

Evaluating break options to cereal cropping in the Upper North

Key Messages:

- Canola and peas only produced half the yield of wheat, but barley performed very well.
- Ryegrass is becoming a problem in wheat on wheat plots.
- Pastures performed well where seed reserves had been increased in 2011.
- All options had good soil moisture (40mm) at the start of the season.

In low rainfall regions of south-eastern Australia, farmers have increasingly adopted continuous cereal cropping strategies as non-cereal crops are perceived as riskier than cereals due to greater yield and price fluctuations. There is a need for non-cereal crop and pasture options to provide profitable rotational crops, disease breaks and weed control opportunities for cereal production.

GRDC has funded a programme to address this issue and one of the projects within this programme will develop an improved understanding and implementation of management practices for Brassica, pulse crops, pastures and other options to reduce the risk of crop failure and improve whole farm profitability in low rainfall south-east Australia. The experiment at Ian Keller's at Appila is part of that project and is being run as a partnership between UNFS and SARDI.

The paddock has been in cereal for several years and while still being productive, has some rye-grass and wild oats building in patches across the paddock.

About the UN trial

The trial is testing nearly twenty different break options for wheat. These breaks are mostly two year breaks (aiming to overcome a grassy weed problem) but some one year breaks have also been included. The benchmark which all these breaks are being evaluated against is continuous wheat.

Every break is being managed in a way to optimise its potential productivity and profitability in a low rainfall environment (ie inputs are generally conservative). While pastures have been included in the break options, we are using mowing as a proxy for grazing as the plots are too small to effectively use sheep.

The trial was started in 2011 so we have just completed the last of the two break crop phases and are preparing to put wheat on all treatments in this season.

What has happened so far?

Growing season rainfall in both 2011 and 2012 were well below the average of 272 mm for Appila (about 200 mm in both years) but production was underpinned by a very wet summer preceding 2011 and a wet March preceding 2012.

The continuous wheat treatments averaged 2.0 and 1.7 t/ha in 2011 and 2012 respectively, with rye-grass becoming an increasing problem and requiring some expensive in-crop herbicides to keep them at bay (increasing the cost of inputs for this treatment to a risky \$270/ha).

Frost wiped out grain yields of all break crops in 2011 (peas, lentils and canola) so the only possible income from these options was as a hay cut. Peas cut as hay would have matched gross margin with wheat as a crop in that year but for all other break options, the cost of hay cutting and freight would have erased all or most of any profit. In general, the costs of growing a break crop were no higher than for wheat (even if wheat inputs had not been inflated by the need for increased grass control).

Break crops in 2012 performed much better despite some frost damage again but they still struggled to perform relative to wheat. Canola and peas only produced more than one half of the grain yield of wheat if they were grown on a fallow in 2011.

Barley was sown on wheat in 2012 and performed very impressively, yielding almost double wheat on wheat.

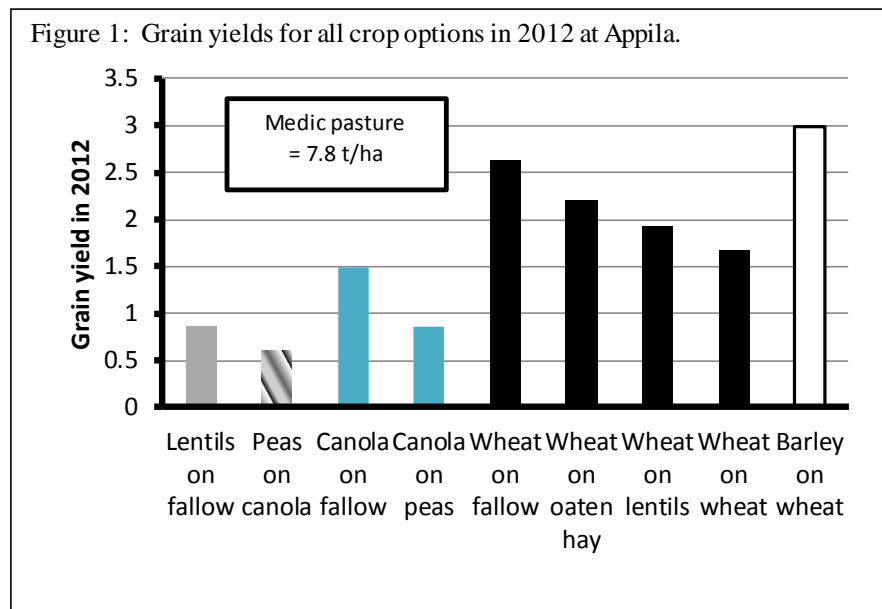
Pastures in 2011 performed very poorly because the medic seed bank was very low after a period of continuous cropping. However in 2012, those options which fostered a good seed set of medic in 2011 resulted in vigorous, medic dominant pastures which provided a lot of quality feed last year (up to 7 t/ha).

In terms of soil condition, all the productive legume options in 2011 increased soil mineral N levels preceding the 2012 crop by up to 50 kg N/ha but no more than a fallow.

For those treatments going into wheat in 2012, estimates of weed seed banks were taken over the summer of 2011-12. Rye-grass seed numbers were high following wheat (121 plants per sq m) and oaten hay (90 plants per sq m) but fallow and lentils in 2011 reduced them substantially (56 and 69 plants per sq m respectively). However, sow thistle and wire-weed seed numbers were high in all these options except for oaten hay and fallow which had lower numbers of sow thistle only.

All options which grew well in 2011 and were grown to maturity resulted in similar soil moisture levels at the end of 2011. The only options which had higher levels of stored water post harvest in 2011 were fallow and oaten hay. These two options increased stored water prior to the 2012 season by approximately 40 and 20 mm, respectively. All options accumulated about 40 mm of water over the summer of 2011-12 so the pre-seeding differences were largely due to water savings during the 2011 growing season.

Several one phase break options were chosen in 2011 so these were sown to wheat in 2012. Wheat yielded highest following a fallow, about 1 t/ha more than wheat on wheat. Wheat on oaten hay yielded 0.5 t/ha better and following lentils, 0.2 t/ha better. See figure 1 for a summary of all grain yields in 2012.



What now?

The project team is now busy processing the performance data for all trials and large scale demonstrations in this project for the first two seasons. There are 5 trials in total in the project, all similar in scale to the one at Appila.

We are now approaching the last two seasons of the project which will monitor the impact of all break options on cereal production.

This type of information will be incorporated into a guide for selecting break options which will address developing problems in your intensively cropped paddocks for least risk and better outcomes.

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