

# Soil Wetter Comparison at Palmdale

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## Key messages

- Barley yield increased from the untreated control (UTC) by 420kg/ha using 3L/ha of 'Aquifer®' and 560kg/ha using 3L/ha of 'SE14®', on the poorest yielding section of the trial.
- Yield differences from other sections, including two separate high performing areas, were not significantly different to the control.
- 2021 was a very wet season with 808.8mm of rainfall recorded by the on-farm weather station.
- The sandplain soil is typically non-wetting and would benefit from clay application and incorporation.

## Background and trial aims

Local farmers in the Takalarup and South Stirlings areas have predominantly sandplain soil types (grey sandy duplexes) that are often acidic and non-wetting. Spreading clay and incorporating from 0-40cm has successfully ameliorated these constraints. However, clay spreading is costly and takes a long time to implement, with some growers ameliorating only one paddock per year. Therefore, even growers with a dedicated annual claying program are looking for short-term, cost-effective solutions to alleviate non-wetting topsoil. Short term solutions are desired until more expensive, but longer-term, amelioration such as claying can be undertaken.

Growers and agronomists know that SE14 has been most effective at alleviating non-wetting topsoil on forest gravel soils. Data for other soil types, like sandplain soil, is limited or variable. Therefore, growers are conducting their own on-farm experiments to measure yield differences and calculate returns on investment. Previous research has indicated that if one wetting agent effectively overcomes non-wetting, other formulations and brands are also likely to be effective. Farmers constantly evaluate their input costs, and wetting agents are no exception.

## Treatments

1. Untreated Control  
Cost per hectare: \$0.00
2. 3 Lt/ha SE14® applied in-furrow  
Cost per hectare: \$15
3. 3Lt/ha Aquifer® applied in-furrow  
Cost per hectare: \$25

## Method

The grower seeded the treatments in three 36m wide replicates in 1.8 km strips on a pale deep sandy paddock. The paddock suffered from severe waterlogging in 2021. Philip Honey (SCF Smart Farms Coordinator) divided the strips into different yielding zones to analyse the data separately based on yield performance and eliminate sections of the trial affected by inundation or other waterlogging effects (Fig 1). The presented yield for each yield performance zone is the average of yield monitor data for the length of the performance zone. DPIRD biometrician Andrew VanBurgel then analysed the raw data to determine if the observed grain yield differences were statistically significant.

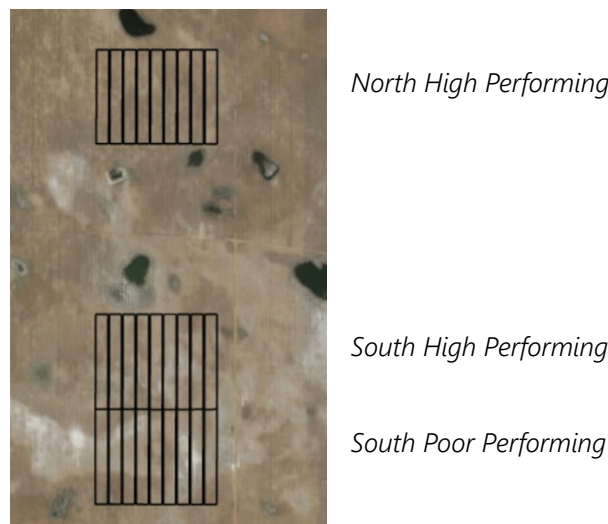


Figure 1: Example of how the non-wetting trial was divided into three separate yield performance zones determined from the harvest yield data (Takalarup, 2021).



Table 1: Change in profit (\$/ha) from wetting agent applications compared to the untreated control. 'Whole Plots' refer to the treatment means calculated from the entire 1.8km strips, and 'Poor Performing' relates to the means calculated from the poor yielding sub-section of the 1.8km strips.

Treatments	Whole Plots	Profit (\$/ha)	Poor Performing	Profit (\$/ha)
	Revenue (\$/ha) - Wetter Costs	Revenue (\$/ha) - Wetter Costs		
UTC	\$ 1,347.50	\$ -	\$ 1,034.00	\$ -
3Lt/ha SE14®	\$ 1,394.00	\$ 46.50	\$ 1,163.00	\$ 129.00
3Lt/ha Aquifer®	\$ 1,362.75	\$ 15.25	\$ 1,134.50	\$ 100.50

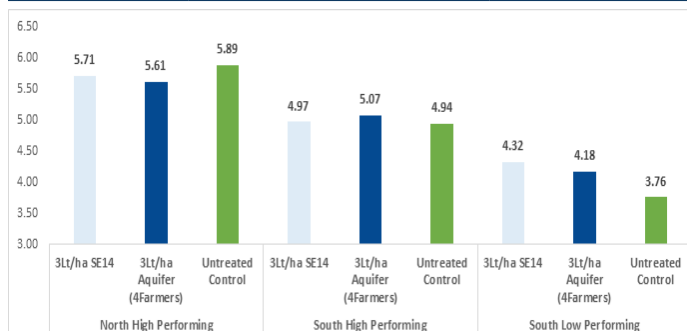


Figure 2: Barley grain yield (t/ha) by "Performance Zone" from the Palmdale wetting agent comparison trial in 2021. "Performance Zones" are categorised on the raw yield data obtained from the harvest yield monitor.

## 2021 Season Summary

In 2021, 808.8mm of rainfall was received on the property measured via an on-farm weather station 2km from the trial site. Based on the nearest Bureau of Meteorology (BOM) station the 2021 season was a decile ten rainfall year.

## Results & Discussion

The mean yields of performance zones (Figure 2) highlight the variability of the wetting agent responses in the 2021 Palmdale trial site. None of the treatments were statistically different, including the "poor performing" area. Although not statistically significant, we calculated the additional revenue from using the wetting agents.

The whole 1.8km plots were also not statistically different between treatments. However, a basic economic calculation was completed to quantify the modest increase in yield relative to the cost (Table 1). The 2021 season was exceptionally wet, and the impact from non-wetting soils may have been minimised compared to a drier rainfall year.

These 2021 results suggest that the response to wetting agents is greater in the poor performing soil types compared to the higher-performing areas. If a grower wanted to reduce the costs of wetting agents, they might consider only applying products to poorer soil types, which could be determined by merging multiple yield maps or other paddock mapping information such as satellite imagery.

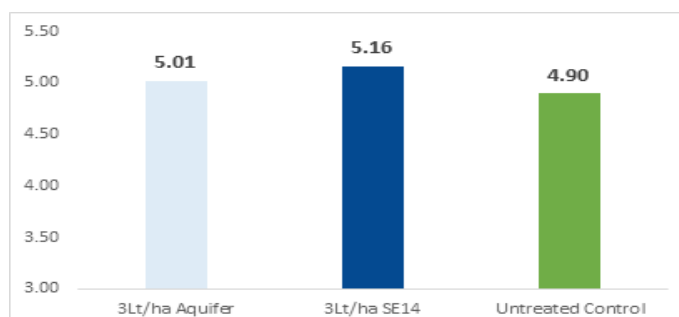


Figure 3: Average barley yields (t/ha) of the three wetting agent treatments (Takalarup, 2021). Treatment means were determined by averaging the harvest yield monitor data over the 1.8km paddock strip lengths

The 4Farmers product, Aquifer®, was cheaper than SE14® to apply but had a lower return on the responsive soil types. Given SE14® has been on the market longer and has more data to support its efficacy, there is not enough evidence to recommend changing products. However, the results from Aquifer® were positive enough to continue measuring its effectiveness against SE14®. Other factors such as ease of handling and mixing compatibility with Flexi-N, fungicides or trace elements could also influence using one product over another.

The data generated from the 2021 trial warrants further investigation on similar soil types in a drier season. Drawing conclusions based on one season of data is a risky strategy. Repeating the treatments on more paddocks and in different rainfall seasons would give greater confidence to the conclusions drawn.

## Conclusion

Applying wetting agents to sandplain soils generated extra profits for this grower despite the very wet season. However, the wet season added more variability to the yield data, which reduces confidence in the results. Based on the available evidence, the continued use of SE14® on this sandplain soil is justified while also comparing it to untreated control or other products on the market. With additional data like this trial, growers should be more confident about the benefits of using wetting agents and which circumstances lead to higher returns from wetting agent usage.