FINAL REPORT

GRDC
GRAINS RESEARCH & DEVELOPMENT CORPORATION

UT00026

Optimising cropping practices in mixed farming systems of Tasmania

PROJECT DETAILS

PROJECT CODE:	UT00026
PROJECT TITLE:	OPTIMISING CROPPING PRACTICES IN MIXED FARMING SYSTEMS OF TASMANIA
START DATE:	01.07.2012
END DATE:	30.06.2015
SUPERVISOR:	PETER JOHNSON (PROJECT OFFICER)
ORGANISATION:	TASMANIAN INSTITUTE OF AGRICULTURE
CONTACT NAME:	PETER JOHNSON

Summary

Dual purpose wheat provides an excellent forage and grain crop option for mixed livestock and cropping farms, particularly those with capacity to irrigate.

Tic beans provide an alternative winter forage crop, however, variety selection for disease resistance is paramount to dry matter production.

Clay amelioration of sandy soils provides a reduction in water repellence, substantially improving infiltration rates.

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Conclusions

Grazing of dual purpose wheat sown prior to April caused little reduction in grain yields. The earlier dual purpose wheat is sown, the higher the dry matter that is produced, and therefore available as feed until lock-up at GS30. Grazing in April and May progressively caused reductions in grain yields that increased as grazing intensity increased. Less dry matter was available for grazing the later the sowing time. No significant differences in grain yields and dry matter were identified in relation to the intensity of grazing at GS24 and GS30. Grazing post GS31 resulted in significantly lower grain yields. These grain yield losses were exacerbated with a delay in sowing time. This does, however, provide a risk strategy for growers where they can make a conscious decision to forego grain yields if they believe the dry matter is more valuable (for example, during a drought). The ability to determine grazing intensity and timing of dual purpose wheat is dependent on the time of sowing, seasonal effects and management of the crop. The trade-off between dry matter production to fill the 'feed gap' and harvested grain yield is dependent on individual situations. The use of dual purpose crops as a valuable winter feed to provide relief to pastures and reduce costs associated with hand feeding, while filling the 'feed gap' makes dual purpose wheat an attractive crop alternative in Tasmania (TAS).

Maximising utilisation of land and water resources through use of forage crops prior to sowing of spring crops rather than leaving grain stubble standing is also a successful alternative strategy for winter feed. Tic beans proved more successful than ryegrass. Tic beans provided acceptable dry matter yields across a range of seasonal conditions, but particularly under waterlogging conditions. Tic beans are also competent nitrogen (N) fixers and provide a break crop in cereal rotations. However, tic beans are susceptible to ascochyta blight and variety selection for resistance would be important. Anti-nutrition factors are not present in the forage and silage of tic beans and daily feed intake in lambs (Thorlacius and Beacom 1981), steers (Ingalls et al. 1979) and dairy (McKnight and MacLeod 1977) has been higher compared to pasture and corn based feed.

Through pot trials, clay amendment of sandy soils in northern TAS presented several benefits including a reduction in water repellence which substantially improved infiltration rates and improvement of water holding capacity (WHC) with increased clay content. After one year of field trials with claying on windblown sands, both clay types were slow to disperse and had not completely mixed into the sands, therefore, no conclusions could be drawn from the field trial and further research would need to be conducted over a longer period of time to investigate the full effects of claying.

Recommendations

It is recommended that dual purpose wheat to be sown prior to April to maximise dry matter production for grazing and to minimise losses on grain yield at harvest.
Grazing beyond GS31 is not recommended under normal circumstances due to large reductions in grain yields.
Dual purpose wheat provides an excellent forage and grain crop option for mixed livestock and cropping farms, particularly those with capacity to irrigate.
Further research into waterlogging tolerant varieties would increase the use of dual purpose wheats.

Tic beans provide an alternative winter forage crop, however, variety selection for disease resistance is paramount to dry matter production.
Tic beans provide an alternative forage crop in waterlogged prone areas.
Further research on feed values and growth rates on tic beans is required.

Clay amelioration of sandy soils provides a reduction in water repellence, substantially improving infiltration rates.
WHC of sandy soils increased with clay content.
Further field trials need to be established to determine the practical ability to apply clays and the cost benefit to growers.

Outcomes

Environmental:
Decreased salinity recharge and waterlogging through utilisation of soil moisture by forage crops over autumn and winter.
Reduced grazing pressure of pasture resources during autumn and winter.
Stabilisation of windblown sandy soils against wind erosion and potential improvement of water and nutrient holding capacity.

Economic:
Increased sustainability and profitability of cropping and pasture rotations.
Removal of herbicide resistant weeds in forage crops.
Increase in grazing potential to fill the winter feed gap.
Forage crop options for sowing into stubbles.
Increased capacity of feed reserves.
Deferral of winter grazing of pastures.

Social:
Increased flexibility in decision making (both variable and capital inputs).
Improved drought risk management.
The ability to both graze and produce grain yields providing risk management options.
Reduction in hand feeding during winter feed gap.

Other research

A Masters student at the Tasmanian Institute of Agriculture, University of Tasmania (TIA/UTAS), is working on a screening trial to look at the genetics associated with recovery following dual purpose grazing. This is taking advantage of genetic mapping that has been done on a diverse population of Chinese and international wheat.

Additional project work involving field trials to evaluate the effects of mixing and dispersal of clays in wind-blown sandy soils of the northern Midlands of TAS on soil properties, in particular, the method of incorporation and fineness of clay granules at incorporation.

Additional information

Attachments

1. Assessment of clay addition to sandy soils in northern Tasmania - technical report.

2. GRDC Fact Sheet 2016 - Managing dual purpose wheat.

3. Can Cycocel and Moddus alone or in combination increase grain yield? Southern Farming Systems Results Book 2012.

4. GRDC Update paper - Mixed bag - dual purpose crops, PGRs and other local research.

5. SFS 2015 Trial booklet.

6. Handout - How much and how long to graze dual purpose wheat.

7. SFS Crop Updates 2011/2012.

8. Quantifying the benefits of stubble as a drainage material for waterlogged duplex soils.