



# **STUBBLE RETENTION CASE STUDY**

with Denis Tomlinson

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**Submitted by:  
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**September, 2022**

# Introduction

Stubble Retention in the cropping systems of Riverine Plains was made possible with funding from GRDC and thanks to the Sustainable Agriculture Victoria – Fast Tracking Innovation Initiative. In addition, we are thankful to the Foundation for Rural and Regional Renewal (FRRR), and the William Buckland Foundation, for providing the opportunity to better understand key drivers in stubble retention systems through the publication of the research and farmer case studies to showcase the outcomes from the project.

The Stubble project was a 5-year program initiated in 2013. GRDC commissioned 10 projects involving Riverine Plains and 15 other farming systems groups/research organisations. It was dubbed 'The Stubble Initiative'. Each of the 10 projects focused on a locally relevant issue that impacted on the profitability of retained-stubble systems across a range of environments in Southern Australia. The projects aim was to develop regional guidelines and recommendations to assist local growers.

## Key Learnings

- Stubble management is not a key driver of yield – stubble management approaches should be considered strategic and flexible not a fixed element that has to be managed around. It is recommended to retain where possible but use tools such as mulching or incorporation to optimize the efficiency of the farming system. Only use burning as a strategic tool when necessary.
- Long stubble shades the emerging crop, resulting in a delay in flowering and maturity. Growers can use this to their advantage by sowing crops earlier into a longer stubble and still have them flower in the correct window, allowing the spread of sowing operations.
- Long stubble did not significantly increase the risk of frost damage in the Riverine Plains region. The likelihood of frost damage is directly connected to the date of flowering and is dependent on whether the date of the frost event coincides with flowering. Managing risk of frost damage by employing a range of sowing dates or stubble heights across a variety/paddock helps spread the risk.
- If full stubble retention is not feasible due to machinery, weeds or disease constraints, there are other options such as shallow incorporation, slashing straw or cutting short at harvest which can reduce the frequency of burning and address timeliness issues.

# Farmer

Denis Tomlinson

# Location

Coreen



## Background

With the help of funding through FRRR we are updating the outcomes from the Stubble Initiative.

Back in 2018 we did a case study with Denis Tomlinson, who farms at Coreen on variable soil types, ranging from heavy clays to clay loam to loams over clay. In this case study we reviewed how Denis' stubble management practices have changed in his farming system over the past 5 years.

### Q. Describe your farming enterprise?

We are dryland continuous cropping enterprise growing wheat, barley, and canola. All our land that can be cropped is. We also run a couple of hundred first cross ewes on areas that cannot be cropped.

### Q. What is your usual cropping sequence /rotation? Is there a pasture phase?

We have a four-year rotation of canola, wheat, wheat, barley but an increasing area of vetch and sub-clover. This helps to reset our paddocks, put some nitrogen back into the soil and clean up some annual ryegrass problem areas.

### Q. What value do you place on retaining stubbles in your cropping system?

We place a high value on stubble retention. We prefer to retain stubbles where we can where the positives of stubble retention are not outweighed by the negative impacts. We are pragmatic with our approach.

### Q. What % of cereal stubble do you retain? Does this vary from year to year with stubble load, or do you have a standard approach across years?

The percentage of stubble that we retain varies year to year, mainly depending on seasonal conditions. In a dry year, low-yielding year we will retain as much as possible, up to 100% of cereal stubble, because it helps keep moisture in the soil. In a year where the stubble load is high, retention may be as low as 30%.

**Q. How do you manage your stubbles within your cropping system?**

We manage stubble height at harvest time by cutting at around 200mm. In addition, since the project ended, we have upgraded our header to a New Holland CR990 which provides us with a much more even spread of chaff and straw, preventing block ups when sowing.

**Q. How do you change your management style based on the weather conditions?**

If the conditions in summer are wet then summer weed control is vital to ensure weeds are controlled before they get too large, as then they become a problem at sowing time. If there is a wet autumn forecast, we will have to burn the paddocks early in preparation. Paddocks with retained stubble take longer to dry out compared to paddocks that have had the straw baled or burnt.

**Q. What is your threshold for any change in management?**

There are a number of factors that we consider but I would say a wheat crop that has yielded over 4t/ha is a paddock that we will have to look at and assess the stubble load.

**Q. What height do you harvest your cereals at?**

200mm.

**Q. How do you manage your stubbles over summer and before sowing?**

Our system is no-till. We do lightly graze the stubbles to clean up any grain left over after harvest, and this helps reduce the likelihood of any major mice or slug problems.



**Q. What is your set up for sowing?**

We have a DBS bar with knife points and press wheels on 300mm spacings. The RTK guidance system on our John Deere 8370RT tractor is vital to inter-row sow accurately, allowing us to sow through our retained stubbles.

**Q. What are the drawbacks to stubble retention?**

Drawbacks include the reduction in effectiveness of pre-emergent herbicides, the potential for seeder blockages, nitrogen tie-up and reduced crop establishment, particularly due to early shading of canola in a cereal stubble. Other issues may include the build up of mice and slugs.

These potential drawbacks can be alleviated using legumes in the crop rotation, and with strategic burning of heavy stubbles.



**Q. As a host farmer for the Riverine Plains Inc GRDC stubble project since 2014, have you changed your farming practice based on the results obtained?**

From the project we have realised that we needed more nitrogen in our cropping system. We are doing this by using higher rates of urea and incorporating legumes in our crop rotation.

At the moment, we are incorporating lime at high rates with the aim of increasing our soil pH at a depth of 125-150mm.

Hopefully correcting our soil acidity problems will open up a greater potential to grow more pulses in the future.

**Q. What do you feel has been one of the greatest learnings to come out of the Stubble project work for the Riverine Plains region?**

The project looked at different stubble management strategies and we now understand what effect each strategy has on our farming system. If a strategy has a negative effect, we can apply practices that ameliorates that effect.

## Summary

- Strategic burning is a useful tool to have, especially when stubble loads are high.
- Accurate GPS systems are vital for inter-row sowing operations which allow the farmers to sow through their stubbles from the previous year
- Different methods of sowing/seeder bars result in different thresholds for change in terms of maximum stubble load that can be retained
- There are some drawbacks associated with stubble retention that may be the reason why some farmers are slow to adopt
  - Poor weed control from pre-emergent herbicide application
  - Still the perception that retaining stubble increases your risk of frost damage
  - Higher risk of pests e.g. slugs, slaters, mice, earwigs
  - Nitrogen tie-up – it is expensive to apply extra fertiliser required and payback is slow
  - Poor establishment due to early shading, particularly for canola sown into cereal stubble.
- It is much easier to retain stubbles in lower rainfall years and the major benefits of doing this then is the conservation of moisture and prevention of soil erosion.
- Stubble management practices to help with high stubble loads include harvesting cereal crops at a lower height or slashing straw post-harvest.

## Gaps/Barriers to Progress

- To what extent does stubble retention help improve soil carbon levels
- Wet summers lead to higher pest populations on retained stubbles – how can we manage these higher pest population efficiently to ensure productivity levels can be maintained?

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