	1.9	1.9
Kiwigold	1.8 d	1.8	1.9	1.8	1.7
Trial Mean	2.4				
LSD (0.05)	0.2				
CV %	5.20				
F Test	0.0000				

Variety	Harvest Dates			
	2003	2004	2005	2006
Polana	28-Jul to 16-Oct	23-Jul to 04-Oct	15-Aug to 28-Oct	18-Jul to 11-Oct
Autumn Britten	28-Jul to 16-Oct	30-Jul to 04-Oct	19-Aug to 28-Oct	25-Jul to 11-Oct
Caroline	07-Aug to 16-Oct	13-Aug to 04-Oct	29-Aug to 28-Oct	29-Jul to 11-Oct
Heritage	14-Aug to 16-Oct	20-Aug to 04-Oct	29-Aug to 28-Oct	8-Aug to 11-Oct
Kiwigold	14-Aug to 16-Oct	20-Aug to 04-Oct	29-Aug to 28-Oct	8-Aug to 11-Oct
Anne	14-Aug to 16-Oct	17-Aug to 04-Oct	29-Aug to 28-Oct	8-Aug to 11-Oct

* Highest yield this year.

** Largest berry this year.

¹ Analyzed using analysis of variance. Yields with same letter are not significantly different at the .05 level.

Organic Blackberry Production
Alcalde, N.M.

Ron Walser (1) and Steve Guldan (2)

Plants of the thornless semi-trailing blackberries Chester and Triple Crown and the thornless upright Arkansas varieties Apache, Navajo and Arapahoe were planted into the field at the New Mexico State University Sustainable Agriculture Science Center, Alcalde, New Mexico, in March 2002. All rows were 10 feet wide with the semi-trailing varieties planted at a spacing of 6 ft down the row (726 plants/acre), while the upright varieties were spaced 2 ft down the row, and allowed to fill in to 10-ft-long hedges that were replicated 3 times. The semi-trailing plants were trained to a 2-wire trellis, with the top wire at 4 ft 8 inches and the lower wire at 2 ft 8 inches. This planting is part of a certified organic orchard established at the NMSU Alcalde Science Center, thus organic cultural practices were followed. The only pest problem encountered during the five years was birds eating the berries. This problem was easily overcome by placing bird nets over the plants before ripening. It has not been necessary to apply any other type of pest control. The very successful fertility program was the application of approximately 5 tons per acre of compost made from 25% horse manure and 75% green chop alfalfa applied down the row in the fall of 2002 and 2003. A cover crop of New Zealand White Clover was planted in the spring of 2002 and since the fall of 2003 has supplied all the nutrients that the plants have required. A low-profile micro-sprinkler irrigation system was installed before planting in 2002; it applies approximately 50 gallons of water per acre per minute. The orchard was generally irrigated two times per week for from 3 to 6 hours, depending on water demand of the plants and on rainfall. Water was obtained from a canal (*acequia*) that draws water of excellent quality from the upper Rio Grande. Training (pruning) of both upright and semi-trailing types involved removing the tips of the new canes (primocanes) when they reached approximately five feet, then during the winter removing the dead floricanes and cutting back the laterals on the remaining canes to approximately 18 inches.

The upright blackberry cultivars did not have enough fruit in 2003 to warrant harvesting, thus the lack of data for Apache in 2003. In 2003 and 2004 it was observed that Arapahoe and Navajo had much less fruit than Apache, thus yield data was not taken from these two cultivars.

Minimum low temperatures during the past four winters, recorded near the orchard, were -1°F in 2002–2003, 2°F in 2003–2004, 1°F in 2004–2005, and -5°F in 2005–2006. With the exception of Arapahoe, which showed some winter damage each year, the plants did not show much winter damage except in 2005–2006. In this winter, freeze damage—expressed as terminal die-back and blind (damaged) buds—was most severe on Arapahoe, slightly less on Navajo and Apache, less on Triple Crown, and very light on

Chester. This damage was also somewhat reflected in the lower yields in 2006 for Apache (Table 2).

Firmness (shipping qualities) of the berries showed that Navajo and Chester were firm and shipped very well, while Apache and Triple Crown were less firm but still maintained sufficient marketable quality while stored at slightly above freezing temperatures (33°F) for several days and then transported to local stores or farmer's markets.

Samples from all of the varieties were frozen and observed for color quality in the frozen product. All of the varieties had sufficient color to meet A grade quality but would need to be harvested fairly mature to reduce the red color of the frozen product.

Thus, in areas where winter temperatures are similar to or warmer than those recorded at Alcalde, any of the 3 cultivars (Chester, Triple Crown, Apache) can be productive and can be successfully grown. In colder areas the Chester variety could be productive but some damage would most likely occur with temperatures much below -5°F. Consumer acceptance of these berries was excellent.

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Table 2. Blackberry yield data

Blackberry Yield Data - NMSU Sustainable Agriculture Science Center at Alcalde						
Variety	1st Harvest	Peak	End	lbs/plant	lbs/acre	grams/berry
2003						
Triple Crown	28-Jul		25-Aug	3.1	2,251	5.8
Chester	28-Jul		21-Aug	2.5	1,815	4.9
Apache	No Data		No Data	No Data	No Data	No Data
2004						
Triple Crown	20-Jul		17-Aug	14.0	10,164	7.7
Chester	30-Jul		20-Aug	3.8	2,788	3.9
Apache	23-Jul		17-Aug		4,673	6.8
2005						
Triple Crown	21-Jul	8-Aug	16-Sep	10.3	7,513	5.9
Chester	1-Aug	29-Aug	16-Sep	13.3	9,633	3.7
Apache	21-Jul	8-Aug	16-Sep		5,282	5.2
2006						
Triple Crown	18-Jul	15-Aug	4-Sep	10.4	7,550	6.2
Chester	25-Jul	22-Aug	4-Sep	16.8	12,197	4.0
Apache	21-Jul	18-Aug	1-Sep		3,555	6.1