

Stubble preparation trial

The aim of this trial was to investigate the effects of sowing various crops into different stubble management techniques; burnt, burnt and worked, mulched, slashed and standing.

Summary

Cereal stubble should be burnt when sowing wheat, barley or canola. The smaller cereal and canola seedlings do not thrive when grown in stubble. The seedlings are usually more yellow and spindly compared to cereal or canola seedlings grown on cultivated ground. Often barley is able to grow out of this phase and perform reasonably well. Larger seeded crops such as chickpeas and lupins perform best in stubble retained situations.

Background

The purpose of crop residue retention is to reduce runoff, reduce soil loss from wind and water erosion, increase surface soil moisture and build up organic matter levels. Some farmers argue that effective stubble management minimizes the difficulties of continuous cropping. In the past, complete removal by burning has been favored as it does not require specialist sowing equipment and does reduce disease carry over problems. Stubble can also be mulched, slashed or left standing. With slashed stubble the straw should be cut short, chopped and spread evenly. Stubble retention is not ideal in all locations, there can be certain limitations for the following crop and for nutrient requirements. Some preparation techniques have proved to be quite successful in certain areas and very unsuccessful in others depending on soil characteristics and disease problems (also see the next article 'Wheat and barley on medic').

Method

Birchip: Four stubble management practices of burnt, mulched, slashed and standing were prepared in a 3 t/ha wheat stubble. Urea treatments were predrilled in late April. Lasseter chickpeas and Digger lentils were sown at 100kg/ha and 50kg/ha respectively with 80kg/ha GLSZn. Barque barley (70kg/ha) and Karoo canola (5kg/ha) were sown with 80kg/ha MMI.

Charlton: Four stubble management practices of burnt and worked, burnt, slashed and standing were prepared in a 2.2 t/ha wheat stubble. Karoo canola (5kg/ha), Linseed (45kg/ha), Silverstar wheat (80kg/ha), Barque barley (70kg/ha), Wallaroo oats (60kg/ha) were sown with 80kg/ha MMI. Blanchfleur vetch (35kg/ha), Merrit lupins (80kg/ha) and balansa and sub clover were sown with 80kg/ha GLSZn.

Results

The pulse crops at the Birchip site (Table 4.7) looked poor due to drought stress, whilst barley and canola performed reasonably well. There were no trends in crop yield in relation to stubble management practices. The mulched and slashed treatments had poor germination, this could have been due to straw build up around the points at sowing. Barley yields generally declined with the higher urea rates (haying-off) whereas for most treatments the canola yields improved with the higher urea rate.

Table 4.7 Crop yields (t/ha) at Birchip, in relation to various stubble management techniques

Crop	Urea (kg/ha)	Stubble management			
		Burnt	Mulched	Slashed	Standing
Barley	50	2.55	2.38	1.93	2.11
	100	1.87	2.20	1.54	2.22
Canola	100	0.45	0.75	0.68	0.54
	200	0.71	0.63	1.05	0.94
Chickpeas	-	0.17	0.17	0.20	0.24

Lentils	-	0.02	0.03	0.05	0.11
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At the Charlton site (Table 4.8), the burnt and worked preparation produced the highest yields in all cases, except for lupins which yielded best in standing stubble. Wheat performed very poorly in the standing and slashed stubble. There was a yield loss to the high urea rate in all cases. Barley did quite well in the standing stubble and showed a 0.3 to 0.7t/ha response to higher urea rate. Canola's poorest yield was where the stubble was left standing. Linseed yields were very poor, especially where stubble was retained. Lupin yields were highest where stubble was retained. Balansa clover and vetch were not harvested but showed much more vegetative growth in areas where residue was retained.

Table 4.8 Crop yields (t/ha) at Charlton, in relation to various stubble management techniques

Crop	Urea (kg/ha)	Stubble management			
		Burnt &Worked	Burnt	Slashed	Standing
Wheat	50	2.78	2.79	1.75	2.11
	100	2.42	2.21	1.60	1.72
Barley	50	3.53	3.16	2.59	3.31
	100	3.99	3.56	3.27	3.59
Canola	100	1.47	1.47	1.42	1.06
	200	1.40	1.47	1.06	1.19
Linseed	50	0.47	0.40	0.20	0.13
	100	0.56	0.16	0.11	0.07
Lupins	-	0.16	0.67	0.91	0.98

Interpretation

When sowing cereals or canola into cereal stubble it is best to remove the stubble to ensure the smaller seedlings do not have to grow through stubble. Burning stubbles also reduces the disease load on the cereals. Larger seeded crops with more vigorous seedlings such as lupins and chickpeas can safely be sown into stubble, and generally this practice produces the highest yields.

Commercial Practice

Cereal stubble should be burnt if wheat or barley are planned. Burning will reduce the disease load and make it easier for smaller wheat seedlings to establish. Cereal stubble should also be burnt when sowing canola. Canola has a very weak seedling and does not perform well if it has to grow through stubble, in addition, insect pests and slugs thrive on canola seedlings and these are usually found in higher numbers in stubble. Larger seeded crops such as chickpeas and lupins perform better when sown into standing stubble.