

Stubble Management in the High Rainfall Zone

*Beech Family, Frankland River / Webster Family, Kendenup
Allison Family, Rocky Gully / Hood Family, South Stirling*

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Key Messages

- Stubble management is a significant issue in the high rainfall zone of WA with a 7t/ha cereal crop typically producing up to 10t/ha in stubble.
- This investment aims to investigate chemical (Res+ and Digest-it) products in conjunction with (and without) mechanical stubble incorporation for stubble breakdown.
- The project will include two small plot trials and three paddock scale demonstrations in the region.

BACKGROUND

Stubble management is a significant issue in Western Australia particularly in the high rainfall zone, where it is not uncommon for cereal grain yields to reach over 7 t/ha with the resulting stubble loads being up to 10 t/ha. This is a high amount of stubble residue left post harvest and is an increasing concern for local growers due to poor establishment of following crops, nitrogen (N) tie-up, disease carryover issues, and seeding operation inefficiencies such as blockages, hair pinning, poor soil throw, and bulldozing. As a result, plant establishment has become increasingly difficult, particularly in Canola.

Previous GRDC research has been conducted to understand the additional N requirements needed to overcome early N immobilisation by stubble. This research suggests that an additional 5-6 kg N/t of cereal residue can help overcome the issues of stubble N immobilisation. Investigation into whether the addition of nutrients, in addition to an enzyme 'digester,' to stubble in conjunction with mechanical stubble treatments during the summer fallow period, can increase the rate of stubble breakdown to allow for improved winter crop establishment (especially canola) and reduction in early season nitrogen tie-up. Reduced carryover of stubble-borne diseases could also be explored via observations.

Broadly, this project will pilot the effectiveness of stubble management/break-down options (chemical and mechanical) in the Albany port zone and assess how these treatments impact on soil nitrogen 'tie-up' and establishment of the following winter crops.

To achieve this, two small plot trial sites and three farm scale trial sites have been established in early 2025 in the Albany Port zone. The trial sites will be used to collect scientifically robust data on what treatments effectively manage the high stubble loads commonly faced by farmers in the high rainfall zone of the Albany Port Zone. The project will run from Autumn 2025 through until Autumn 2026.

METHODOLOGY/TREATMENTS

Small plot Trials

Two triple replicated small plot trials were implemented in early March and located in Frankland River and South Stirling. The biological and nutritional treatments were duplicated (blocked design) with these treatments being applied to both stubble that is left standing and stubble that is incorporated (with rotary tiller) after treatments are applied. The trials total 16 treatments, replicated 3 times. The treatments have been completely randomised within each block and applied at rates as per manufacturer recommendations, discussed with suppliers Adama and Bio-Ag.

The small plot trial treatments include:

Block 1 – Standing Stubble

- Res+ – one application early March & late March (1.2l/ha)
- Res+ - Later application (late March) – 1.2lha – slight change due to Adama recommendation
- Digest-it (Bio-Ag) – one application (with rainfall) - 3l/ha + 20L/UAN
- UAN (50L/ha) – 21kg N/ha – February 2025
- UAN – Rate determined by stubble breakdown requirements (measure stubble load).
- Liquid NS (74L/ha)- 21kg N/ha & 5.77kg S/ha – February 2025
- Granular N/S (21kg N/ha, 5.77kg S/ha) – February 2025
- Untreated (control)

Block 2 – Rotary Tilled after product application

- Res+ – one application, early March (1.2l/ha)
- Res+ - Later application (late March) – 1.2lha - slight change due to Adama recommendation

- Digest-it – one application (with rainfall) - 3l/ha + 20L/UAN
- UAN (50L/ha) – 21kg N/ha – February 2025
- UAN – Rate determined by stubble breakdown requirements (measure stubble load).
- Liquid NS (74L/ha)- 21kg N/ha & 5.77kg S/ha – February 2025
- Granular N/S (21kg N/ha, 5.77kg S/ha) – February 2025
- Tilled only (control)

Paddock Scale Trials

Three farm-scale trials were implemented in early March 2025 and monitoring of these trials will continue through to grower harvest of the 2025 winter crop (incl. subsequent soil & stubble sampling). The locations for the trials are Frankland River, Perillup and Kendenup. At least two mechanical stubble management options were applied at each site in conjunction with plus and minus Res+. The paddocks used for each demonstration were cropped to barley in 2024 and will be seeded with canola in 2025. The trial design was replicated twice and randomised (Figure 2).

Trial Map Treatment Description

Trt	Code	Description
1	CHK	Res 1
2		Res 2
3		DG
4		UAN 1
5		UAN 2
6		L-NS
7		G-NS
8		UTC

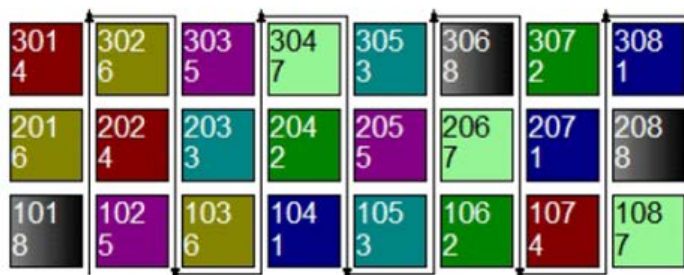


Figure 1: 2025 Stubble Management small plot trial – Standing stubble block design.

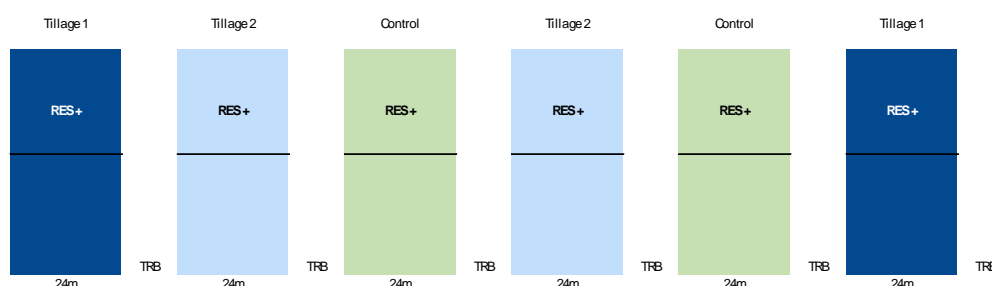


Figure 2: 2025 Stubble Management paddock-scale design

TRIAL MEASUREMENTS

Small plot and farm-scale trials will have all the same trial measurements conducted with the exception of the N-wise testing and the mesh bags for stubble breakdown for the small plot only. Photo monitoring using Canopeo will be used to observe stubble breakdown. The complete list of trial measurements is listed below:

- Baseline/initial stubble load (stubble biomass cuts/dried & weighed)
- Baseline stubble sampling for disease loading – SARDI testing
- Baseline comprehensive soil testing 0-10cm, 10-30cm.
- Predicta B – Paddock scale only
- CSBP Potentially mineralisable N – baseline & pre-seeding 2025, 2026.
- Stubble breakdown – Photo monitoring, post treatment & Pre-seeding (using Canopeo App).
- Stubble breakdown – Mesh Bags*
- Stubble sampling for disease loading pre-seeding 2025 & 2026 – SARDI testing
- N-wise testing (Day of seeding)
- Canola establishment counts (plants/m²)
- Canola tissue testing (H100).
- NDVI (multi-spectral drone) – two timings (early establishment & at canopy closure)
- Canola harvest yield and seed quality – Kalyx
- Post-harvest comprehensive soil sampling 0-10cm, 10-30cm.

* Mesh bags will be used to store cut stubble treated with the nutritional and biological treatments. These will be lain on the surface of the soil (replicating standing stubble) and shallow buried (to simulate tilled) and left until time of seeding, where the material in the bags will be recovered, dried and weighed. This is current best practice on advice from Dr Ismail Garba (Cropping Systems Scientist, CSIRO) who has experience in measuring crop residue breakdown

SUMMARY

Given the local grower and adviser interest in stubble breakdown products such as Res+, it is hoped this project will provide farmers with scientifically robust and independent data so they can make informed decisions on use of these products going into the 2026 growing season. In-season field walks, trials review presentations and communications materials are planned to extend this information widely.

ACKNOWLEDGMENTS

Stirlings to Coast Farmers would like to acknowledge the GRDC for investment in this project and project partner 'Frankland Rural'.

