# Managing Acidity

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**Key messages**

- In furrow remediation could be useful in managing acidity generated by fertiliser placement.
- CalSap® is a liquid product which can be used to manage acidity generated by fertiliser in the furrow.

**Aim**

Examine the effect of variable rates of fertiliser on acidity in the furrow and how CalSap® interacts with soil pH over a period of time at different locations in the profile.

**Background**

CalSap® is a liquid product designed to prevent further acidification from banded fertiliser in the soil. In this case the liquid was banded at seeding with liquid nitrogen (N). The suggested application rates for a sandy soil is 4-5 L/ha. In this farmer demonstration the Dodd's compared different rates of CalSap® (0, 5 and 10 L/ha) and different rates of fertiliser.

Optima CalSap® is 6% calcium, fully soluble, and has an organic chemistry base that makes the product reactive. With a pH of 12.5 this process also makes the product soil and plant safe.

Previous trial data has demonstrated that CalSap® is high reactivity and alkalinity is a useful tool in changing pH levels where the seed and fertiliser is placed. The management of furrow pH will lead to better nutrient recovery and therefore improved efficiency from the applied fertiliser. An improved pH in the root zone will allow for potential increases in biological activity and less root pruning. Soluble calcium provides additional benefits to plants and soil over simple acid neutralization when applied to the root zone. Optima CalSap® should not be seen as a lime replacement to remediate existing acidity but one component of a strategy to address acidity on the farm.

**Trial Details**

| | |
|---|---|
| **Property** | Mike and Narelle Dodd, west Buntine |
| **Plot size & replication** | 300m x 14m x no replications |
| **Soil type** | Yellow Sand (pear tree) |
| **Soil pH ($CaCl_2$)** | 0-15cm: 4.5 15-40cm: 4.3 |
| **EC (dSm)** | 0.05 |
| **Sowing date** | 30/05/2014 |
| **Seeding rate** | 3 kg/ha Stingray |
| **Fertiliser** | 30/05/2014: 35 kg/ha AgFlow, 10 kg/ha Muriate of Potash, Flexi-N as per protocol (Table 1)<br>20/07/2014: 30 L/ha of Flexi-N at cabbage |
| **Soil Amelioration** | 27/03/2013: 2 t/ha Limesand, full cut cultivation |
| **Paddock rotation** | 2010: pasture, 2011: wheat, 2012: wheat, 2013: wheat |
| **Herbicides** | 29/05/2014: 1.1 L/ha Glyphosate, 1.1 kg/ha Atrazine, 1 L/ha Propyzamide<br>01/06/2014: 1.1 kg/ha Atrazine<br>28/06/2014: 500 mL/ha Clethodim |
| **Growing Season Rainfall** | 185mm |

**Results**

The highest yielding treatment was 0.75 t/ha and received 30 L/ha Flexi-N and 10 L/ha CalSap® (Table 1). The lowest yield recorded was 0.59 t/ha for 30L/ha of Flexi-N and no CalSap®. This was an un-replicated farmer demonstration so it is difficult to tell if a difference in yield is random paddock variation or caused by application of product.

**Table 1:** Canola yield and quality grown with three rates of CalSap® and different fertiliser rates applied at seeding, west Buntine 2014.

| Plot # | Flexi-N (L/ha) | CalSap® (L/ha) | Yield (t/ha) | Oil (%) | Protein (%) |
|---|---|---|---|---|---|
| 1 | 30 | 0 | 0.69 | 42.4 | 23.2 |
| 2 | 0 | 0 | 0.65 | 43.3 | 23.3 |
| 3 | 30 | 10 | 0.75 | 42.7 | 22.7 |
| 4 | 60 | 10 | 0.68 | 41.8 | 23.2 |
| 5 | 30 | 5 | 0.74 | 43.1 | 23.1 |
| 6 | 60 | 0 | 0.69 | 41.3 | 24.4 |
| 7 | 60 | 5 | 0.64 | 41.5 | 24.1 |
| 8 | 30 | 0 | 0.59 | 41.9 | 24.4 |
| 9 | 0 | 0 | 0.71 | 43.2 | 22.1 |

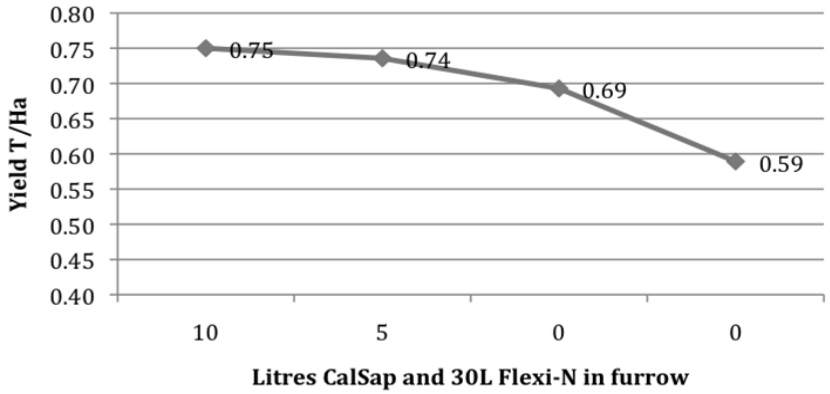


**Figure 1**: Yield comparisons at 30 L/ha of Flexi-N in furrow at Buntine.

## Economic Analysis

**Table 2:** Input costs for treatments compared to income generated from grain yield for trial west of Buntine in 2014 (Includes treatment costs and oil bonuses).

| Plot | CalSap® (L/ha) | Flexi-N (L/ha) | Flex-N Post (L/ha) | Yield (t/ha) | Total Costs ($/ha) | Gross ($/ha) | Net ($/ha) |
|---|---|---|---|---|---|---|---|
| 1 | 0 | 30 | 30 | 0.69 | 74.49 | 346.43 | 271.94 |
| 2 | 0 | 0 | 30 | 0.65 | 61.46 | 323.21 | 261.75 |
| 3 | 10 | 30 | 30 | 0.75 | 90.00 | 375.00 | 285.00 |
| 4 | 10 | 60 | 30 | 0.68 | 103.03 | 339.29 | 236.25 |
| 5 | 5 | 30 | 30 | 0.74 | 86.31 | 367.86 | 281.55 |
| 6 | 0 | 60 | 30 | 0.69 | 86.04 | 342.86 | 256.82 |
| 7 | 5 | 60 | 30 | 0.64 | 94.16 | 317.86 | 223.70 |
| 8 | 0 | 30 | 30 | 0.59 | 70.79 | 294.64 | 223.85 |
| 9 | 0 | 0 | 30 | 0.71 | 60.72 | 355.36 | 294.64 |

**Table 3:** Input costs for treatments compared to income generated from grain yield for trial west Buntine in 2014 (Includes treatment costs and oil bonuses), ranked by return and showing treatment $/ha difference to highest ranked plot.

| Treatment # | CalSap® (L/ha) | Flexi-N (L/ha) | Flex-N Post (L/ha) | Yield (t/ha) | Net ($/ha) | $/ha difference to highest ranking treatment |
|---|---|---|---|---|---|---|
| 9 | 0 | 0 | 30 | 0.71 | 294.64 | 0.00 |
| 3 | 10 | 30 | 30 | 0.75 | 285.00 | -9.64 |
| 5 | 5 | 30 | 30 | 0.74 | 281.55 | -13.09 |
| 1 | 0 | 30 | 30 | 0.69 | 271.94 | -22.70 |
| 2 | 0 | 0 | 30 | 0.65 | 261.75 | -32.89 |
| 6 | 0 | 60 | 30 | 0.69 | 256.82 | -37.82 |
| 4 | 10 | 60 | 30 | 0.68 | 236.25 | -58.39 |
| 8 | 0 | 30 | 30 | 0.59 | 223.85 | -70.79 |
| 7 | 5 | 60 | 30 | 0.64 | 223.70 | -70.94 |

**Comments**

The demonstration site was sown with favourable conditions continuing into May and June. July was dry and August was drier with some really high temperatures when soil moisture was all but exhausted. The higher applications of N have suffered from the production of biomass that has affected yield in the hot dry conditions. Mike has commented that in retrospect the post application of N would have been better left out. CalSap® at the lower rates of N seem to have been worthwhile economically but as the trial is not replicated and there are some inconsistencies in plots of the same treatments results should be treated with caution. It is hoped that the trial can be continued next year. Closer evaluation of soil pH through the profile will be investigated to determine changes.

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**Paper reviewed by:** Brendan Edwards, Optima Agriculture

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