Peola at Minnipa in 2009

INFORMATION EXTENSION

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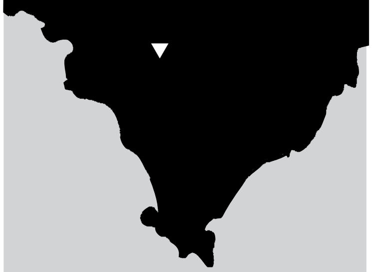
Almost ready



Location: Minnipa Ag Centre
Rainfall
Av. Annual: 325 mm
Av. GSR: 242 mm
2009 Total: 421 mm
2009 GSR: 333 mm
Yield
Canola potential: 3.9 t/ha
Canola actual: 0.9 t/ha
Peas potential: 3.6 t/ha
Peas actual: 2.2 t/ha
Paddock History
2008: Wheat
2007: Wheat
2006: Wheat
Soil Type
Sandy loam
Plot size
12 x 1.5 m x 3 reps
Yield Limiting Factors
Nitrogen deficiency in canola
Soil Health
Ground cover:
Potential erosion risk

Key messages

- **Inter-cropped peas and canola return higher gross income than monoculture peas or canola.**
- **The addition of canola to field peas reduced post harvest wind erosion risk.**

Why do the trial?

Targets for reducing wind and water erosion in the cropping zone have been set by the state government. One of the more risky crops grown on the low rainfall regions of Eyre Peninsula for wind erosion is field peas. The erosion risk for field peas is especially high after the crop has been harvested. The concept of growing canola in combination (inter-cropping) with peas to reduce erosion risk is simply to provide anchored material to help maintain groundcover until the following crop has established.

The aim of the trial was to determine the optimum ratio of peas and canola for grain yield, profitability and post harvest ground cover. It was also anticipated that the intercrop of peola would improve harvestability of the peas, helping them stand up better rather than have to use crop lifters.

Previous work done by Brendan Frischke at Minnipa is reported in EPFS Summary 2001, p 51-52.

How was it done?

The replicated trial was sown in the airport paddock at Minnipa on a sandy rise to maximise potential erosion risk. It was sown on 30 April using DBS tines set on 254 mm row spacing. Tanami canola was banded through the seed boot with 30 kg/ha DAP and inoculated Kaspa peas were deep banded through the fertiliser boot.

Terbyne was applied pre-sowing @ 1 kg/ha for broadleaf weed control. Plots were harvested without using lifters, with the sieves set for harvesting peas, while the fan was set for canola to reduce harvest losses. Erosion risk levels were assessed on 19 January 2010, with a rating system of 1= high risk of erosion, 3 = moderate erosion risk, 5 = low erosion risk.

What happened?

The soil type and paddock chosen for the trial has inherently low nitrogen reserves due to the long term cereal regime. The low N levels gave a competitive advantage to the peas over the canola. The pure canola plots failed to produce significant quantities of biomass and final grain yield.

The peas climbed up the canola stems in the peola plots and helped maintain crop height during the growing season. By harvest, however, the intercrop peas still lodged, although less in the plots with the higher canola sowing rates.

Canola sown at 2 kg/ha as a monoculture produced the highest yield (Table 1). The pea sowing rate treatments had similar yields with and without the addition of canola.

Gross income was highest in the inter-cropping treatments (Figure 1). Erosion risk was highest in the monoculture peas, decreasing with higher rates of canola in the crop mixture. Higher rates of canola, or canola sown as a monoculture contributed to a lower overall erosion risk.

What does this mean?

Peola is not a new concept. Research was conducted in the early 1990's on crop mixtures to improve the post harvest erosion risk in break crops in the mid north region by Alan Mayfield. After several years of trial work to test the concept with many crop combinations, it appeared that peas and canola had the best fit for a non monoculture crop. One issue which was highlighted through Alan's experience was the challenge of balancing peas and canola in the rotation. If there is too much nitrogen in the system, then the canola will outcompete the peas, whereas if there is a deficiency of nitrogen (which was the case at Minnipa in 2009), then the peas will dominate.

Table 1 Grain yield, gross income and erosion rating from pea + canola mixtures

Pea and Canola sowing rate (kg/ha)	Canola Yield (t/ha)	Pea Yield (t/ha)	Total Grain Yield (t/ha)	Gross Income ($/ha)*	Erosion Risk Rating (1 - 5)**
0+1	0.39	-	0.40	146	2.7
0+2	0.90	-	0.91	335	4.0
0+3	0.59	-	0.59	210	4.3
50+0	-	2.15	2.15	429	1.3
50+1	0.34	2.08	2.43	541	4.0
50+2	0.47	1.77	2.25	523	2.3
50+3	0.39	1.61	2.01	454	4.0
75+0	-	2.03	2.04	399	1.7
75+1	0.28	2.16	2.45	527	2.3
75+2	0.33	2.17	2.51	544	3.3
75+3	0.48	1.89	2.38	539	3.3
100+0	-	2.25	2.25	436	1.0
100+1	0.33	2.03	2.36	513	2.3
100+2	0.45	1.89	2.34	524	3.0
100+3	0.40	2.08	2.50	543	3.3
LSD ($P \leq 0.05$)			*0.39*		*1.4*

* *Gross Income calculted with an on farm price of $380/t for canola and $205/t for peas*
** *Erosion risk rating: 1=high risk, 3=moderate risk, 5=low risk*

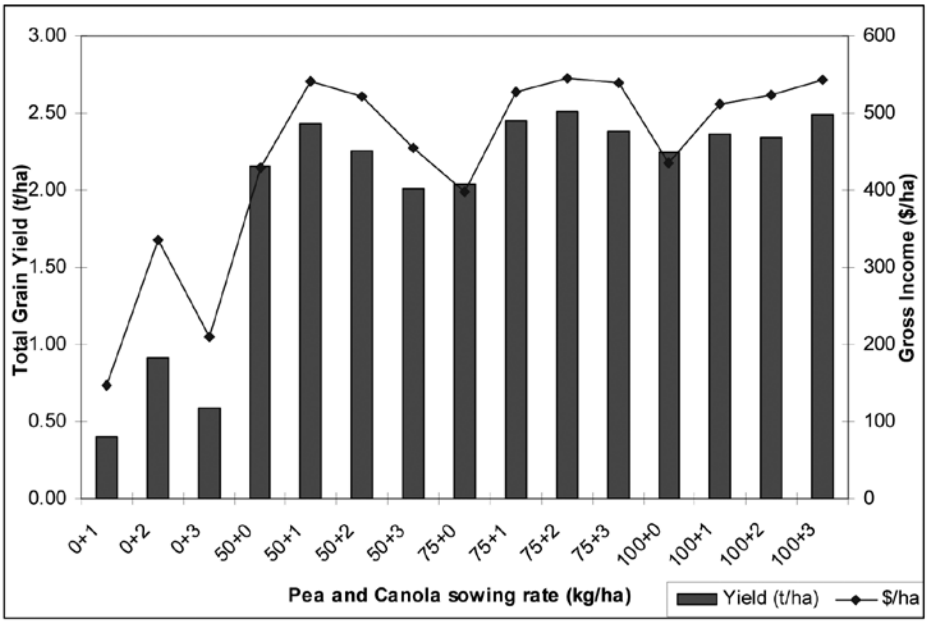


Figure 1 Total grain yield and gross income from peas and canola mixtures
Gross Income calculated with an on farm price of $380/t for canola and $205/t for peas

The profitability of an inter-crop will depend on the prices received for the grain harvested. In 2009 an on farm price of $380/t for canola and $205/t for peas was used for analysis. Although the addition of canola to the field peas did not contribute to higher overall yield, a higher gross income was achieved as the canola was of a higher value than the peas.

Erosion risk in an inter-crop of peas with canola is lower than a monoculture of peas. Growers who have tried inter-cropping peas and canola find the lower erosion risk the most impressive feature of the crop, above any other benefit from harvestability or other agronomic advantage.

It is difficult to assess erosion risk from small plot trials when the harvest residue is not evenly spread across the length of the plots. A more accurate assessment of erosion risk from crop mixtures would be best sought from a larger scale demonstration utilising commercial harvesting equipment with adequate residue spread.

The canola treatments should have had an adequate fertiliser package to ensure potential yields were achieved, however fitting this in the balance of a trial directed towards inter-cropping was a challenge.

Broadleaf herbicide management for peola is not as challenging as it has been in the past. Triazine tolerant canola can be used with Terbyne, which is a group C herbicide which is registered for use in peas and TT canola. The combination of Clearfield canola and field peas will open some group B options, such as Raptor, however Clearfield canola is not on the label and it does not control medics. Using conventional canola with field peas is an option if broadleaf weeds are not likely to be an issue. Group A herbicides can be used in the inter-crop system for grass weed control.

The 2001 trials by Brendan Frischke showed overall yield for inter-cropped peola was reduced compared to a conventional monoculture field pea crop. Using the 2009 harvest prices for peas and canola, greater profitability is found for an inter-crop of peola with reduced overall yield compared to a pea monocrop with higher yield.

nter-cropping does require more careful harvest management to get both crops off the paddock successfully. The harvested crop will need cleaning to separate the canola from the peas, fortunately due the size difference in the two, separation is not difficult.

In terms of reducing the post harvest erosion risk for field peas which is a perennial problem in the low rainfall environment, peola is an excellent concept, which requires more careful management, however still worthy of including in break crop options.

Acknowledgements

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