

6.7 Enhancing Stubble Breakdown With Additives - Bishopbourne, Tas

Location:

"Brookdene", Bishopbourne, Tasmania

Researchers:

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Funding Organization:

National Landcare Program

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Acknowledgment: Stewart McGee

Rainfall (Mar-Aug): 274 mm

Summary of Findings:

A fertiliser additive was applied to standing stubble and compared with untreated stubble. The fertiliser additive was applied with and without a sticker or molasses. There was no significant difference in the amount of stubble dry matter remaining after 6 months i.e. the rate of stubble breakdown was comparable between all treatments. Similarly there were no consistent effects on feed and chemical characteristics. Addition of nutrients and molasses did not improve intake by grazing sheep.

Background:

Excess straw can be a major problem when sowing through crop stubbles. Apart from burning, incorporation and mechanical breakdown assisting with the breakdown of straw is a potential means of reducing stubble load.

In an Honours project at the Uni of Tas in 2005 over 20 fungal species capable of utilising cellulose were isolated from wheat, poppy and lupin crops. These isolates were screened for relative cellulose and lignin degrading activities, and relative growth on ground stubble under optimal conditions to select those having the most vigorous degrading activities. In glasshouse trials however, addition of microbial inocula to stubble was relatively ineffective in accelerating the decay, except during the initial stages of poppy stubble decay (7 weeks).

In contrast addition of nutrients (nitrogen and phosphorus) to poppy and wheat stubble had a significant beneficial effect on their decay with decreases in dry matter. A field trial was set up to examine these effects further in a commercial situation.

The aim of this investigation was to develop a means of enhancing stubble breakdown using nutrient supplements prior to planting of the next crop.

Method:

There were four stubble treatments:

1. Nil
2. Stubble fertiliser additive
3. Stubble fertiliser additive + molasses
4. Stubble fertiliser additive + sticker

The chemical sticker (Bond) was applied to increase rain-fastness and assist additives to bind onto the straw. Half of the trial was also grazed to determine whether any of the treatments increased the palatability and intake of the straw. The trial was conducted in a triticale stubble, the paddock having been harvested in Jan 2007. Plots were 20m long x 2m wide with 4 replicates (randomised complete block design) for both grazed and ungrazed areas. Treatments were applied on 9th March 2007 using a knapsack sprayer operated at approximately 250kPa pressure with a walking speed of close to 1m/sec. A repeat spray was applied on 26th April.

At the end of the trial straw from each plot was cut and weighed on 23 August prior to paddock preparation for sowing green peas. The late cutting date was used to maximize the duration of breakdown and increase any potential differences between treatments. Stubble was weighed and sub samples dried in an oven at 56°C for 48 hrs. This was to test whether there had been any structural changes to the stubble which will decrease stubble strength so that it breaks more readily upon contact with a cultivating /planting tyne or disc. Samples from each treatment were pooled and sent to Feed Test, Hamilton for fibre, digestibility and crude protein analysis.

Results and Discussion:

There were no significant differences between the 4 treatments in amounts of stubble remaining ($P=0.69$) ie the addition of nutrient additives and molasses had no effect on reducing the mass of stubble. Similarly these additives did not assist in palatability or intake of stubble when the area was grazed. Consequently grazed and ungrazed data is pooled. It is likely that the small amount of additional energy from the supplement for grazing animals is insignificant compared with the volume of straw.

▼ **Table 6.1: Effect of different stubble additives on breakdown of stubble and feed characteristics, Bishopsbourne 2007**

Treatment	Stubble dry matter (DM t/ha)	Crude protein (%)	Fibre content (%NDF)	DM digestibility	Estimate of ME (MJ/kg DM)
Nil	1.62	4.1	79.8	37.2	4.5
fertiliser additive	1.64	3.5	81.2	36.3	4.4
fertiliser add. + molasses	1.65	3.8	80.0	37.4	4.6
fertiliser add. + sticker	1.79	3.5	79.4	36.6	4.4
	not significant				

In Feed Test results the nil stubble contained a higher crude protein content but was intermediate for other tests.

A similar trial conducted in 2006-07 also showed no benefit in terms of increased stubble breakdown or changes in physical and chemical properties. No further work will be conducted by SFS but there is some indication that higher rates of fertiliser are required and this may be examined further in a University student project.





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