Annual Medic-Wheat Rotation at MAC

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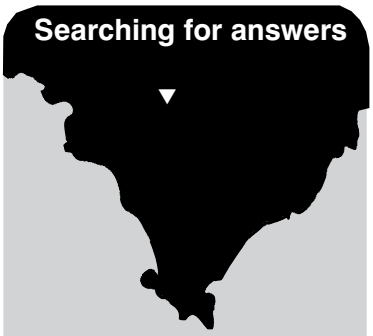
DEMO



Location: Minnipa Ag Centre
Rainfall
Av. Annual: 325 mm
Av. GSR: 242 mm
2010 Total: 410 mm
2010 GSR: 346 mm
Paddock History
2009: Medic self-regenerating pasture
Soil Type
Red sandy loam
Plot size
Broadcare demonstrations (40 ha)
Yield limiting factors
Nil
Environmental Impacts
Soil Health
Soil structure: more even grazing
Compaction risk: low
Social/Practice
Time (hrs): sowing pre normal seeding
Clash with other farming operations: standard management
Labour requirements: minimal, check sheep and spraying grass and insect pests
Ecomomic
Cost of adoption risk: low

Key messages

- **The study has shown benefits from the medic as a break crop and a high quality forage source.**
- **There was no wheat quality loss in 2010 as a result of high soil N from 2009 medic production.**

Why do the demonstration?

Medic pastures are known to be an important part of low input, low risk sustainable mixed farming on upper EP. They provide high quality animal forage, and a weed, pest and disease break for following cereal crops and clean, green nitrogen. However the above average rainfall and high production from annual medic pastures over wide areas of Eyre Peninsula in 2009 and 2010 has resulted in some concern of increased "haying off" in subsequent cereals in average or lower rainfall years due to excessive soil nitrogen.

The aim of this demonstration was to assess the performance of annual medics in a pasture – wheat rotation over the 2009 and 2010 seasons. The biomass produced over the 2009 growing season and the retention of the pasture residue over the summer period was reported in EPFS Summary 2009, pg 167. In 2010 the impact of the pasture on the cereal phase was measured.

How was it done?

Paddock North 4 (area 40 ha) on Minnipa Agricultural Centre had a regenerating medic pasture in 2009 (see EPFS Summary 2009, pg 167). In 2010 Mace wheat was sown at 65 kg/ha on 31 May with 45 kg/ha of DAP (9 units of N, 8 units of P), there was no further fertiliser applied.

The same 4 sites from within the 40 ha commercial paddock were used throughout the 2009 and 2010 demonstration. In 2010 measurements collected from the 4 sites were; soil analyses from the 0-10 and 10-60 cm profiles (25 May), plant density and anthesis biomass (18 September), harvest biomass (16 November) and grain yield, protein, screenings and test weight.

What happened?

More than 5t DM/ha of medic biomass was produced in this paddock in 2009; a decile 9+ year. With the mineralisation of N from the 2009 medic and with the nitrogen applied as fertiliser there was 170 kg/ha of crop available N. In the decile 8+ 2010 year the paddock produced 3.8 t/ha of grain with a 44% harvest index. Protein content was measured at 11.4% resulting in an APW1 classification (Table 1).

What does this mean?

The benefits of an annual medic dominant pasture are well documented and through this demonstration have supported medic as a;

- High quality animal forage – in 2010 ewe hoggets stocked at 10 DSE/ha on a medic dominant pasture gained 3.5 kg/head over a 2 week period in a controlled experiment at MAC.
- An excellent break crop to control grass weeds and soil borne cereal root diseases – the 3.8 t/ha 2010 wheat yield followed a grass free medic in 2009. The crop received only low levels of P and N at seeding, was weed-free despite no pre or post emergent weed control and had no obvious disease issues.

There was no indication of haying off as a result of the 2009 pasture/nitrogen production, in fact on 3 of the 4 sampled sites the protein content was less than expected in response to the calculated N levels available. The fourth site (3) had the highest protein and screenings percentages, which suggests a lack of plant available water during seed maturation. Reasons may include that site having the highest established plant density and decile 5 conditions at anthesis. However, most likely is paddock variability and the site selected was an outlier.

Table 1 Soil, wheat plant density, biomass and grain yield, protein, screenings and test weight from 4 sites in N4 on MAC in 2010

		1	2	3	4	Mean
Soil Analysis	N mg/kg 0-10 cm	44	36	35	31	37
	N mg/kg 10-60 cm	31	17	10	16	19
Plant density	plants/m^2	165	135	170	163	158
Anthesis biomass	t DM/ha	5.5	4.8	5.1	6.3	5.4
Harvest biomass	t DM/ha	9.8	6.8	8.4	96	8.7
Grain yield	t/ha	4	3.6	3.6	4	3.8
Grain protein	%	11	10.8	13	10.6	11.4
Grain screenings	%	2.1	1.8	8.5	2	13.2
Grain test weight	kg/hL	65.8	79.4	72	79.6	74.2

Table 2 Grain yield (t/ha), protein (%), screenings (%) and gross margin summary from sampled sites in North 4 and whole of South 7 and North 1 paddocks at Minnipa Agricultural Centre, 2010

	North 4	South 5	North 1
Rotation	Medic - Wheat	Field Pea - Wheat	3 years Wheat
Area (ha)	37	34	70
Yield (t/ha)	3.8	4.2	2.8
Protein (%)	11.4	11.6	10.3
Screenings (%)	3.6	1	2.1
Variable cost of growing wheat/ha (%.ha)*	112	112	112
Wheat value ($/ha)**	1,140	1,386	750
Gross margin ($/ha)	1,028	1,274	638

**Wheat costs based on 2010 Farm Gross Margin Guide.*
***Wheat value was calculated by using Viterra Port Lincoln nett contract prices on 5 January 2011 for APW1 (N4), H2 (S7) and ASW1 (N1) classification.*

The commercial results from the paddocks show relatively comparable performance from the annual medic-wheat and field pea-wheat rotations. The wheat-wheat rotation produced a lower yield and protein as would be expected.

Acknowledgements

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