

## **Per Acre Receipts for Red Delicious and Gala: The Effects of Grade, Size, Cullage and Yield**

By R. Thomas Schotzko  
Extension Economist  
Washington State University

Periodically, over the years, I have had the opportunity to share information on the dollar effect of grade, size, cullage and yield. Typically, the approach has been to look at receipts in a particular year and indicate the number of dollars not received due to less than optimal levels of these different factors. While I consider that a useful endeavor, it also seems valuable to do the same with prices averaged over several years to better judge practices in light of the fluctuations in crop size from year to year.

The past summer I had occasion to calculate the per acre dollar effects for Red Delicious and Gala for the Northwest Horticultural Council to be used in discussions with the EPA regarding the economic impacts of altering the restrictions in the use of Guthion™ and Imidan.™ As the numbers may be of interest to the broader grower community they are presented and discussed in this article.

Tables 1 and 2 contain per acre estimates of grower receipts at different yields, cullage rates, peak sizes and grades. Each size distribution is based on an actual grower packout records.

The prices were calculated from Washington Grower Clearing House data and cover the crop years of 1996 through 2000. The price averages were calculated in a manner that reflected the volumes being sold at each price. Hence, the lower prices received for the 1998 and 2000 crops have a bigger effect on the average price than the higher prices received in 1996 or 1997.

The Extra Fancy category in the table contains only Washington Extra Fancy fruit. Because of the way the price averages were calculated it reflects the actual distribution of fruit by category (i.e. different labels) within the WAXF grade. Implicitly, the extra fancy fruit in the packout records are assumed to have the same distribution as the sales represented by these figures.

The figures in the tables were calculated at 24, 32 and 40 bins per ac. Cost information calculated by Jim DuBruille at Wenatchee Valley College for Red Delicious were extrapolated to those yield levels to determine profitability. Estimated costs at 24 bins are \$3659, 32 bins at \$3808 and 40 bins at \$3920.

While those cost figures may not truly reflect the needed expenditures to produce highly colored fruit with “good” size and very little cullage, they do show what everybody already knows: it’s been tough to make money on Red Delicious.

Each number in the body of the tables is based on a given grade, size, cullage rate and yield. For example, the \$2776 at the top of Table 1 is the per acre receipts for 24 bins of Red Delicious, peaking on size 125’s with 75% Washington Extra Fancy and 10% cullage. The number directly below it (\$2394) is based on 20% cullage and the number to the right (\$2939) is for fruit peaking on size 113’s.

No one factor guarantees a profit. High yields alone do not guarantee a good income. It needs to be accompanied by large, highly colored fruit. At the same time lower yields can improve receipts if it improves size, grade and/or cullage. However, any improvement in

receipts due to reduced yield generally has to be associated with more than one factor. (Keep in mind that this discussion concerns only those dollar effects associated with fruit delivered to the warehouse. The decision to deliver or not deliver cannot be directly based on these numbers.)

These numbers can be used to estimate the increase in receipts associated with making various improvements in the fruit. For example, with 24 bins per acre peaking on size 125's and 80% WA extra fancy, reducing cullage from 30% to 20% would have increased receipts by \$393 per acre, on average, over the five years. At this yield and fruit size each percent of cullage costs about \$39 per acre. On the other hand, at 40 bins with fruit peaking on 125's and 80% WA extra fancy, going from 30% to 20% cullage increases receipts by \$655.

Similar calculations can be made for grade, size and yield. In each case the figures represent the average effects during the past five years.

Table 2 contains per acre receipts for Gala. The figures in the table are a reflection of the high prices received for Gala during the second half of the 1990's. With the number of new trees in the ground today, production of Gala in some future years could be at least as much as 50% higher than this year. With that increase in production, it would be wise to assume that per acre receipts will decline by 30% or more.

However, even with a 30% decline in revenues, profits remain decent for those growers who are able to produce reasonable (30+ bins per acre) yields of large, highly colored fruit.

Assuming the Fuji production costs calculated by Jim DuBruille, and reported in a Washington Growers Clearing House bulletin, are reasonably close to Gala production costs, those figures can be used to determine breakeven points. Those costs are \$4513 for 24 bins, \$4740 for 32 bins, and \$4910 for 40 bins per acre.

Table 2 has been shaded in red to show which combinations of yield, grade, size and cullage would be unprofitable should F.O.B. prices decline 30%.

The final point to make about these tables (many readers will have already noted this) is the difference in returns from achieving the same effects in both varieties. In a Gala block at 24 bins per acre peaking on size 125's and 80% WA extra fancy, reducing cullage from 30% to 20% would have increased returns per acre by \$910. This is more than double the effect that would have been received in Reds. Allocating those scarce operating dollars to the Gala block first is the rational decision.

**Table 1: Impacts of Yield, grade, size and cullage On Gala receipts per acre Prices based on 5 years of sales data. Packing costs based on an incharge and a charge per packed carton.**

		<b>Cullage Level</b>	<b>Small</b>	<b>Fruit Size Medium</b>	<b>Large</b>
<b>Yield</b>	<b>600</b>			\$/AC	
<b>% XF</b>	<b>70</b>	10%	5172.47	5813.89	7011.6
		20%	4524.42	5094.56	6159.2
		30%	3876.36	4375.24	5306.8
<b>Yield</b>	<b>600</b>				
<b>% XF</b>	<b>80</b>	10%	5485.91	6166.01	7443.07
		20%	4803.03	5407.57	6542.73
		30%	4120.15	4649.12	5642.39
<b>Yield</b>	<b>600</b>				
<b>% XF</b>	<b>90</b>	10%	5799.34	6518.14	7874.53
		20%	5081.64	5720.57	6926.25
		30%	4363.93	4923.00	5977.97
<b>Yield</b>	<b>800</b>				
<b>% XF</b>	<b>70</b>	10%	6896.62	7751.85	9348.80
		20%	6032.55	6792.75	8212.27
		30%	5168.49	5833.66	7075.73
<b>Yield</b>	<b>800</b>				
<b>% XF</b>	<b>80</b>	10%	7314.54	8221.35	9924.09
		20%	6404.04	7210.09	8723.63
		30%	5493.53	6198.83	7523.18
<b>Yield</b>	<b>800</b>				
<b>% XF</b>	<b>90</b>	10%	7732.46	8690.85	10499.38
		20%	6775.52	7627.42	9235.00
		30%	5818.58	6564.00	7970.63
<b>Yield</b>	<b>1000</b>				
<b>% XF</b>	<b>70</b>	10%	8620.78	9689.81	11686.00
		20%	7540.69	8490.94	10265.34
		30%	6460.61	7292.07	8844.67
<b>Yield</b>	<b>1000</b>				
<b>% XF</b>	<b>80</b>	10%	9143.18	10276.69	12405.11
		20%	8005.05	9012.61	10904.54
		30%	6866.91	7748.53	9403.98
<b>Yield</b>	<b>1000</b>				
<b>% XF</b>	<b>90</b>	10%	9665.57	10863.56	13124.22
		20%	8469.40	9534.28	11543.75
		30%	7273.22	8204.99	9963.28

These are the Red Delicious receipts per acre for different yield, grade, size and cullage levels.

Prices based on 5 years of sales data.

Packing costs based on an incharge and a charge per pack

Yield	%	of cullage	Small	Medium	Large
			\$ per Acre		
600 %XF	70	10	2775.66	2938.71	3057.2
		20	2393.92	2538.85	2644.18
		30	2012.18	2138.99	2231.16
600 %XF	80	10	2875.7	3056.8	3189.95
		20	2482.84	2643.82	2762.18
		30	2089.99	2230.84	2334.41
600 %XF	90	10	2975.74	3174.89	3322.7
		20	2571.77	2748.79	2880.18
		30	2167.8	2322.69	2437.66
800 %XF	70	10	3700.87	3918.27	4076.27
		20	3191.89	3385.13	3525.57
		30	2682.9	2851.99	2974.88
800 %XF	80	10	3824.26	4075.73	4253.27
		20	3310.46	3525.09	3682.91
		30	2786.65	2974.45	3112.54
800 %XF	90	10	3967.65	4233.18	4430.27
		20	3429.03	3665.05	3840.24
		30	2890.4	3096.92	3250.21
1000 %XF	1000	10	4626.09	4897.84	5095.34
		70	3989.86	4231.41	4406.97
		30	3353.63	3564.99	3718.6
1000 %XF	80	10	4792.83	5094.66	5316.59
		20	4138.07	4406.36	4603.63
		30	3483.31	3718.07	3890.68
1000					