# Solid vs Liquid Fertiliser Economics: 2020 Case Study

## Burdekin grower: Warren Viero

*Growers participating in Project Catalyst trials worked with economists from the Department of Agriculture and Fisheries to identify costs and benefits of the trials. In this study, Warren Viero together with Farmacist compared liquid fertiliser to granular fertiliser (applied via side dress and stool splitting).*

The objective of the trial was to assess the yield, CCS and economic performance of cane under a granular against liquid fertilizer comparison. Applying liquid fertilizer would also be more convenient in terms of calibration and ease of handling. A further objective was to determine the difference between side-dress and stool-spilt granular application methods on both agronomic and economic outcomes.

Costs and production data for each treatment were collected to compare profitability. This included examining differences between the side dressed granular fertiliser, the stool split applications of granular fertiliser, and the liquid fertiliser.

Given the trial block's history of poor soakage, the grower was interested in determining which method of fertiliser application would be the most effective with furrow irrigation. The analysis presents the second ratoon yields, CCS, variable costs, and gross margins.

### Trial design

Farmacist conducted the trial with Warren Viero on his farm located in the Burdekin region. The randomised strip trial was established in 2019 on a second ratoon crop of Q252 harvested in 2020.

**Key findings**

- The granular side-dressed treatment had significantly higher yields, sugar and gross margin results when compared to the stool split and liquid fertiliser treatments ($p<0.05$).
- Further validation of results over multiple seasons, on similar soil types and conditions are required. The agronomic impact of stool splitting should also be further examined.

Warren's standard practice in the ratoons is to apply granular fertilizer side-dressed at 177 kg nitrogen/ha (N/ha). The trial compared the same level of N (177kg N/ha) under three treatments, each with four replicates: Granular fertiliser stool-split; Granular fertiliser side-dressed and Liquid fertilizer stool-split. There were differences in the P-K-S combinations between the granular and liquid fertilisers due to the availability of commercially equivalent products (see Table 1). However, from an industry perspective, these differences were not expected to have a significant impact on production.

***Table 1: Nutrient application rates***

| Treatment | Kg/ha | | | |
|---|---|---|---|---|
| | N | P | K | S |
| Granular (side-dressed) | 177 | 12 | 73 | 18 |
| Granular (stool split) | 177 | 12 | 73 | 18 |
| Liquid fert. (stool split) | 177 | 11 | 70 | 15 |

## Agronomics

Trial results (Figure 1) show that the Granular side-dressed treatment achieved the highest average yield (9t/ha more than the liquid fertiliser treatment). This difference was statistically significant (p<0.05).

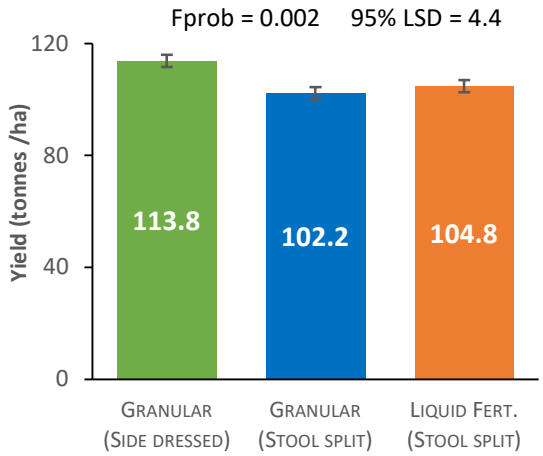


***Figure 1: Average cane yields (Tc/ha)***

There was also a significant difference in sugar (Figure 3) between the treatments with the Granular side-dressed treatment having a 1.8ts/h higher sugar yield when compared to liquid fertiliser (p<0.05). There was, however, no significant difference in CCS (Figure 2).

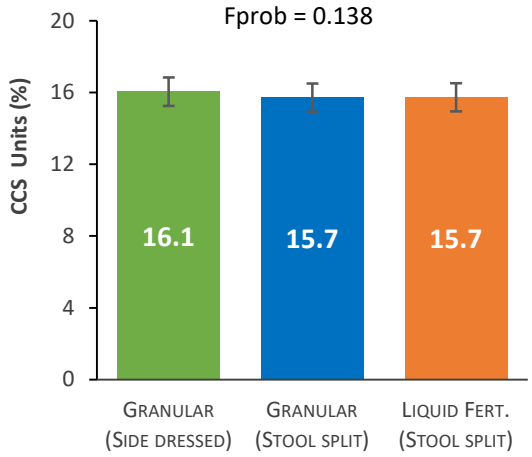


***Figure 2: Average CCS***

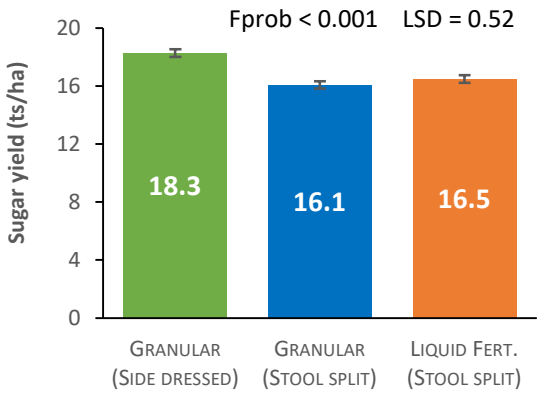


***Figure 3: Sugar yield (Ts/ha)***

## Costs

Figure 4 presents the variable costs for the second ratoon. Differences in costs were due to differences in fertiliser prices, method of application, and costs that changed with yield (harvesting costs and levies). The liquid fertiliser had a higher product cost compared to the granular fertiliser treatments, with stool splitting also increasing costs against side dressing application.

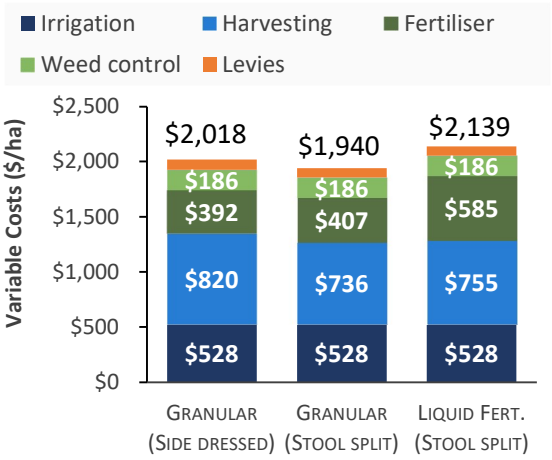


***Figure 4: Treatment variable costs***

## Gross margins

The gross margins (revenue less variable costs) for each treatment are presented in Figure 5. The Granular side dressed treatment had a signficantly higher gross margin ($581-$660/ha higher) when compared to the other two treatments (p<0.05). This was largely due to the higher sugar yield but also due to lower fertiliser product and application costs.

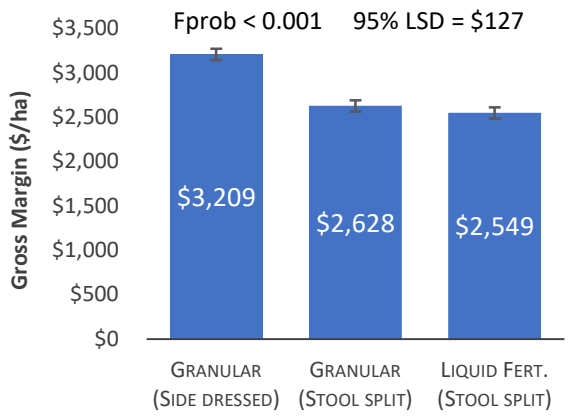


***Figure 4: Gross margins ($/ha)***

## Conclusion

Results show the Granular fertiliser side-dressed treatment had a significantly higher yield and gross margin ($p<0.05$) when compared to both stool split treatments (i.e. liquid and granular). These differences could confidently be attributed to the treatment effects.

There was very little difference in gross margin between the granular stool split and liquid fertiliser stool split treatments which may suggest that application method rather than product type was the most important factor impacting the overall economic results.

To further validate the results, it would be worthwhile to extend the trial over a full crop cycle and across a number of seasons, locations and soil types to see if the similar results are observed.

***Note: the trial results are specific to this grower, paddock and prevailing conditions.***

**We acknowledge the contribution made by Farmacist in collection of trial data used in this publication, and Angela Anderson (DAF) for the statistical analysis and guidance.**

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*Publication date: June 2021*

*Project Catalyst is funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation, and the Coca-Cola Foundation with support from WWF-Australia and Catchment Solutions Pty Ltd.*