



## ***Rock Dust Fertilizer Increases Riesling Grape Yield in Clare Valley***

*March 2008*

### **Aim:**

Subsequent to previous grape trials conducted in Cadell in 2006-07, Fishers Creek Rock Dust (FCRD) conducted a new trial to test the effects of FCRD fertilizer on Riesling grape yields in the Clare Valley wine region.

### **Method:**

The trial was conducted on 4 Riesling grape rows on a vineyard in the Mintaro area of the Clare Valley. FCRD fertilizer was applied to these 4 rows of vines in May 2007. The FCRD fertilizer application rates for this trial consisted of a control (0 t/ha), 2.5 and 5 t/ha. In February 2008, a total of 64 grape bunches were then randomly picked from each of the three application rates. These 192 grape bunches were then weighed and statistical analysis performed to determine the effect of varying FCRD application rates on average grape bunch weight.

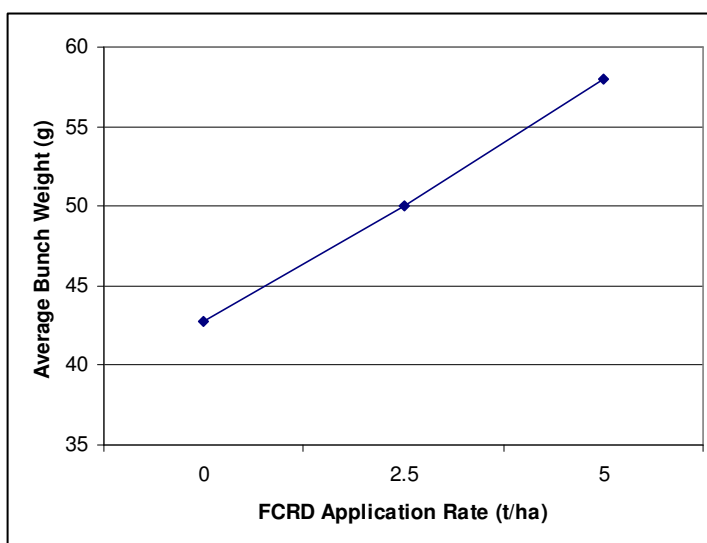
### **Subsequent Analysis:**

Given statistically significant increases in average bunch weights were identified in this trial, a Cost / Benefit analysis was then undertaken to assess the economic outcome to the grower given grape prices, application rates, and the price of FCRD.

### **Results:**

Results from this trial indicate that the average grape bunch weight significantly increased when applied with 2.5 and 5 t/ha of FCRD as opposed to a control application rate of zero. As shown in Figure 1, when vines were applied with 2.5 t/ha of FCRD there was a 14.49% increase in average grape bunch weight when compared to the control group. There was also a 13.71% increase in average bunch weight when 5 t/ha of FCRD was applied to vines when compared to 2.5 t/ha application rate. Furthermore, when compared to the control group, average bunch weight increased by 26.21% when applied with 5 t/ha of FCRD fertilizer. These results are graphically illustrated in Figure 1 and also shown in Table 2 below:

### Average Grape Bunch Weight



**Figure 1.** The effect of increasing FCRD application rate on average grape bunch weight.

### Bunch Weigh: Standard Errors

| FCRD Application Rate (t/ha) | Average Bunch Weight (g) | Standard Error |
|------------------------------|--------------------------|----------------|
| 0                            | 42.78                    | 2.16           |
| 2.5                          | 50.03                    | 2.55           |
| 5                            | 57.98                    | 2.86           |

**Table 1** – Summary of average grape bunch weight analysis and standard error.

Table 1 above shows the average bunch weight (g) of grapes from the three FCRD application groups. Furthermore, it shows the standard error score that corresponds with each FCRD application rate and represents the statistical variation observed from the average weight.

The increases in average bunch weights for both the 2.5 t/ha and 5 t/ha application rates are further supported by t-test calculations that show that these increases in average bunch weights occurred with a confidence level of above 96%. The percentage increases in average bunch weights and t-test confidence scores are illustrated in Table 2 below.

### Bunch Weight – Confidence Levels

| Comparisons Between Application Rates (t/ha) | Percentage Increase in Average Bunch Weight | T-test Confidence Level |
|--|---|-------------------------|
| 0 - 2.5                                      | 14.49%                                      | 96.80%                  |
| 2.5 - 5                                      | 13.71%                                      | 98.01%                  |
| 0 - 5  | 26.21%                                      | 99.97%                  |

**Table 2** – Average bunch weight increases and t-test calculations between varied FCRD application rates. [Note: any data points that fell outside three standard deviations of the mean were considered ‘outliers’, and were subsequently removed from the data set.]

### Cost / Benefit Analysis:

Using data obtained from this trial at 2.5 t/ha, FCRD collaterally suggests the grower would have made a 268% gain on his investment of \$5,313 over 10 Ha of grapes in that year. Furthermore, using data obtained from this trial at 5 t/ha, FCRD collaterally suggests the grower would have made a 233% gain on his investment of \$10,625 over 10 Ha of grapes in that year. This is shown in Table 3.

### Trial 2. Mintaro 2008

| Mintaro 08 Cost / Benefit Analysis   |                 | Mintaro 08 Cost / Benefit Analysis   |                 |
|--------------------------------------|-----------------|--------------------------------------|-----------------|
| FCRD Application Rate (t/ha)         | 2.5             | FCRD Application Rate (t/ha)         | 5               |
| FCRD Spread Rate                     | 1/4             | FCRD Spread Rate                     | 1/4             |
| FCRD Cost per 10 Ha                  | \$5,313         | FCRD Cost per 10 Ha                  | \$10,625        |
| % Increase in Yield                  | 14.49%          | % Increase in Yield                  | 26.21%          |
| \$ per tonne of grapes               | \$2,000         | \$ per tonne of grapes               | \$2,000         |
| Tonnes of grapes per Ha              | 6.75            | Tonnes of grapes per Ha              | 6.75            |
| Benefit per 10 Ha                    | \$19,562        | Benefit per 10 Ha                    | \$35,384        |
| Profit = Benefit – Cost              | <b>\$14,249</b> | Profit = Benefit – Cost              | <b>\$24,759</b> |
| <b>Percentage Gain on Investment</b> | <b>268.22%</b>  | <b>Percentage Gain on Investment</b> | <b>233.02%</b>  |

**Table 3.** Cost / Benefit analysis for 2.5 t/ha and 5 t/ha application rates over 10 Ha for Mintaro trial.

### Discussion:

The results obtained by FCRD in this trial show that the FCRD fertilizer application of both 2.5 t/ha and 5 t/ha significantly increases Riesling grape yield in the first growing season. Furthermore, Cost / Benefit analysis indicates that there is significant financial benefit in applying the FCRD product on Riesling grape vines to the level of 2.5 t/ha and 5 t/ha.

The previously conducted trials in Cadell 2006-07 had limitations due to significant variations in vine vigour along the rows. Furthermore, those trials were more susceptible to errors due to sample size and random sampling errors. Whilst random sampling errors may still occur, this study aimed to alleviate limitations by conducting the trials on more consistent vines and with a much larger sample size.

**Future Directions:**

The results of this trial are consistent with previous trials conducted in Cadell in 2006-07 where it was found that average grape yields significantly increased further in the second growing season without any further application of FCRD fertilizer. With that in mind, FCRD aims to continue this current trial in future growing seasons to further investigate the short and long term effects of FCRD fertilizer on Riesling grape yields in the Clare Valley wine region as well as investigating additional trials in the other grape growing regions.