Lime sources trial

Hosts: Mackie Family

Nathan Dovey, CEO, SCF

KEY MESSAGES

- The 2021 season was exceptionally wet at Kendenup, with 831mm recorded at the nearby DPIRD Kendenup West weather station.
- Severe and prolonged waterlogging was experienced at the trial site, and this likely caused yield variation unrelated to the lime treatments.
- The two lower yielding treatments are likely to be due to waterlogging effects in 2021 rather than differences due to the lime sources.
- Stirlings to Coast Farmers will employ a contractor to test the soil pH ($CaCl_2$) at 10cm increments down to 50cm soil depth in 2022.

Background & Trial Aims

The lime sources trial at Kendenup was established in 2015 to address the lack of long-term lime trials in the southern High Rainfall Zone (HRZ). John Blake (SCF) set up the original trial with funding from South Coast Natural Resource Management (SCNRM). The aim was to evaluate five different sources of lime from the southwest to determine if there were changes in soil pH or grain yields over time. SCF continued monitoring the trial in the intervening years and received funding in 2020 from the National Landcare Program (NLP) to continue monitoring and reporting on the trial results to benefit members and the agricultural industry.

Methodology

A two-replicate broad-scale trial was set up in 2015 with plot dimensions of 130m by 30m. The lime source treatments were:

1. Bornholm
2. Denmark
3. Lancelin
4. Redgate
5. WALCO
6. Nil control
7. 3 times 2(t/ha) Lime equivalent of 6t/ha Lime

Each lime source had the product rate (t/ha) adjusted to ensure each plot received the same amount of neutralising value (NV). For example, the reference liming rate was 2t/ha with a NV of 80%. Lime with a slightly lower NV, say 74%, had a higher rate of lime applied to make the NV's even between treatments. Soil-sampling contractors carried out a comprehensive soil testing regime to determine the baseline soil acidity levels in each plot from three different soil depths; 0-10cm, 10-20cm and 20-30cm, in 2015. The soil sampling locations were geo-referenced, so re-testing years later can be carried out from the same position within the plot.

In 2021 the trial paddock was sown to canola.

Results and Discussion

Canola yields from the 2021 season show that none of the treatments are significantly different, despite the Bornholm and WALCO lime treatments having lower yields than the others. The trial site suffered severe waterlogging in 2021, with 831mm of rainfall for the calendar year. The waterlogging caused significant yield variation across the trial site, which would have had a greater influence on final grain yields than soil pH. The large variation in the untreated control (UTC) plots is displayed in table one below.

Table 1: Mean canola yields (t/ha) in 2021 from the untreated control (Control) plots.

Replicate 1	Replicate 2
UTC Plots	UTC Plots
1.48	2.24
1.13	1.74
2.85	1.75

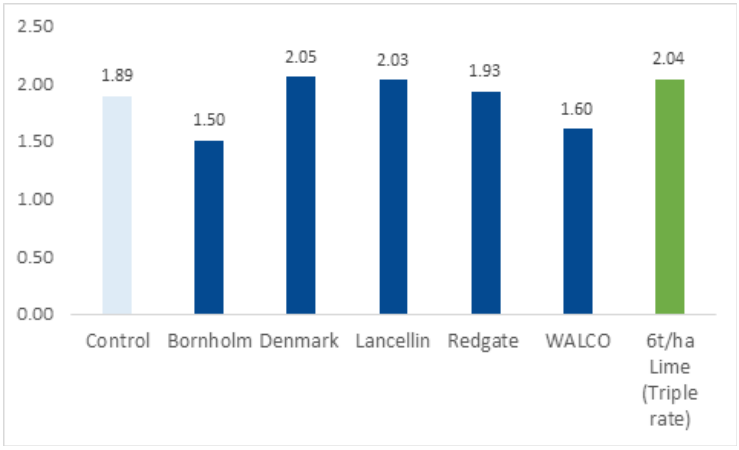

Figure 1: Canola yields (t/ha) from the Kendenup Lime Sources trial in 2021. None of the treatments was significantly different from each other.
Note: The paddock suffered severe waterlogging in 2021, which affected yield results in ways we could not quantify.

Last year's results should be interpreted with caution. We recommend waiting until the 2022 yield data is determined before putting the 2021 results in context. SCF researchers have booked a soil sampling contractor to test the soil pH at 10cm increments down to 50cm soil depth before seeding in 2022. The soil data will compare pH at depth from the different lime sources.

During the 2017, 2018 and 2020 seasons, there were also no significant yield differences between the trial treatments. Our interpretation was that the paddock started with an adequate soil pH of (4.8-5.2 $CaCl_2$) and then had the equivalent of 2t/ha Lime applied at 80% neutralising value. The adequate starting soil pH means that pH would not have had a significant impact on crop yields at this site. Any impact from root systems compromised by sub soil pH issues would be masked by the 'soft' seasonal finishes experienced in the past few years, where the crops could access sufficient moisture and nutrients from shallower soil unaffected by pH.

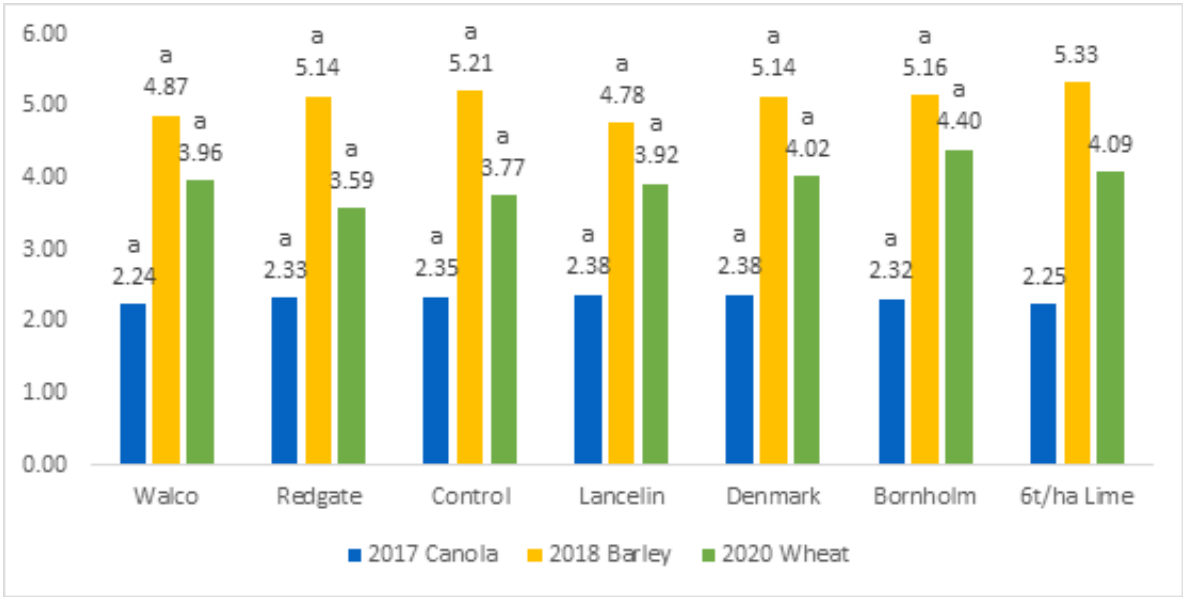

Figure 2: Grain yields (t/ha) from the Kendenup Lime sources trial in 2017, 2018 and 2020. Means followed by the same letter or symbol do not significantly differ (P=.05, LSD).
NB: There is only one replicate of the high rate (6t/ha lime treatment), which means we cannot complete statistical analysis on this treatment.

Conclusion

The yield variation between plots caused by severe waterlogging in 2021 was much greater than any possible effects due to the different lime sources being evaluated. In isolation, the 2021 data set has negligible value but may be interesting to review in the coming years when more yield and soil data is obtained. The soil data to be collected in 2022 will be valuable in assessing if there are any commercially valuable differences between each lime source. For example, has one or more lime sources changed the topsoil pH faster than others? Have one or more lime sources improved soil pH at depth compared to others? Results will be published for SCF members later in the year.

Thank you to South Coast Natural Resource Management (SCNRM) for providing the original funding for this trial.

Many thanks to the National Landcare Program (NLP) for funding the ongoing trial observations since June 2020.

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